Faces: 14 Edges: 36 Vertices: 24

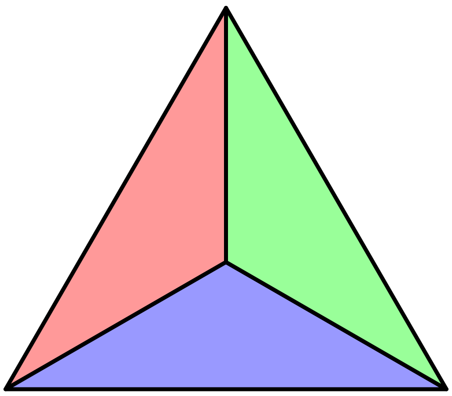
F - E + V = 2

Euler's Theorem

Russ MacKenzie

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.



This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 0 of 72

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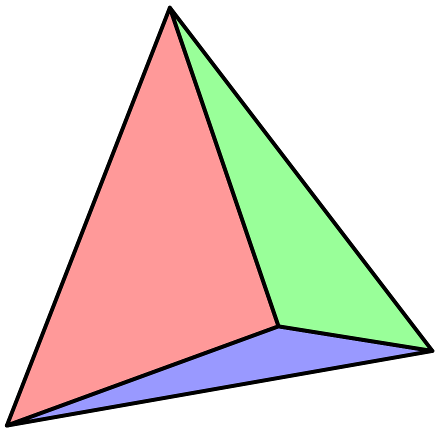

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Animation: 1 of 72

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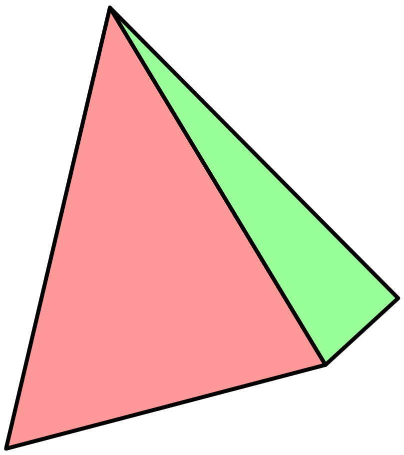

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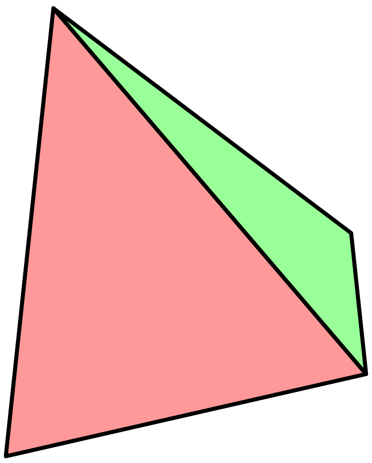

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Animation: 3 of 72

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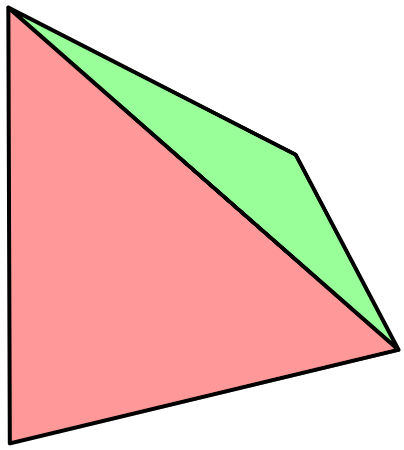

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Animation: 4 of 72

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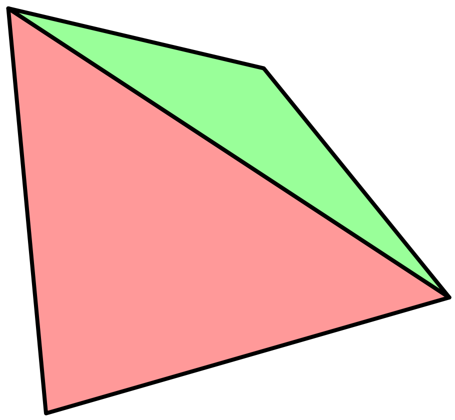

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Animation: 5 of 72

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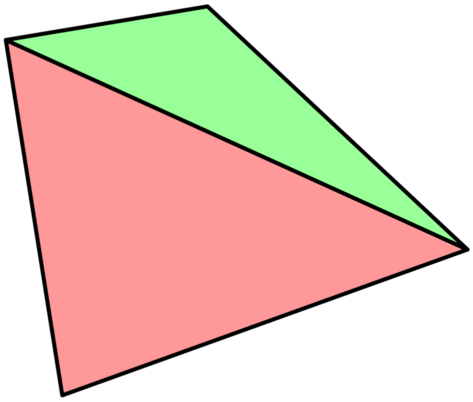

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Animation: 6 of 72

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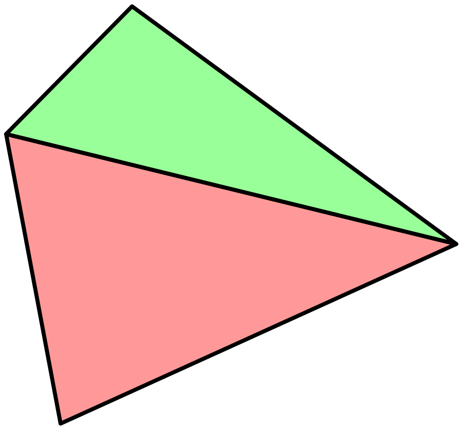

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Animation: 7 of 72

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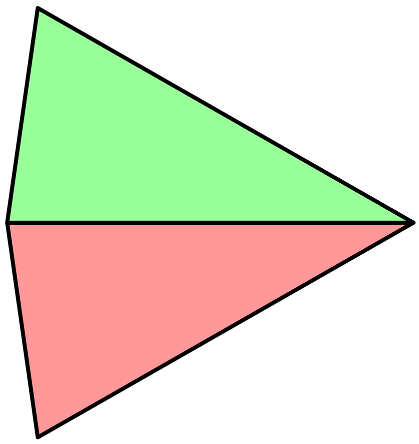

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Animation: 8 of 72

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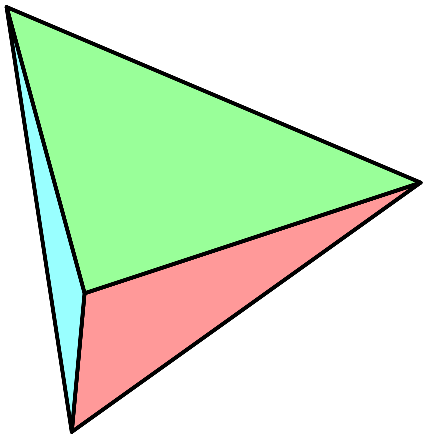

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Animation: 9 of 72

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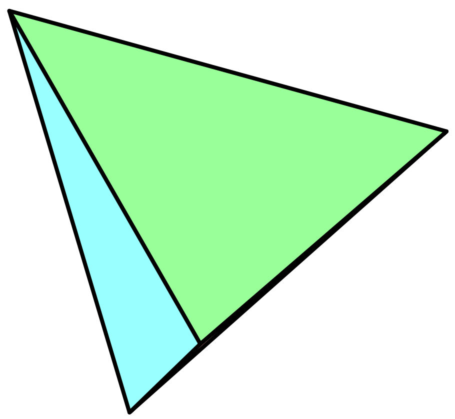

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Animation: 10 of 72

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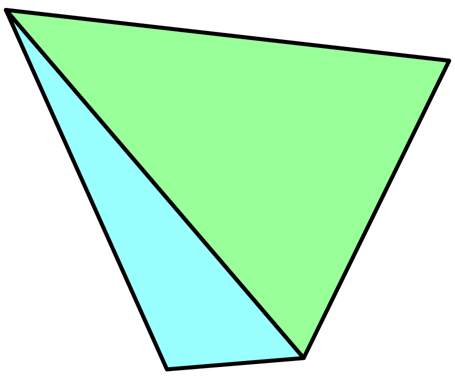

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Animation: 11 of 72

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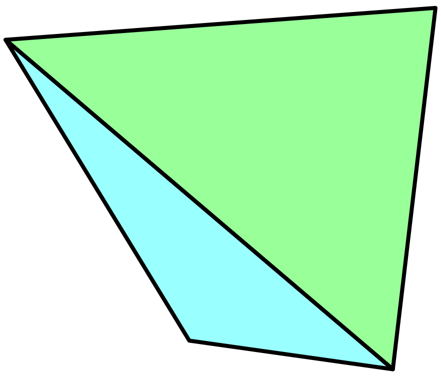

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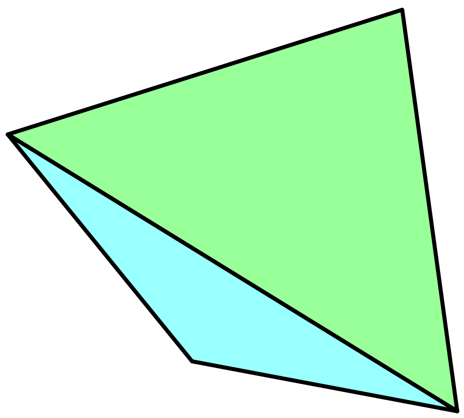

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Animation: 13 of 72

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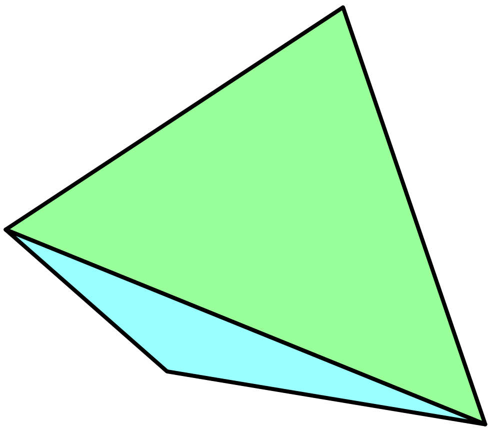

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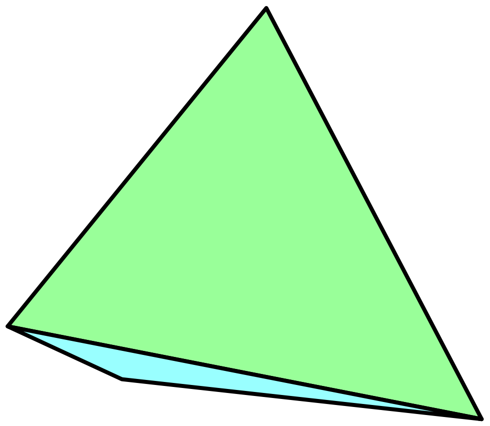

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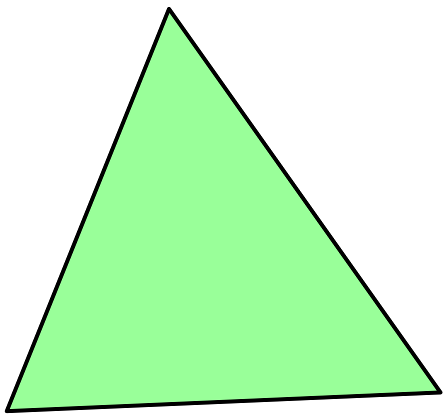

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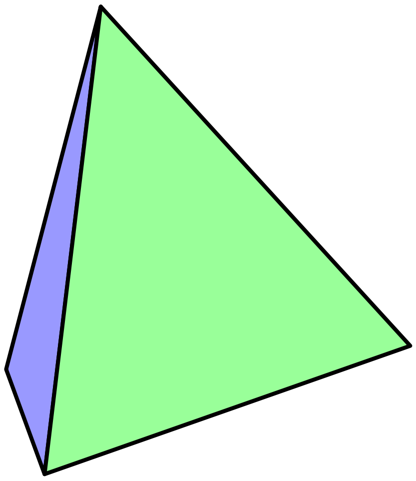

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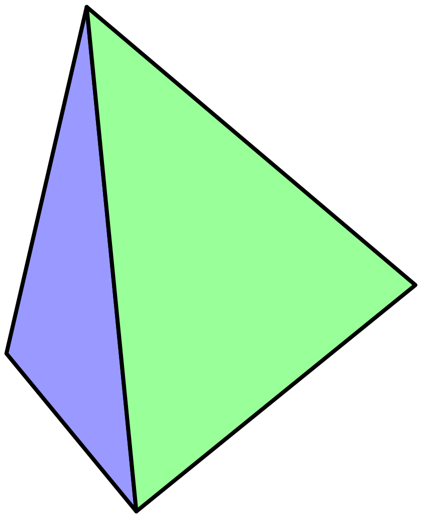

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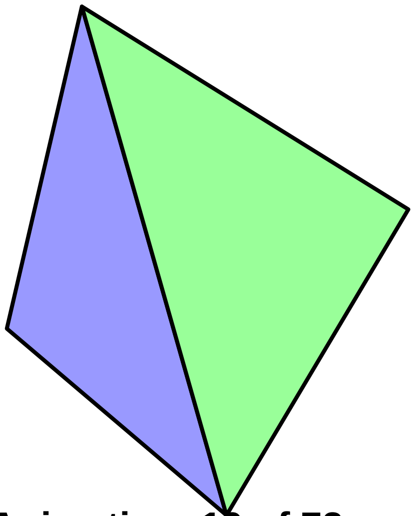

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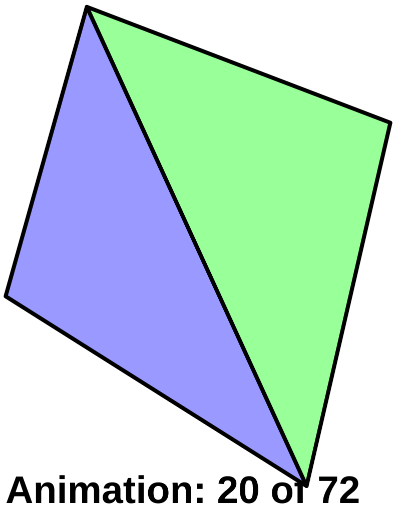

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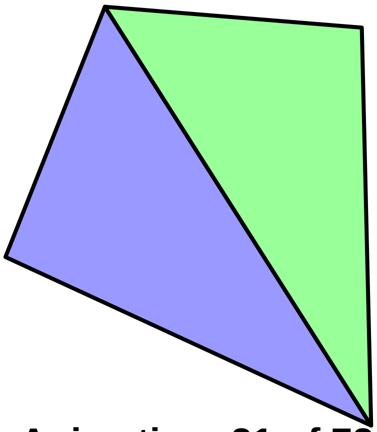

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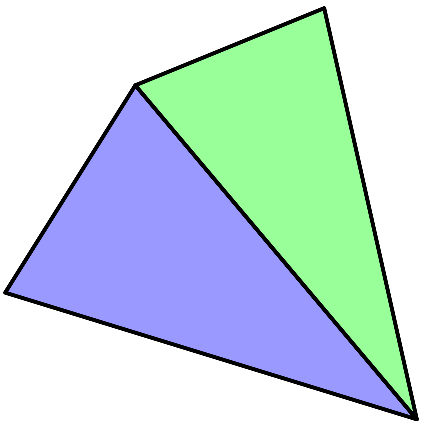

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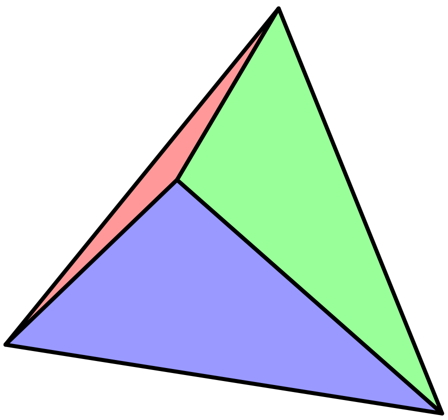

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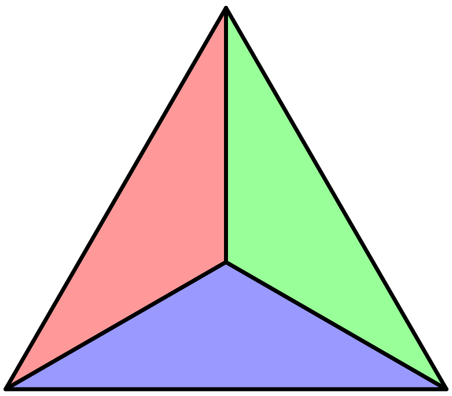

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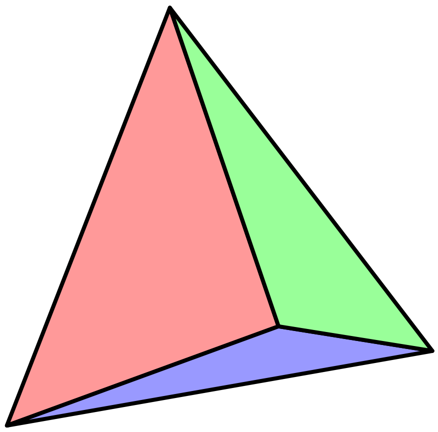

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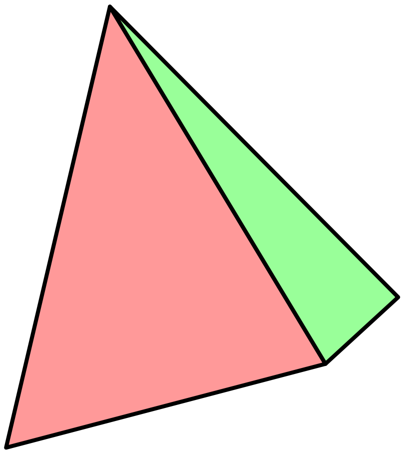

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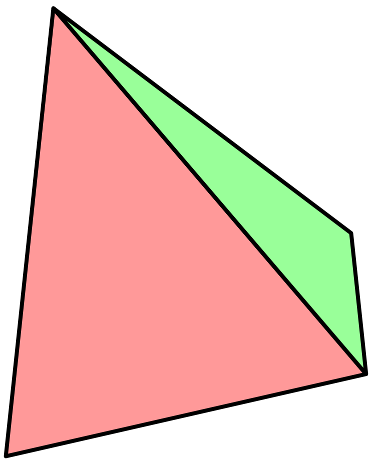

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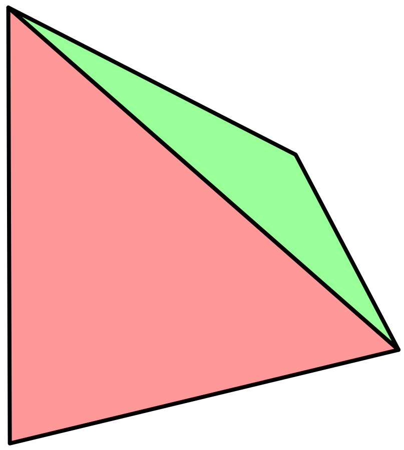

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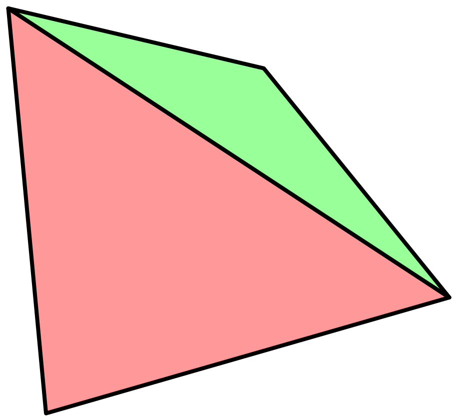

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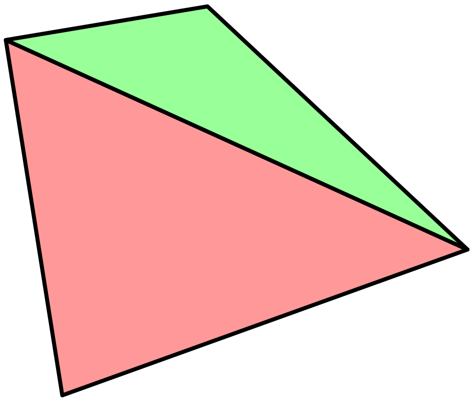

Animation: 30 of 72

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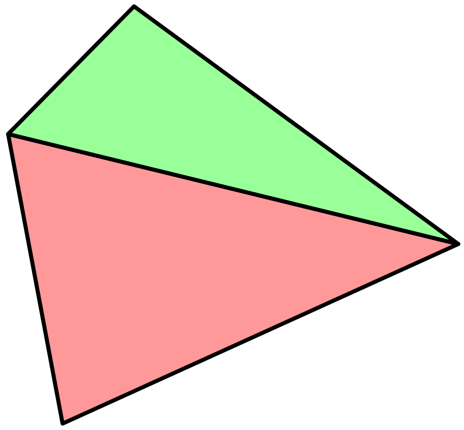

Animation: 31 of 72

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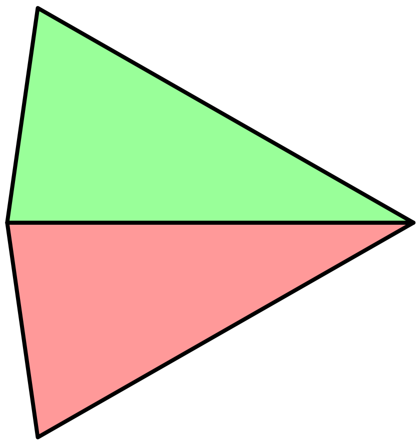

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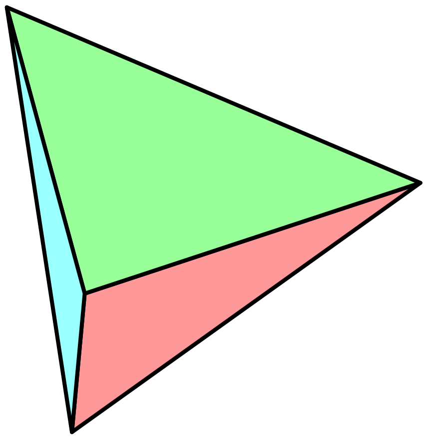

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Animation: 33 of 72

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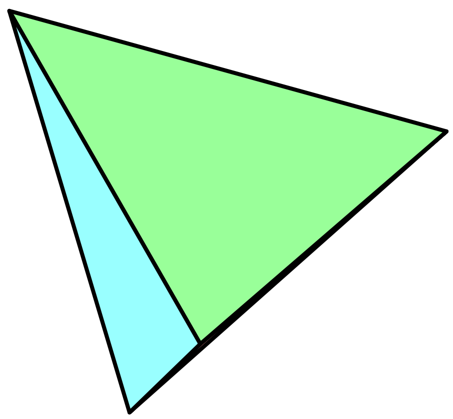

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Animation: 34 of 72

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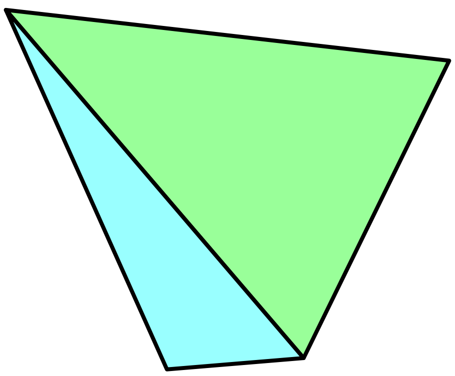

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Animation: 35 of 72

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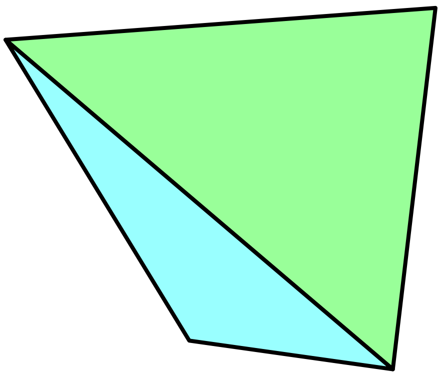

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Animation: 36 of 72

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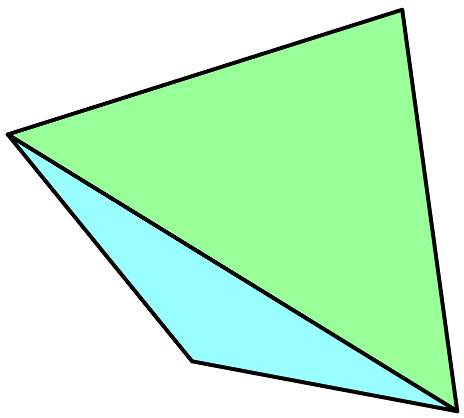

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Animation: 37 of 72

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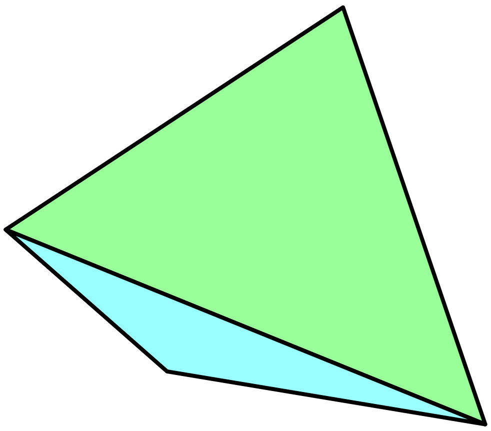

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Animation: 38 of 72

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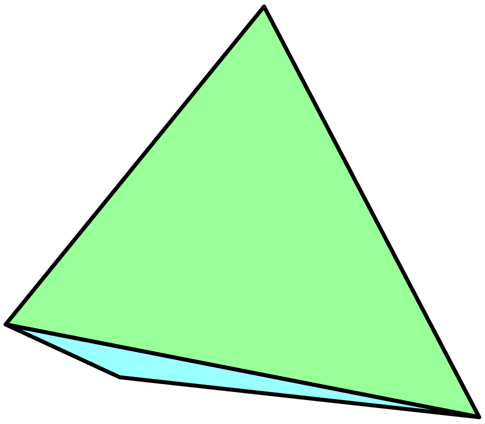

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Animation: 39 of 72

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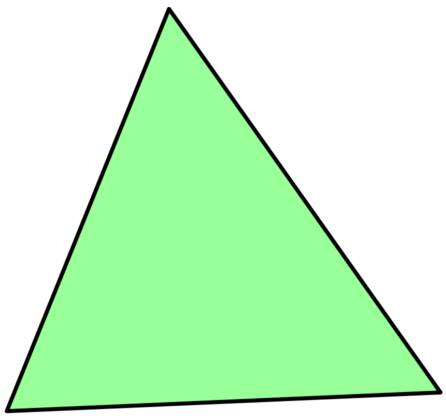

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Animation: 40 of 72

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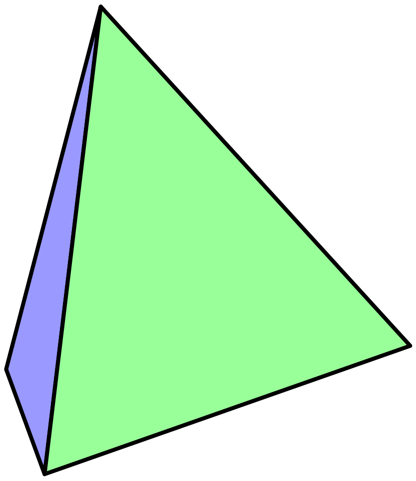

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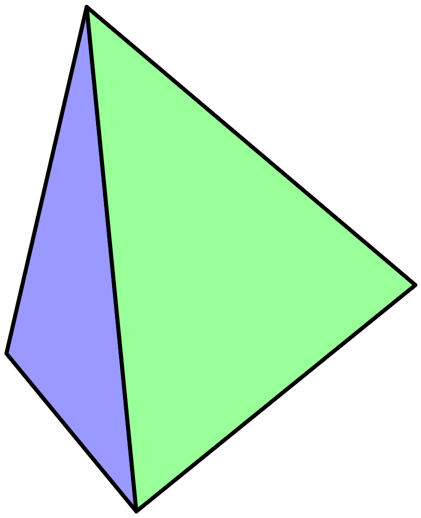

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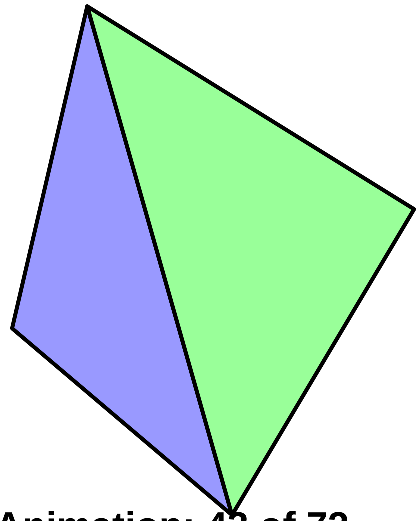
The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

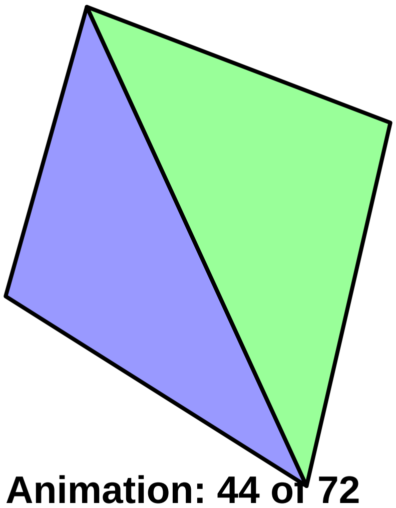


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 43 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

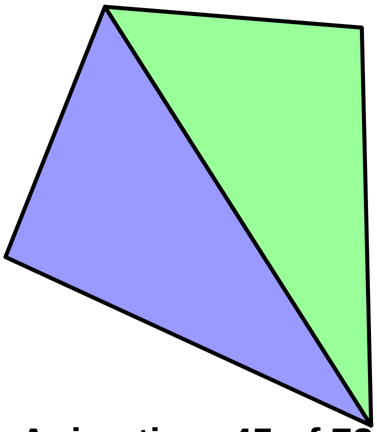


Animation: 44 of 72

This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

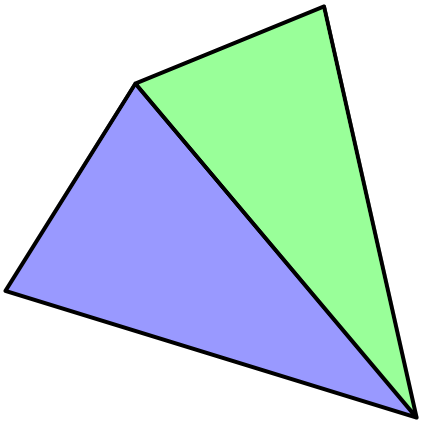


Animation: 45 of 72

This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

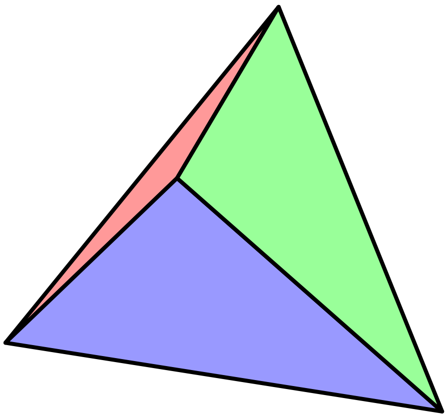


Animation: 46 of 72

This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

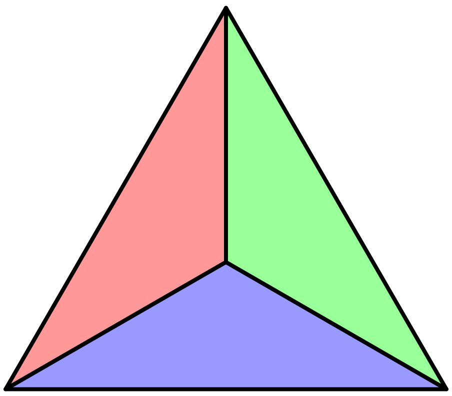


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 47 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

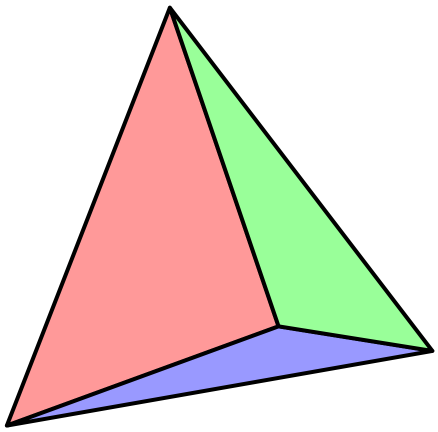


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 48 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

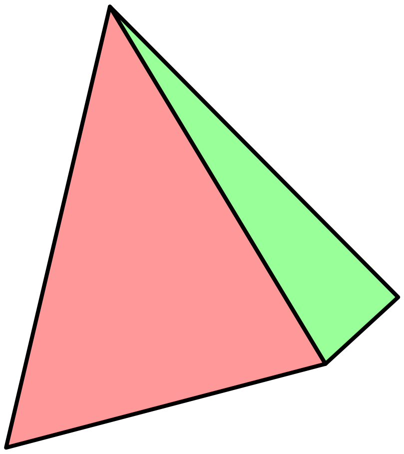


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 49 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

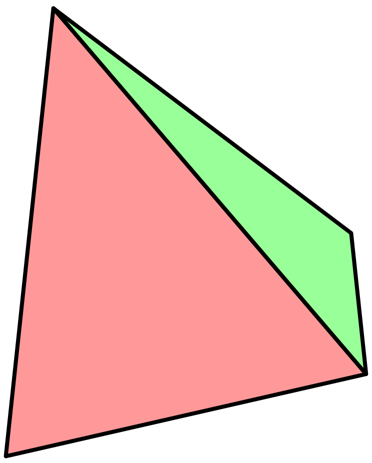


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 50 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

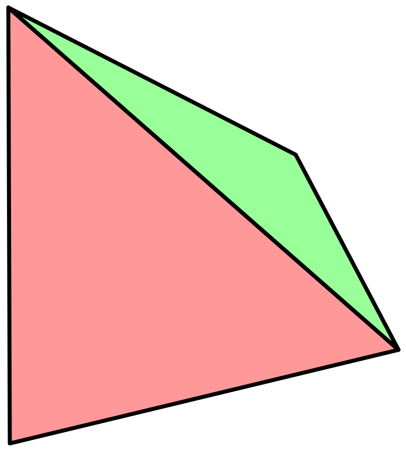


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 51 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

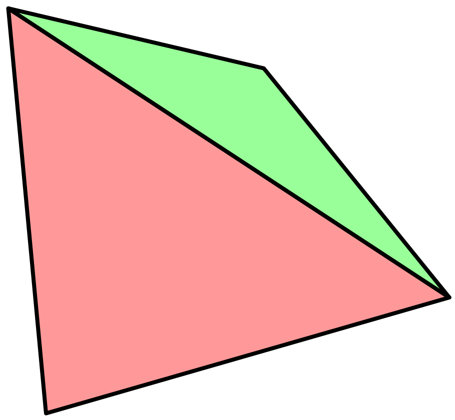


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 52 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

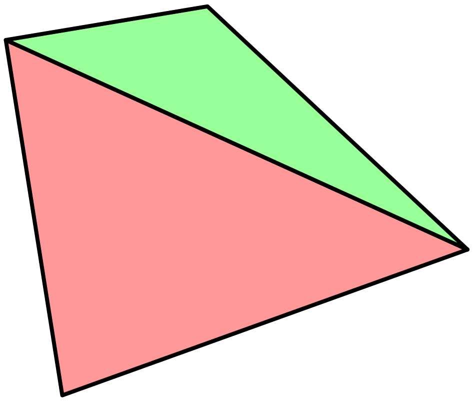


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 53 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.



This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

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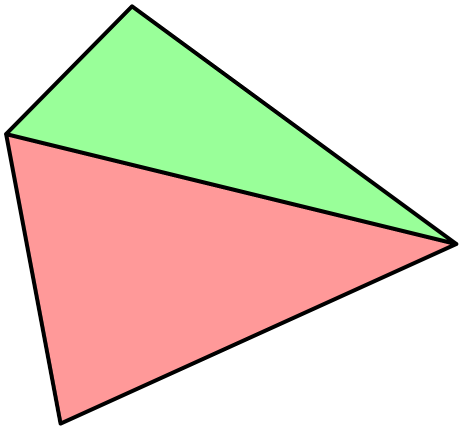
The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

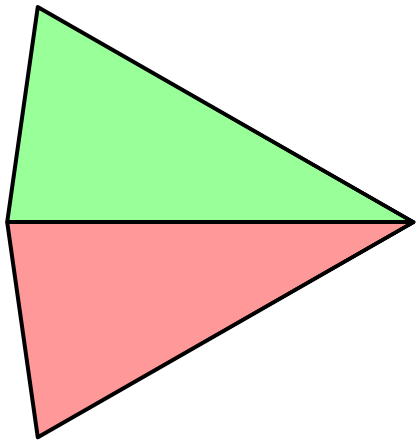


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 55 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

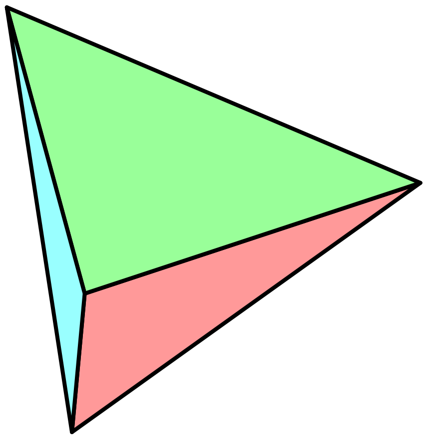


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 56 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

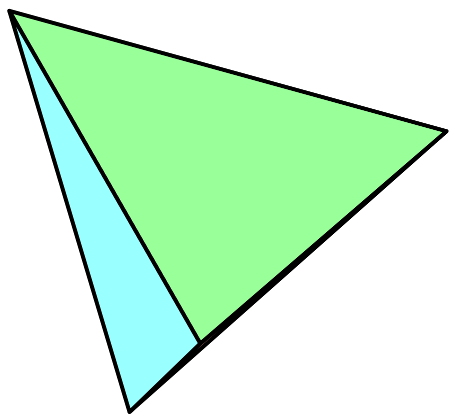


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 57 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

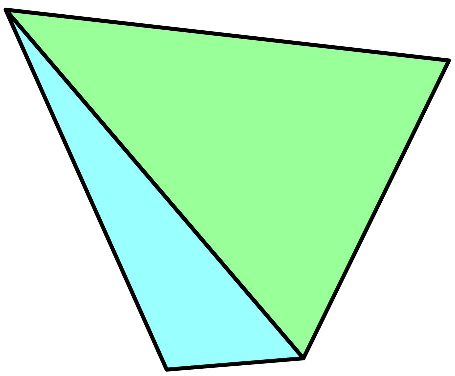


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 58 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

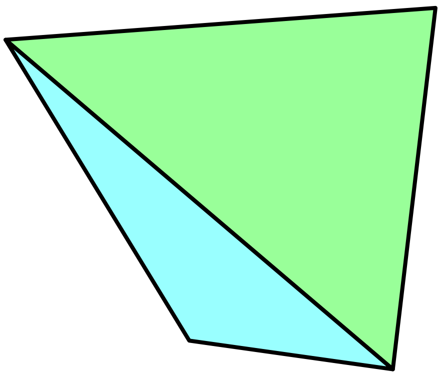


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 59 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

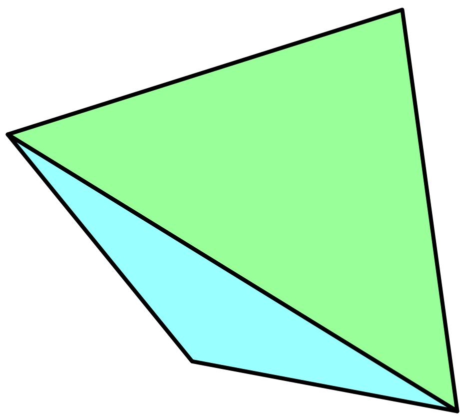


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 60 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.



This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

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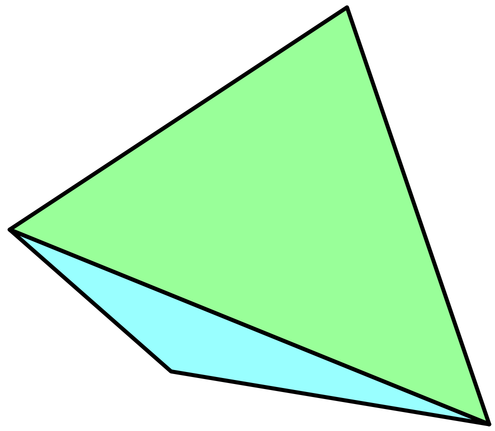
The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

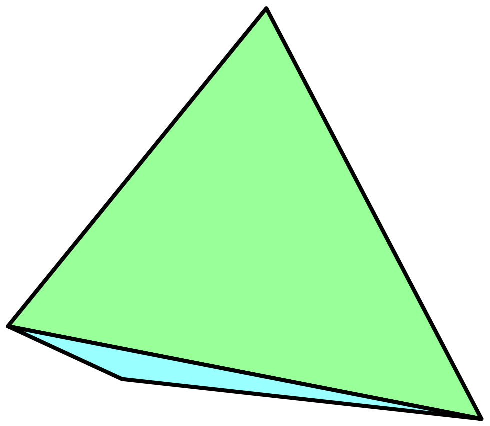


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 62 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

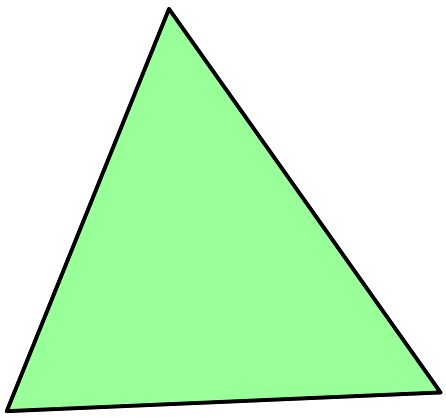


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 63 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

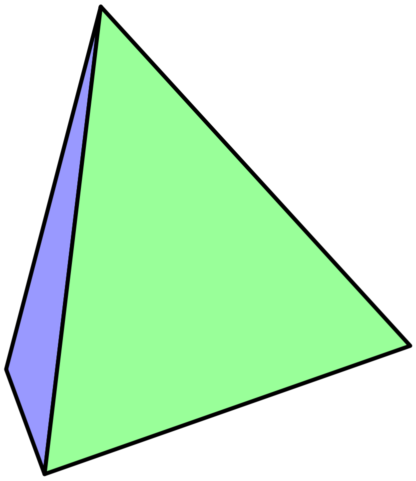


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 64 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

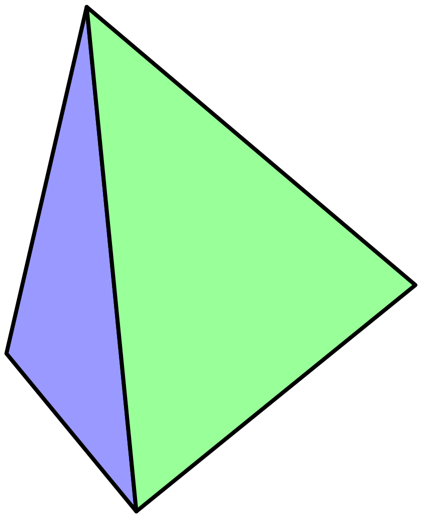


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 65 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

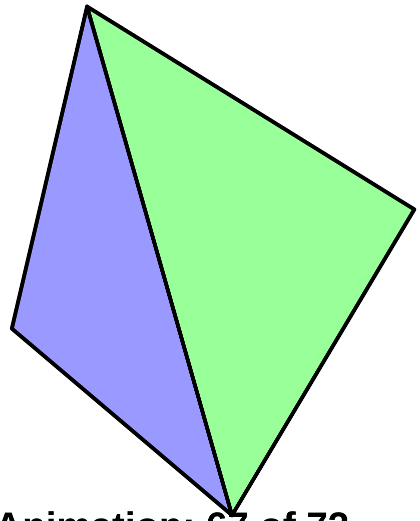


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 66 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

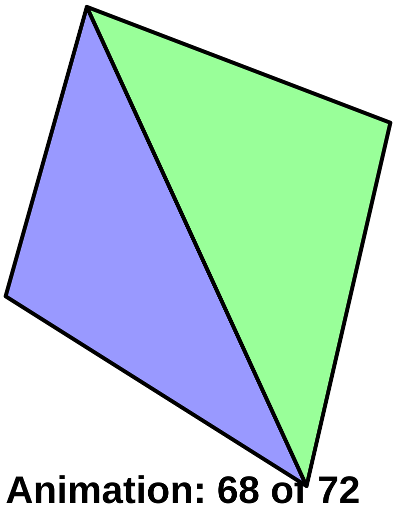


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 67 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

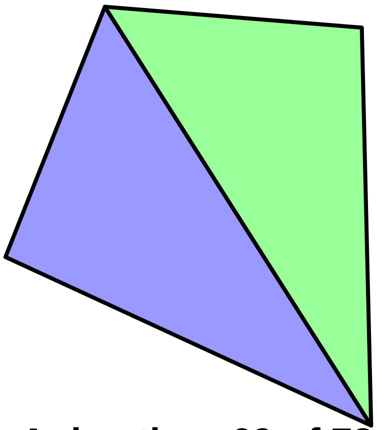


This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 68 of 72

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.

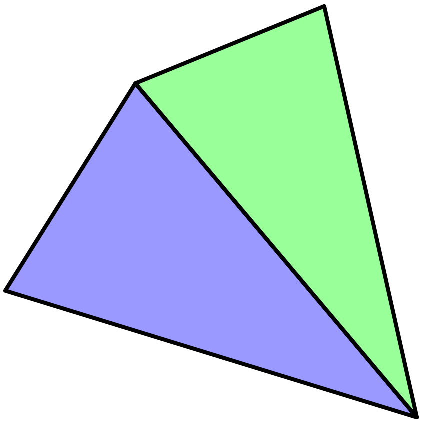


Animation: 69 of 72

This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.



This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

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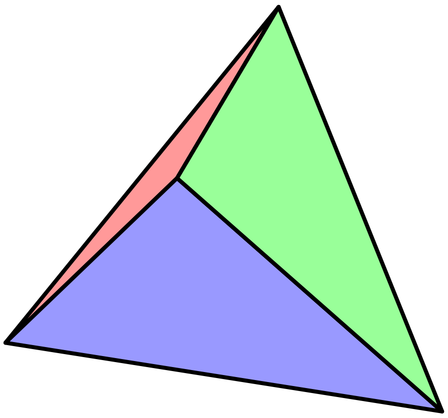
The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.



This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

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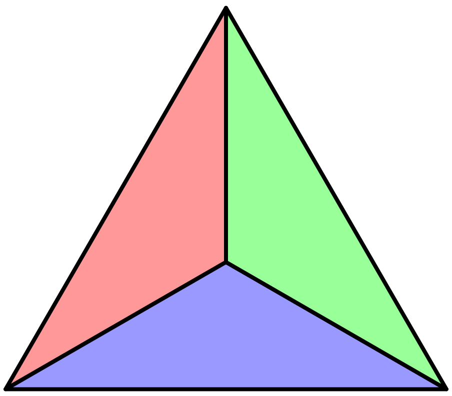
The theorem:

F - E + V = 2 for a simple polyhedron, where F is the number of faces, E is the number of edges and V is the number of vertices.



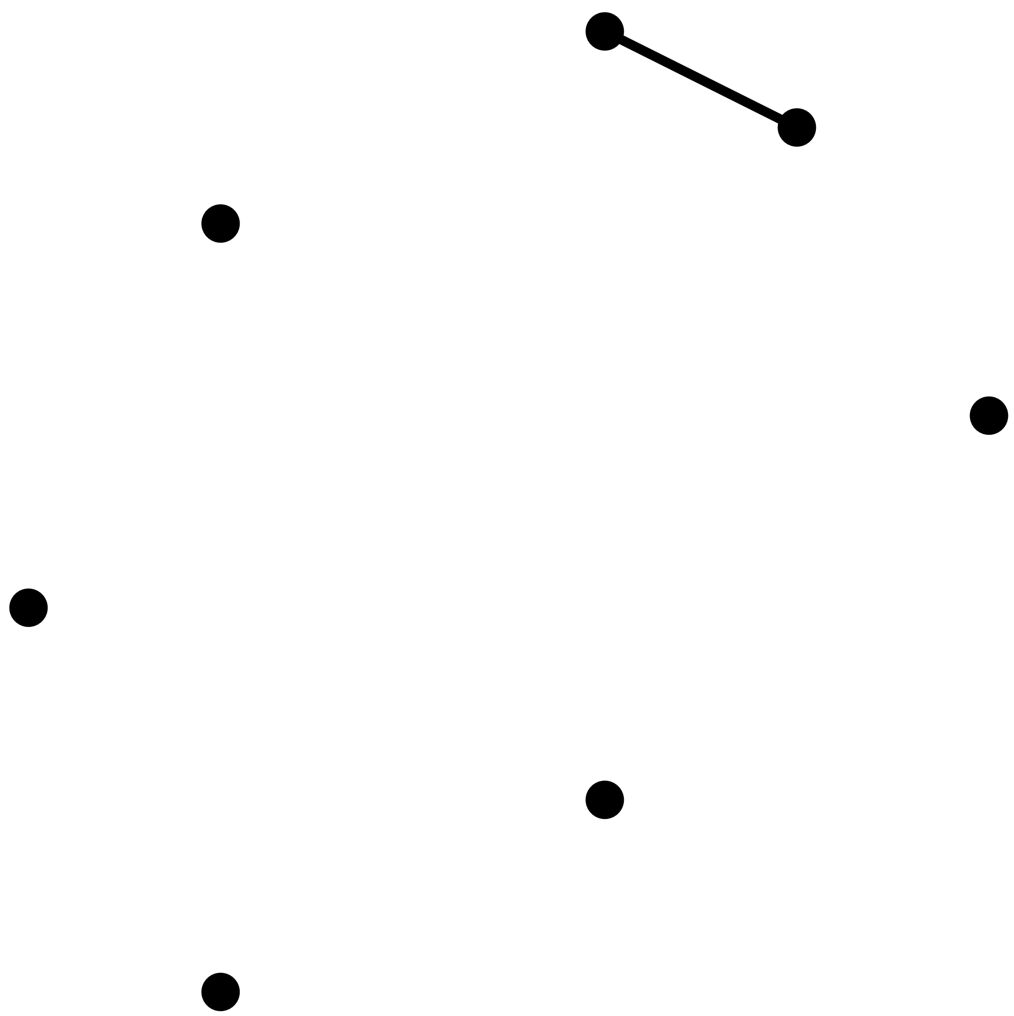
This tetrahedron, for example, has 4 faces, 6 edges, and 4 vertices. 4 - 6 + 4 = 2, as the theorem states.

Animation: 72 of 72

Definitions:

Simple: ’no holes’

Polygon: an ordered collection of vertices with edges joining them.

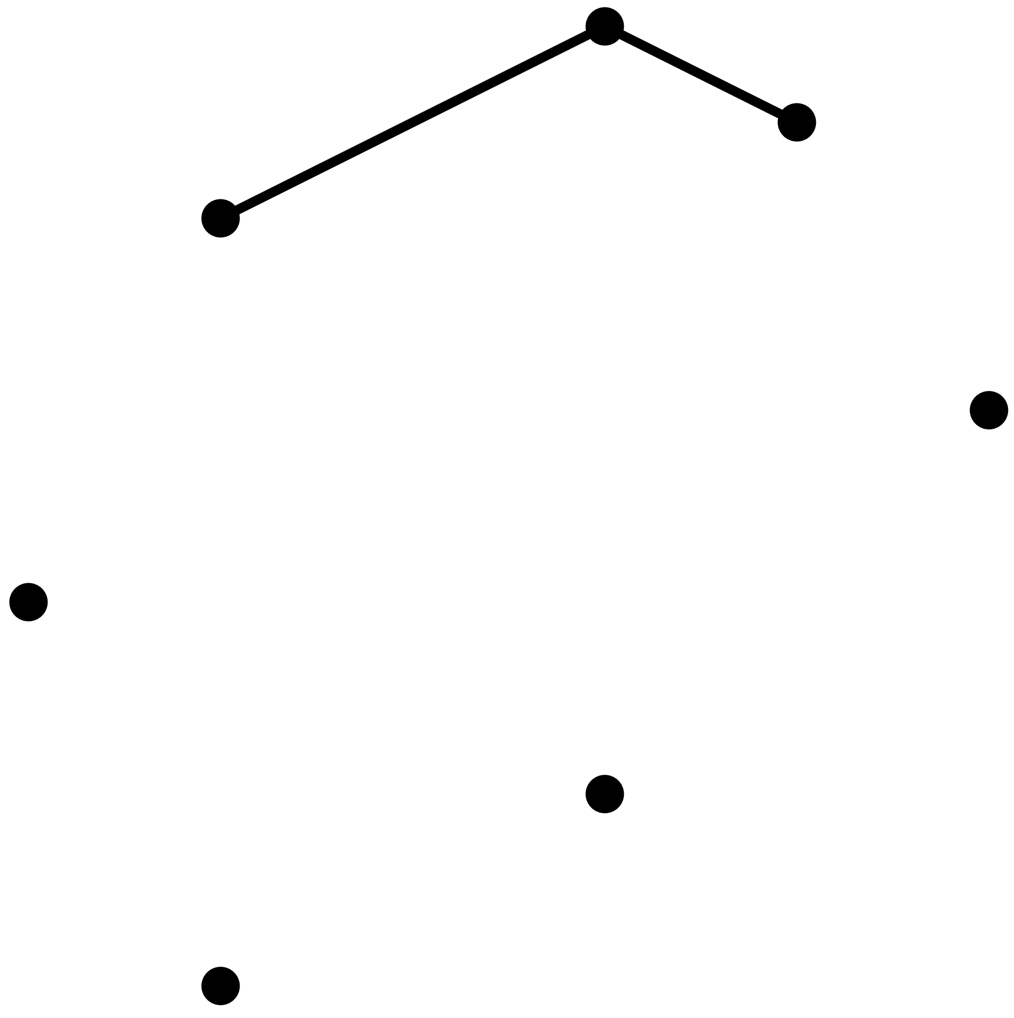


Animation: 0 of 6

Definitions:

Simple: ’no holes’

Polygon: an ordered collection of vertices with edges joining them.

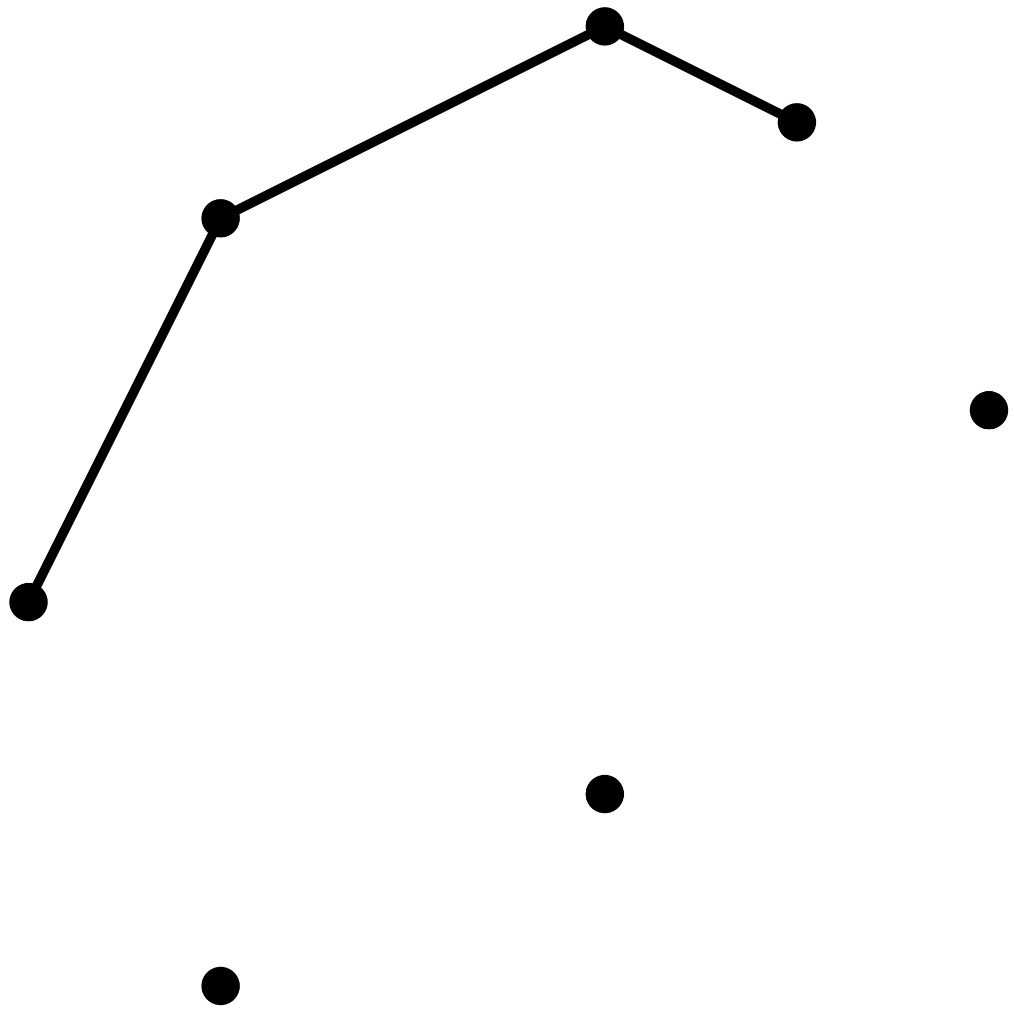


Animation: 1 of 6

Definitions:

Simple: ’no holes’

Polygon: an ordered collection of vertices with edges joining them.

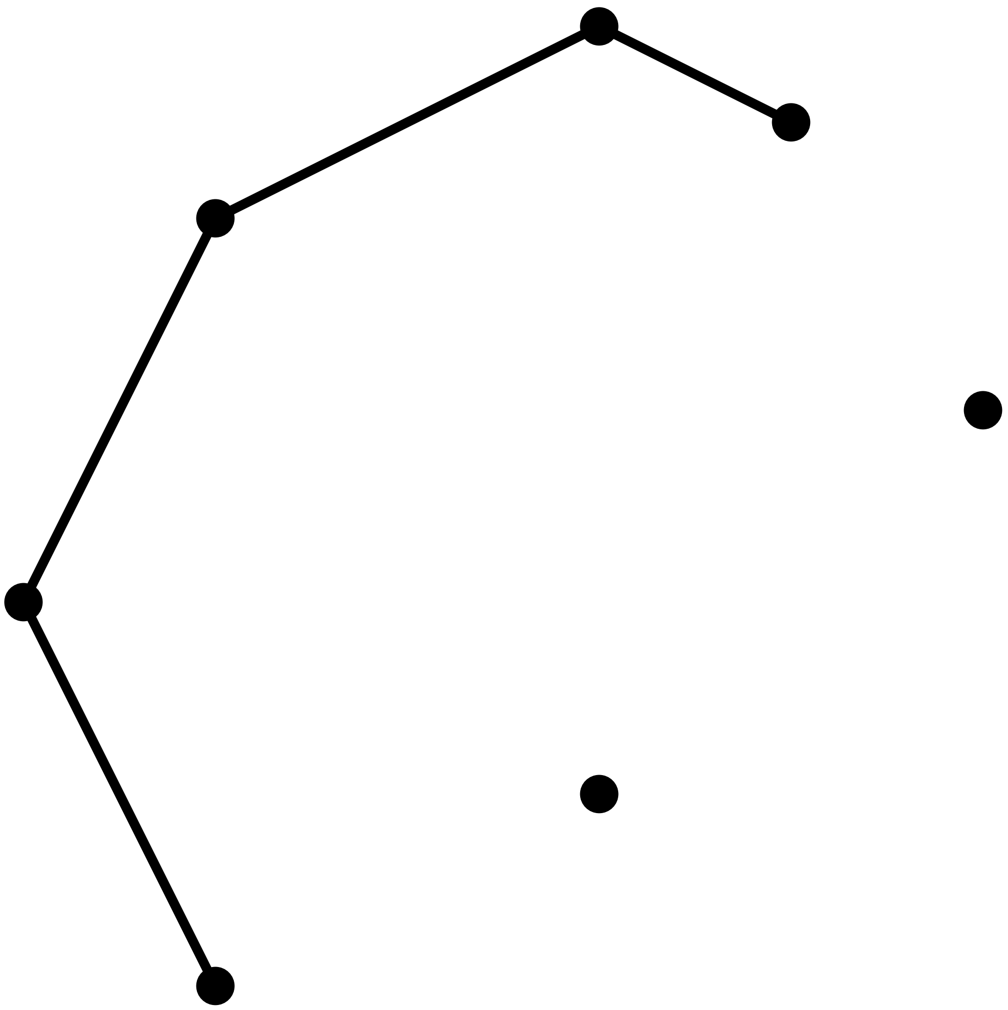


Animation: 2 of 6

Definitions:

Simple: ’no holes’

Polygon: an ordered collection of vertices with edges joining them.

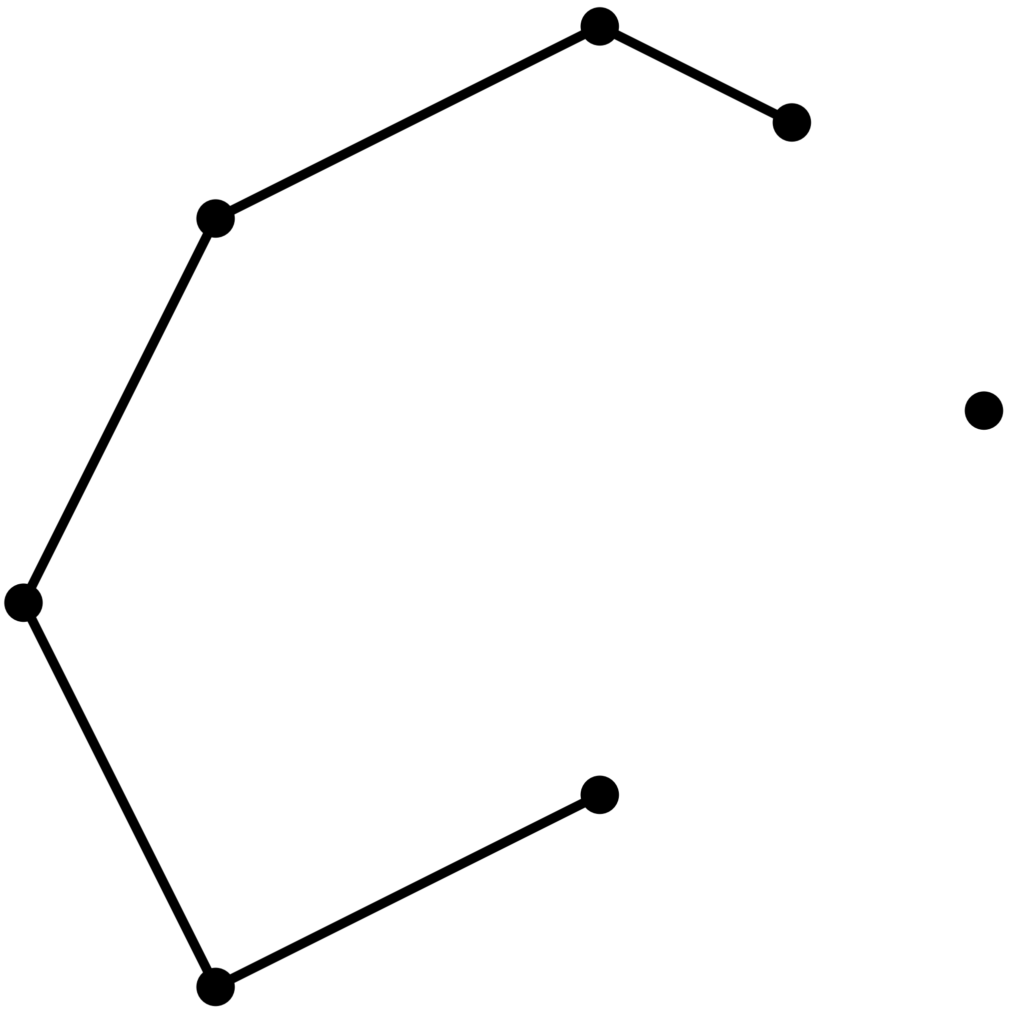


Animation: 3 of 6

Definitions:

Simple: ’no holes’

Polygon: an ordered collection of vertices with edges joining them.

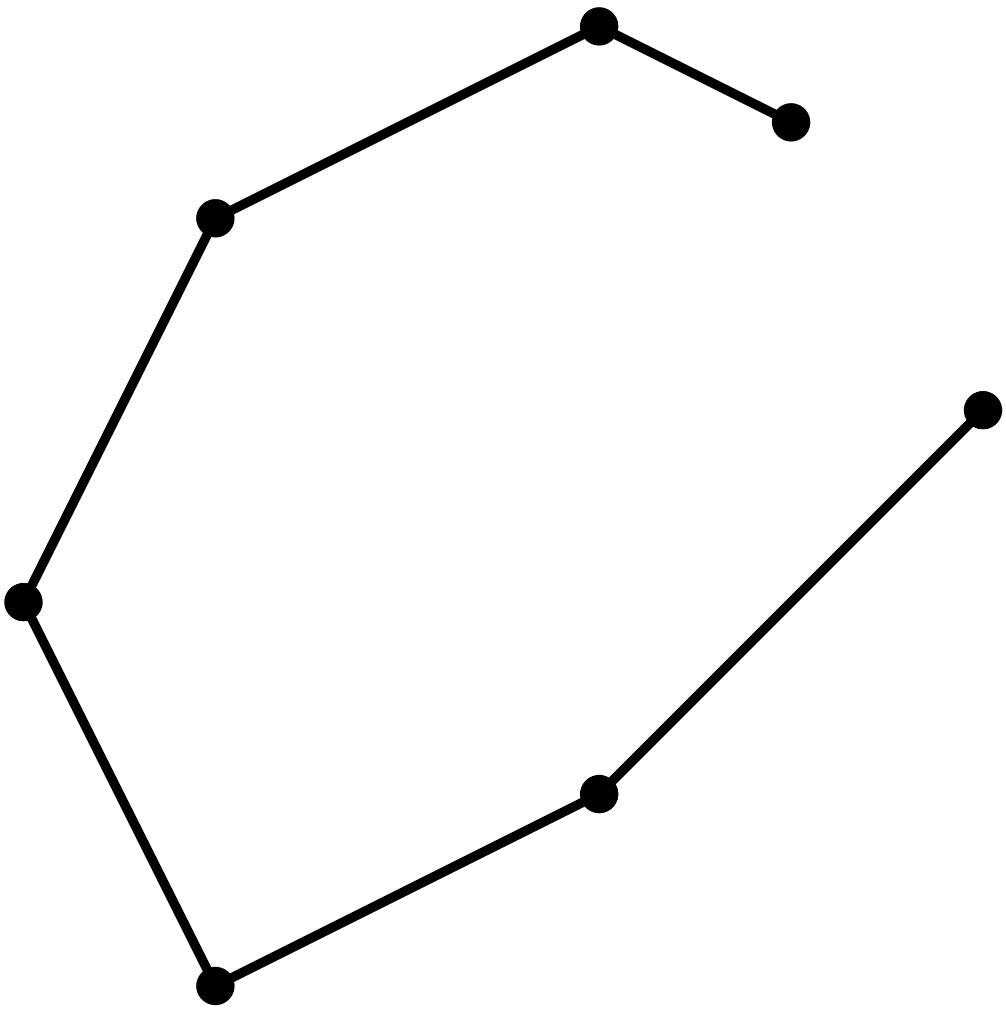


Animation: 4 of 6

Definitions:

Simple: ’no holes’

Polygon: an ordered collection of vertices with edges joining them.

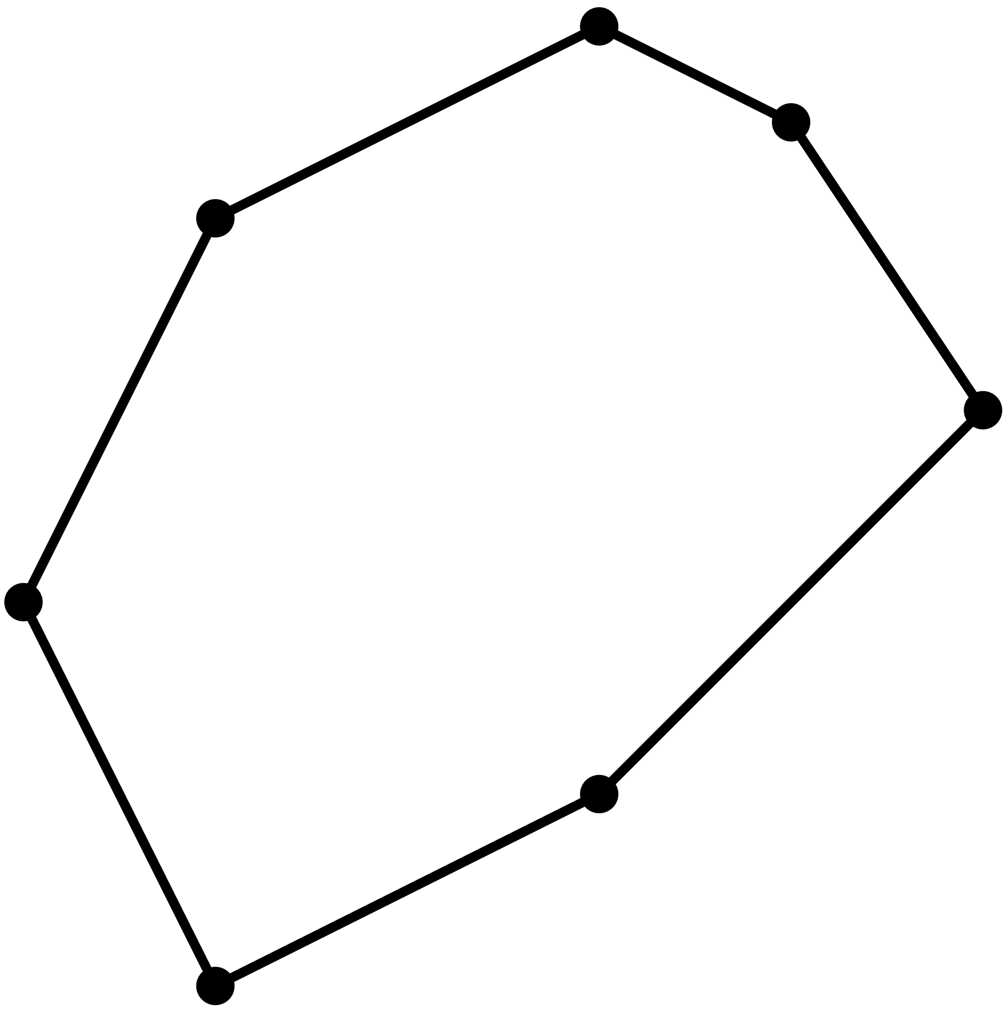


Animation: 5 of 6

Definitions:

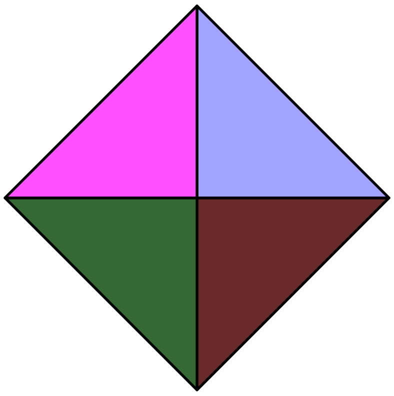
Simple: ’no holes’

Polygon: an ordered collection of vertices with edges joining them.

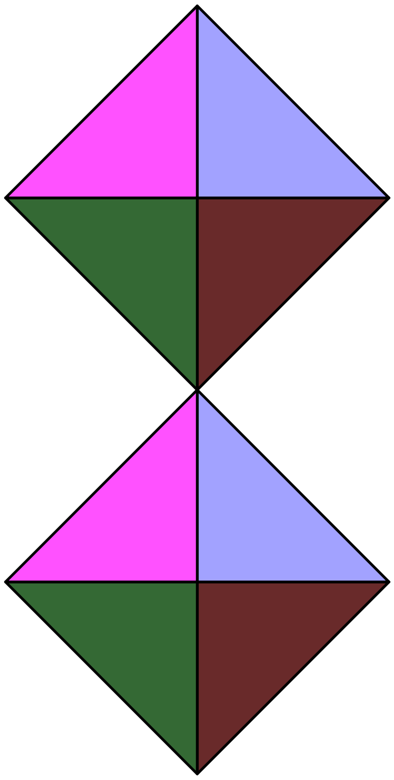


Animation: 6 of 6

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



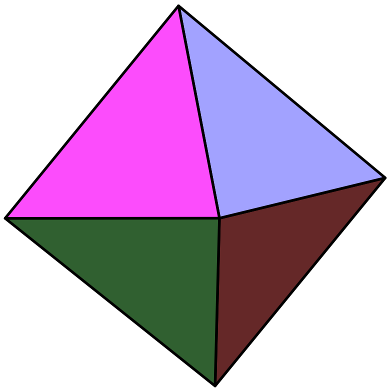
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



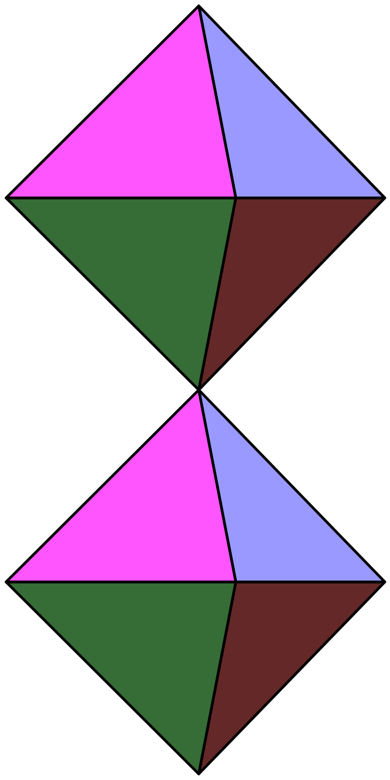
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 0 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



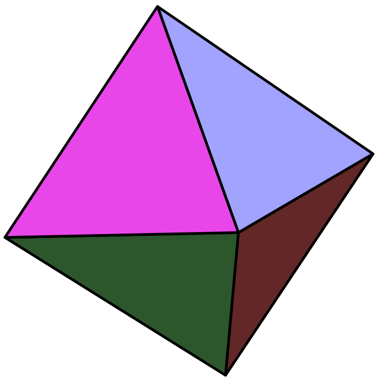
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



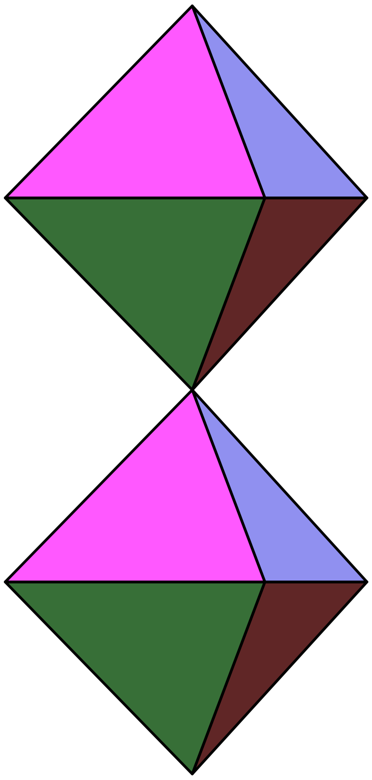
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 1 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



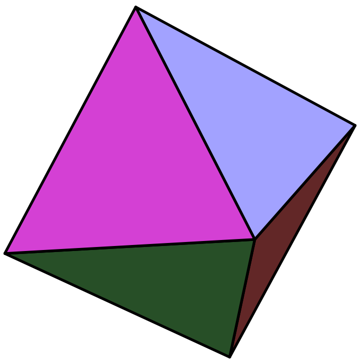
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



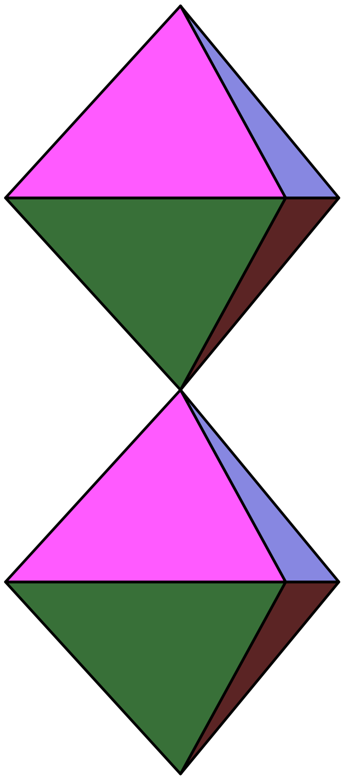
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 2 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



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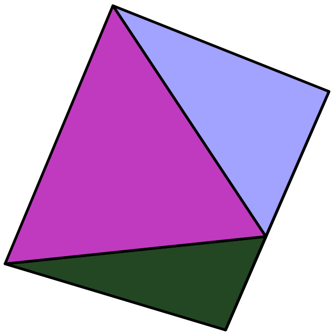
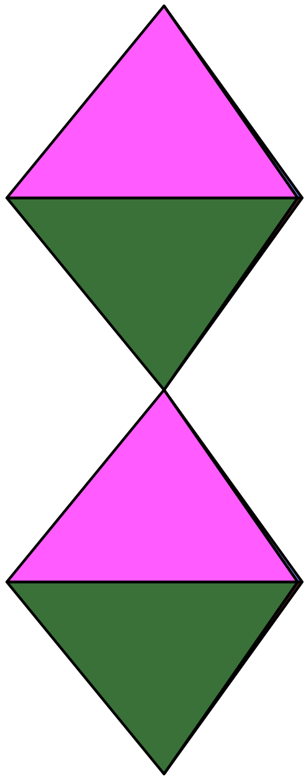
Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



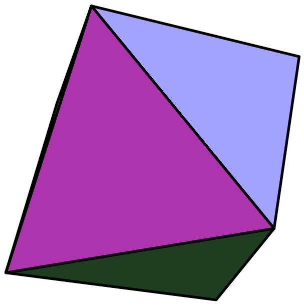
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



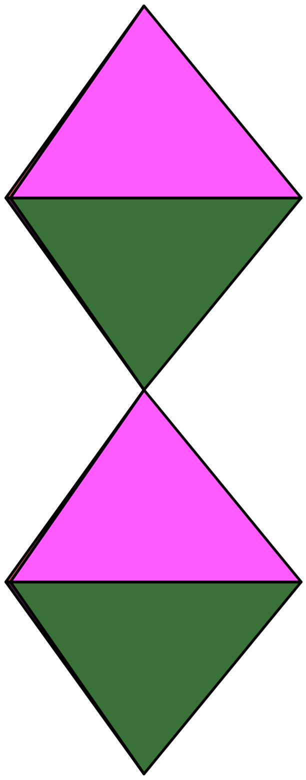
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 4 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



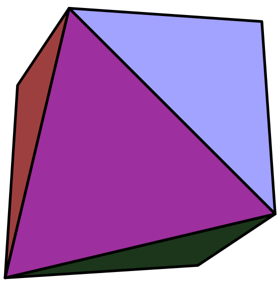
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



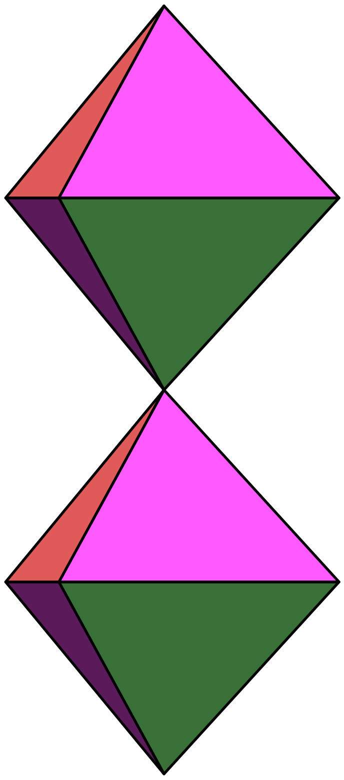
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 5 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



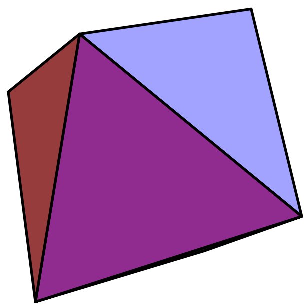
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



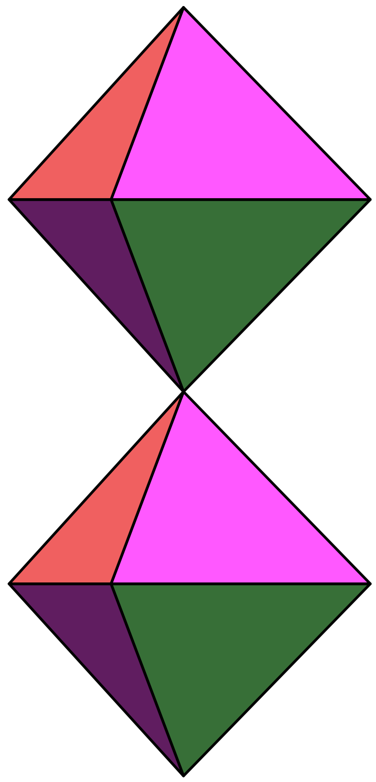
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 6 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



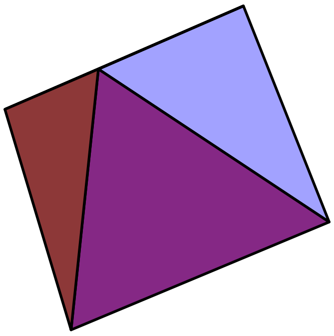
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



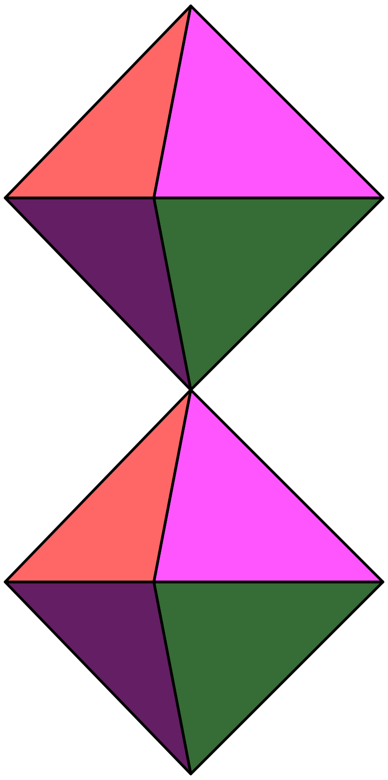
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 7 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



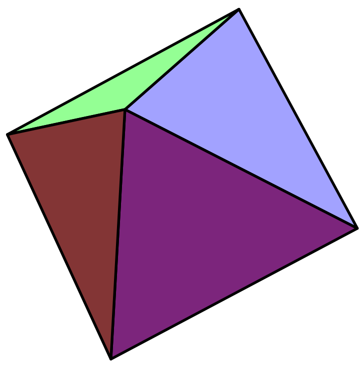
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



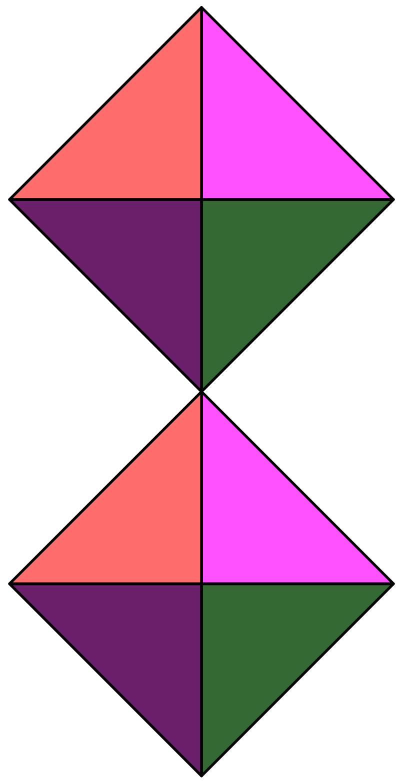
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 8 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



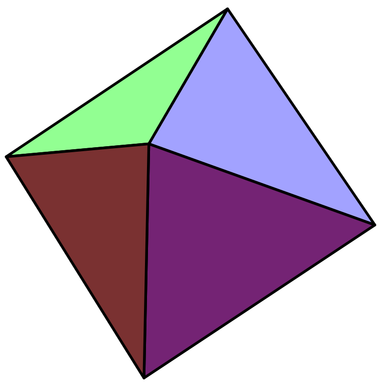
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



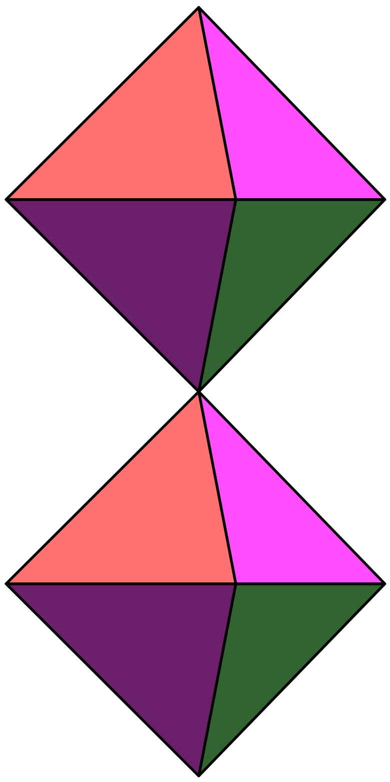
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 9 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called 'faces'. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

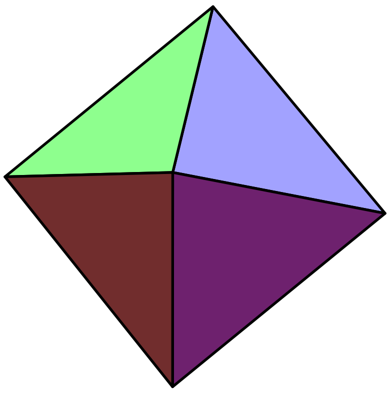


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

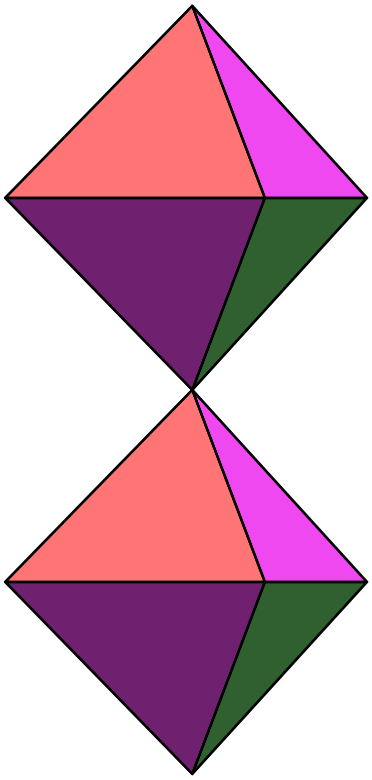


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

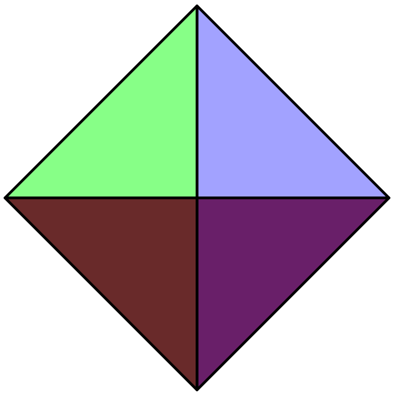


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

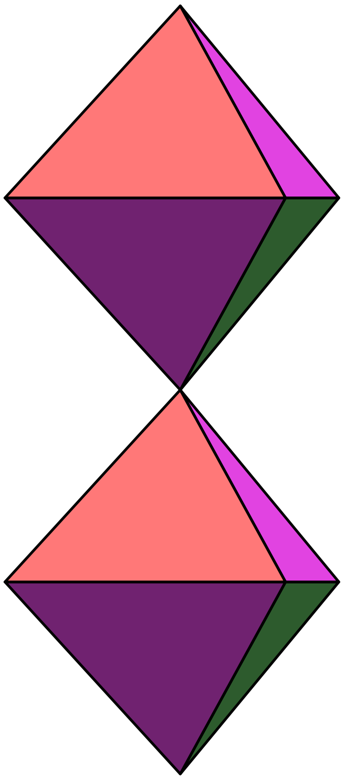


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



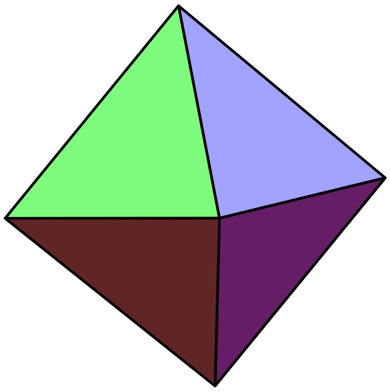
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



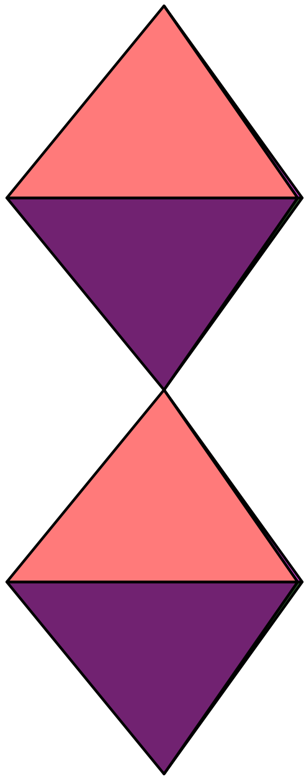
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 12 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



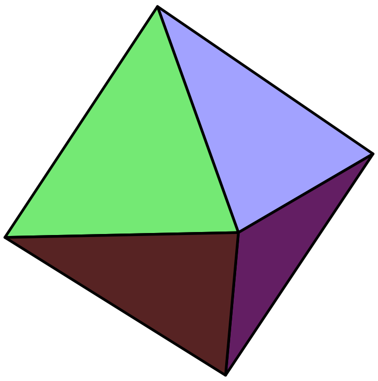
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



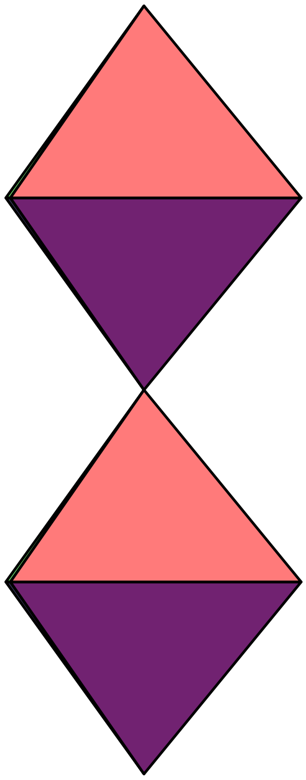
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 13 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

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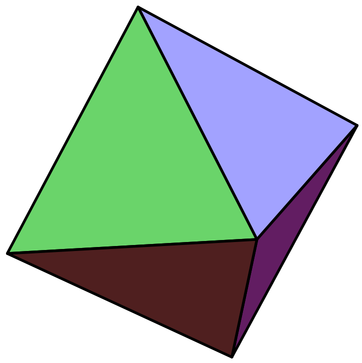
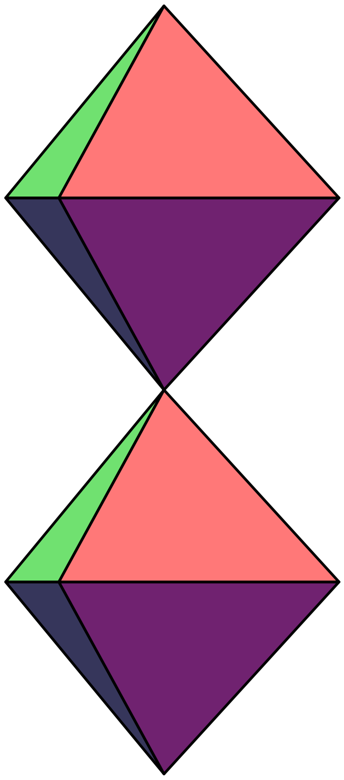
Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



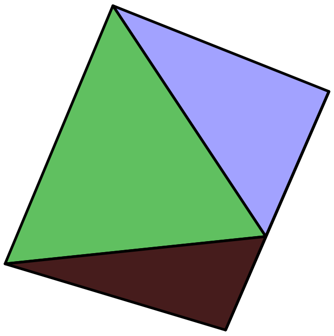
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



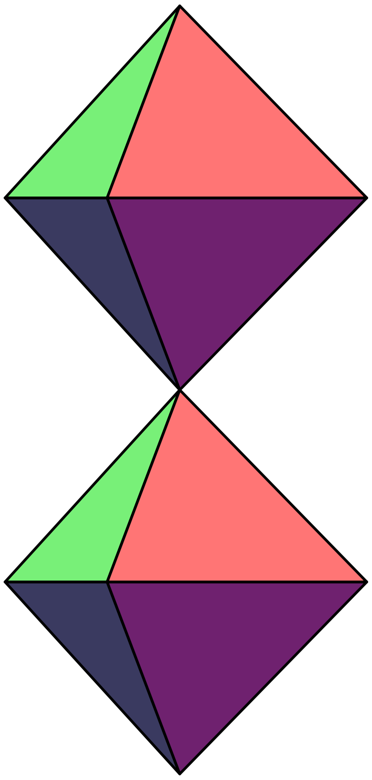
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 15 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



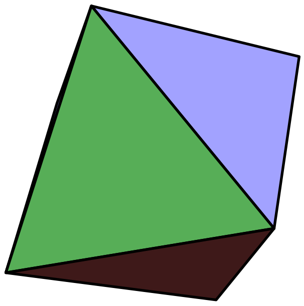
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



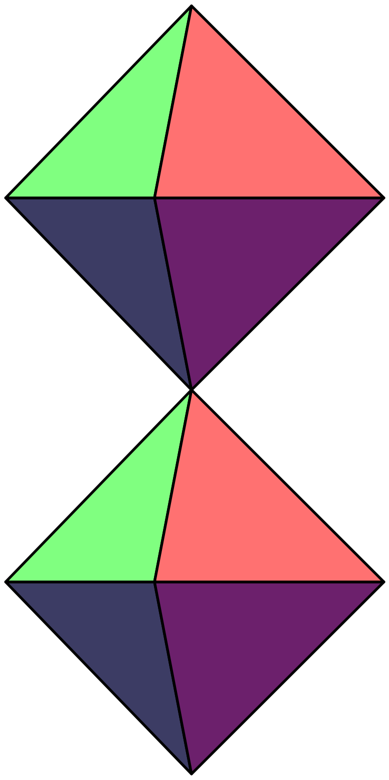
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 16 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

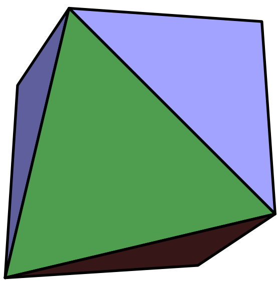


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

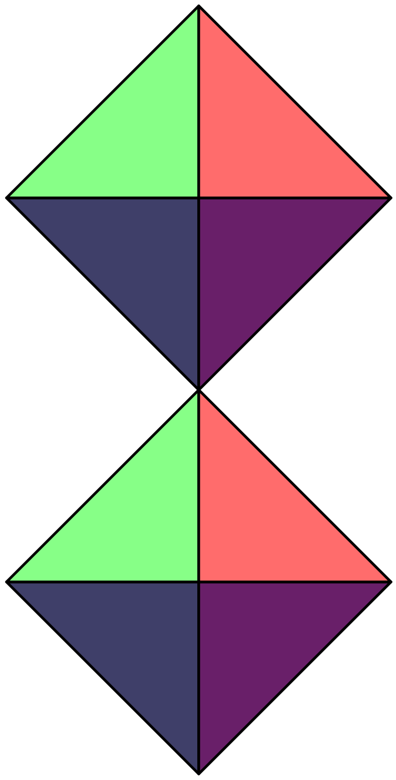


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

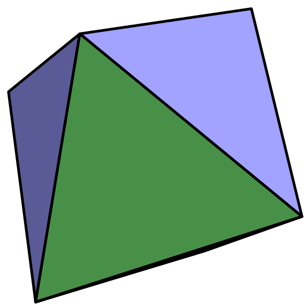


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

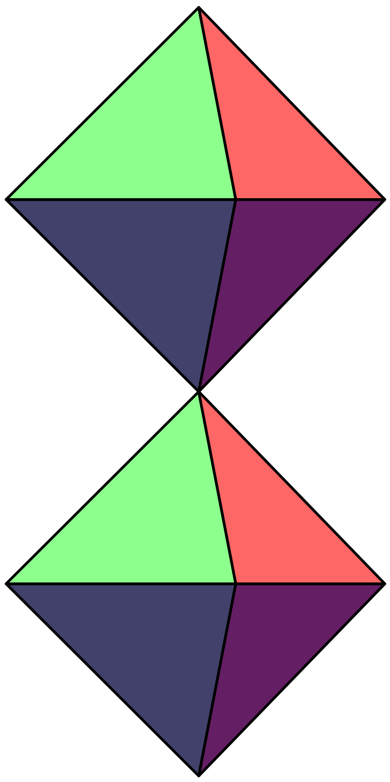


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

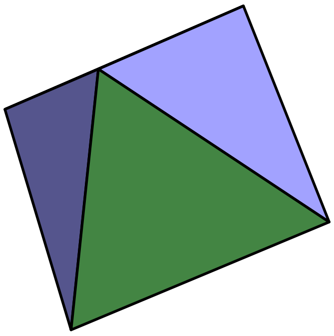


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

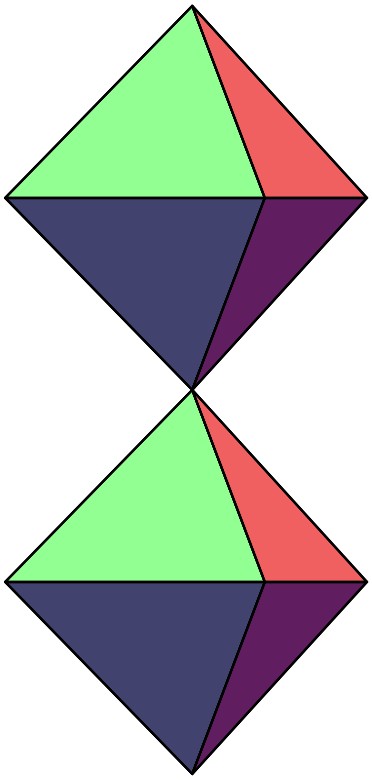


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



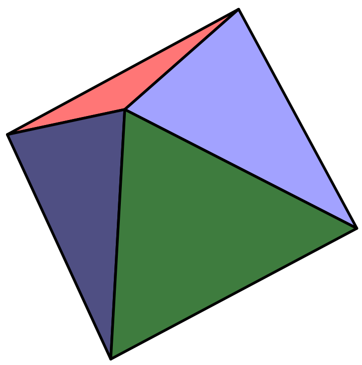
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



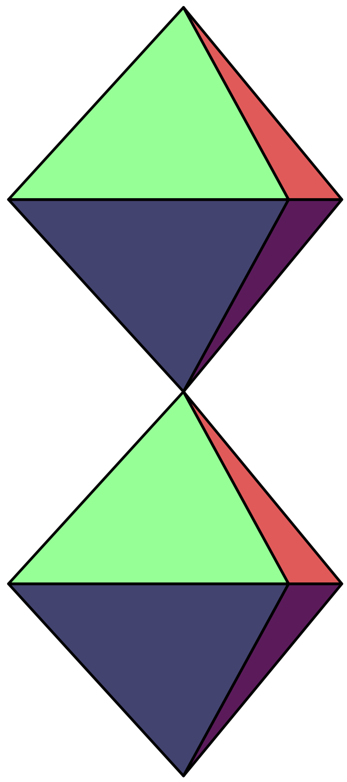
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 20 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



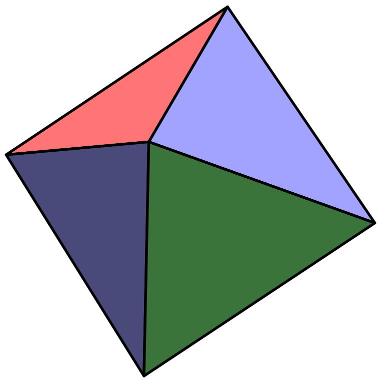
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



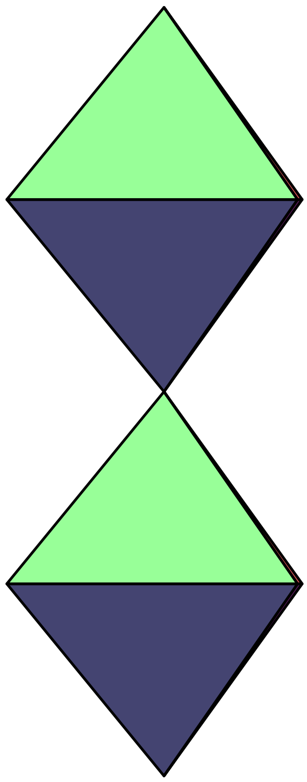
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 21 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



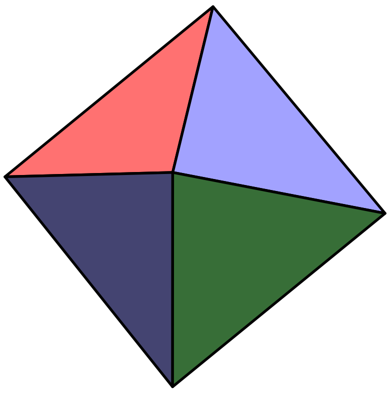
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



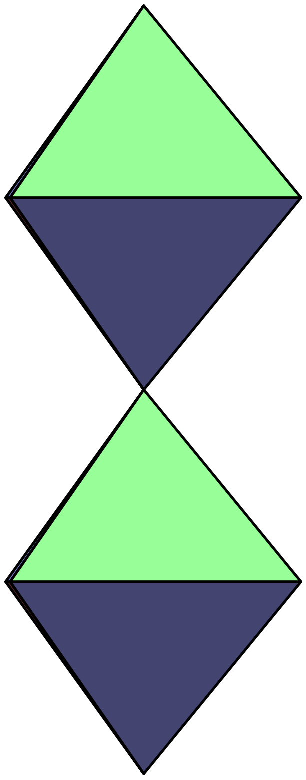
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 22 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



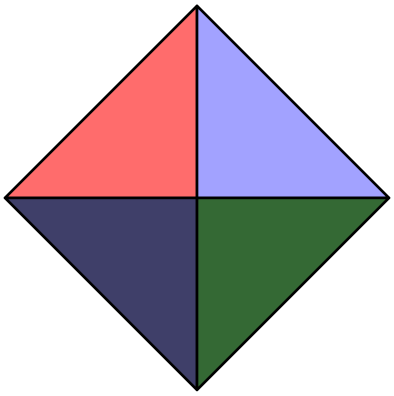
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



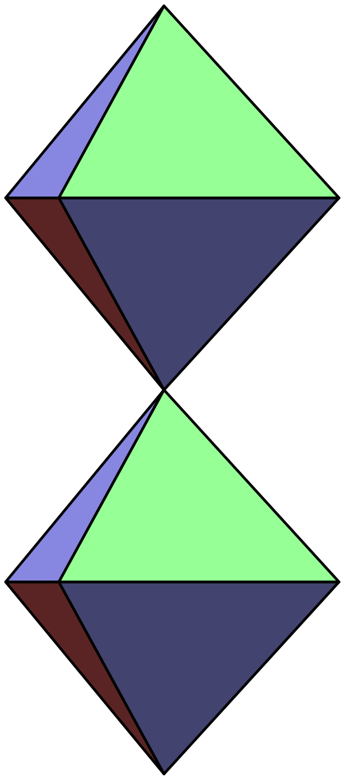
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 23 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

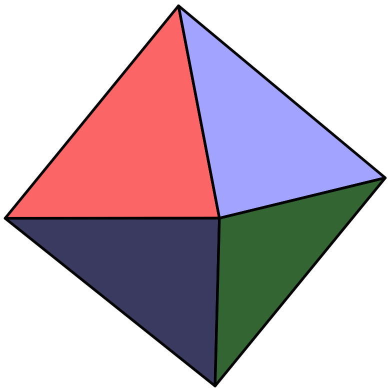


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

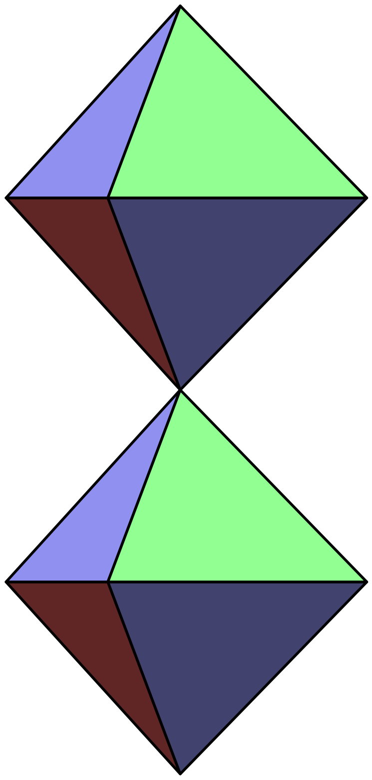


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

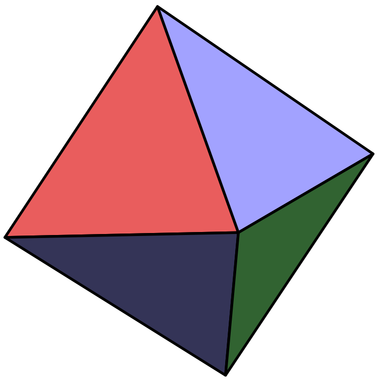


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

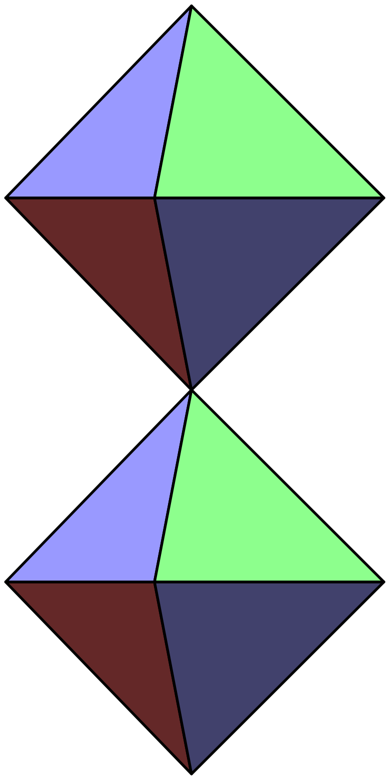


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



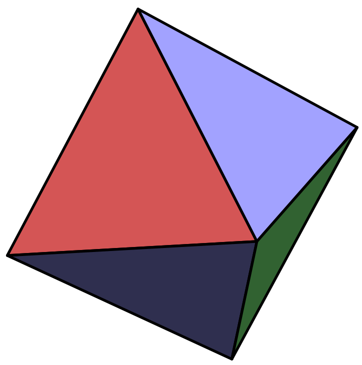
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



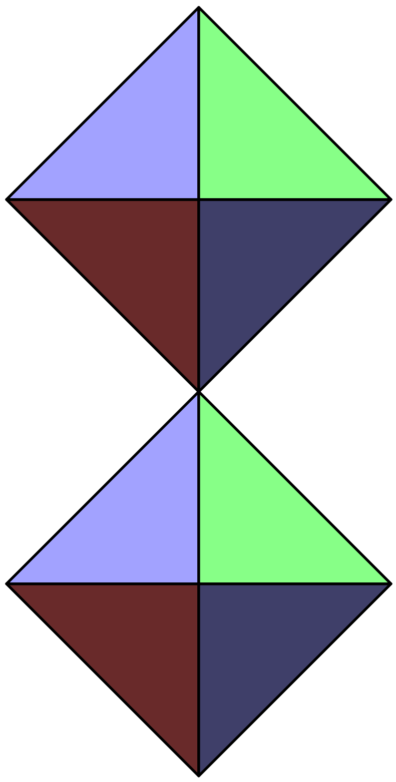
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 26 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

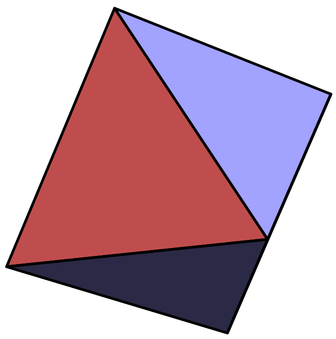


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

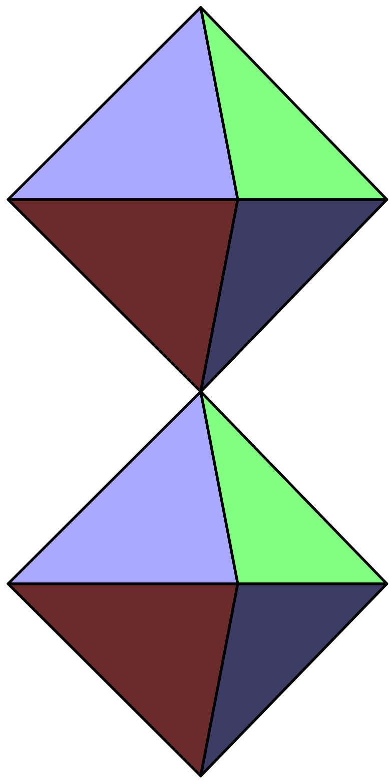


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

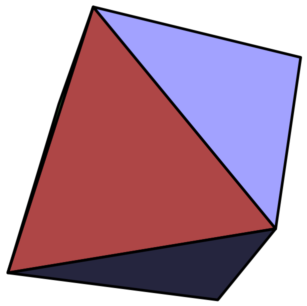


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

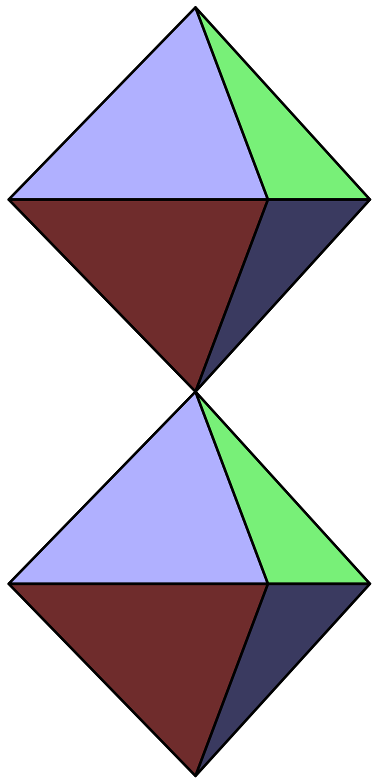


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called 'faces'. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

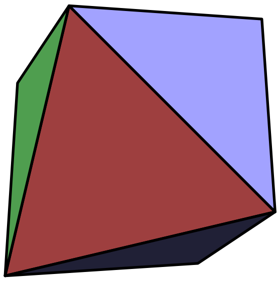


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

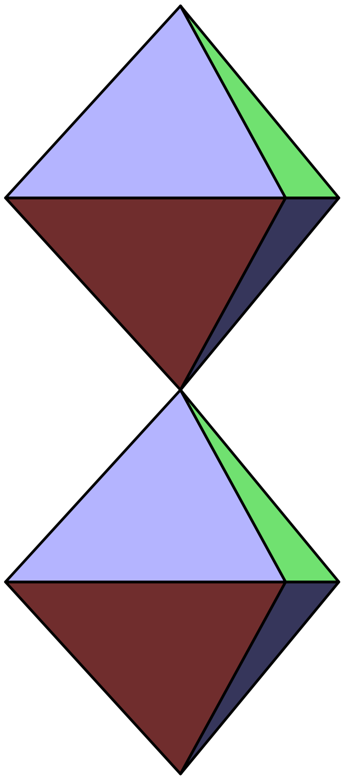


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



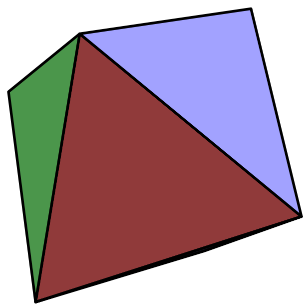
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



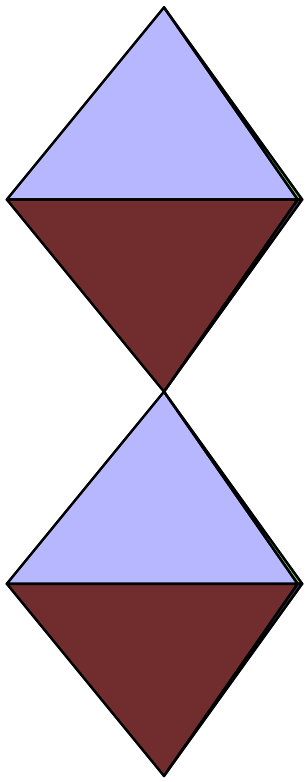
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 30 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



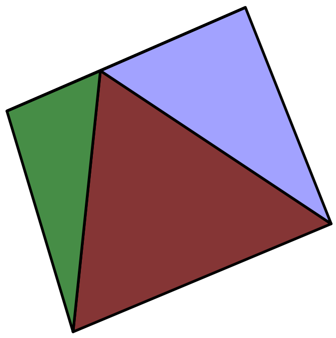
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



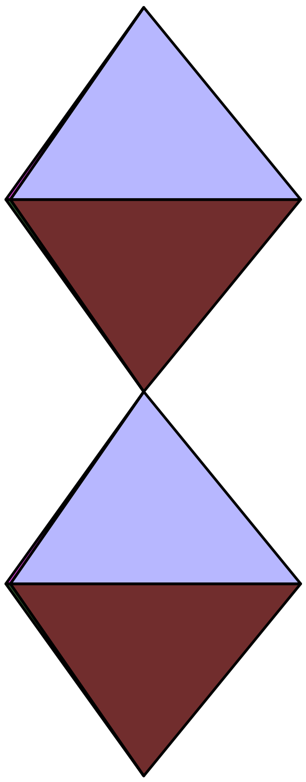
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 31 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



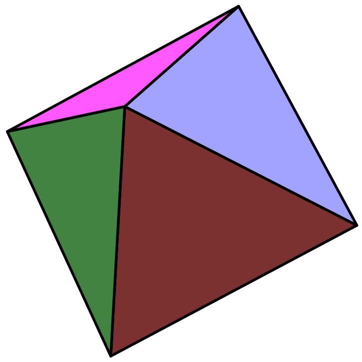
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



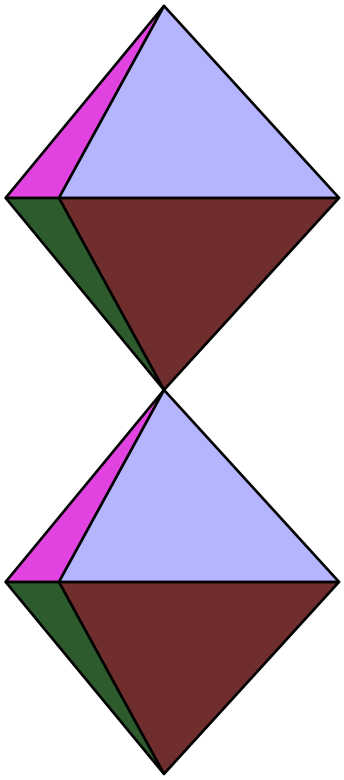
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 32 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



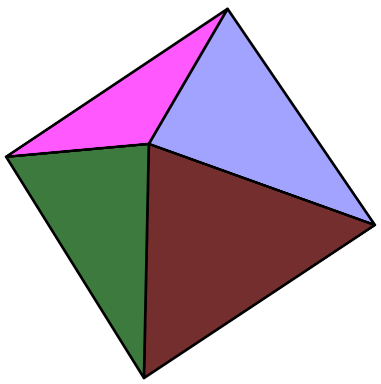
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



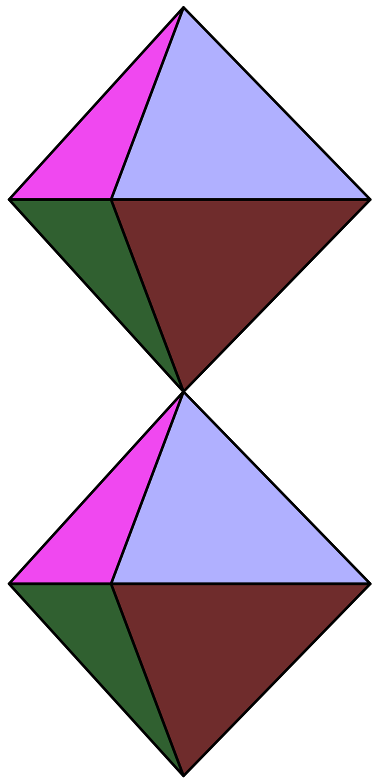
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 33 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

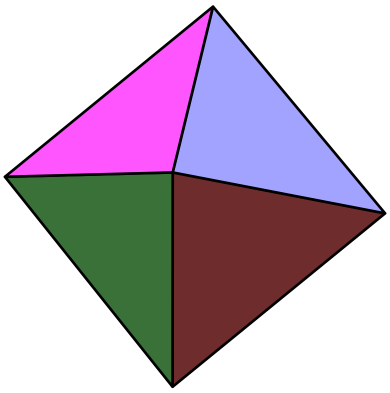


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

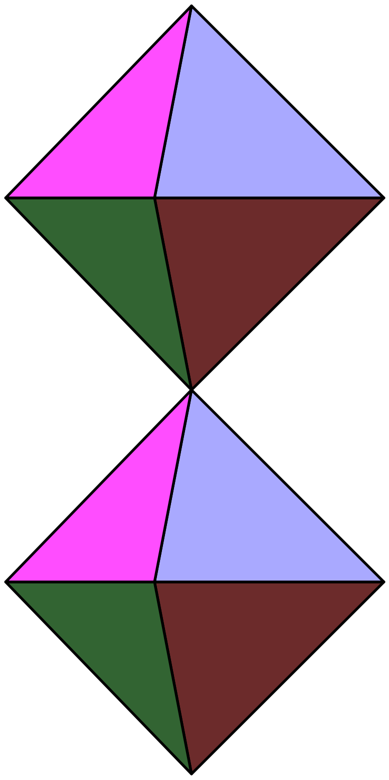


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

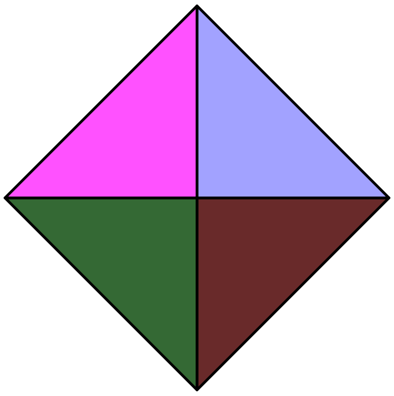


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

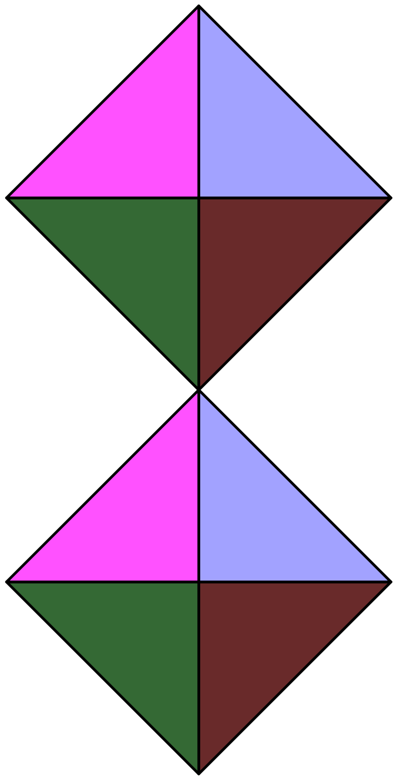


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



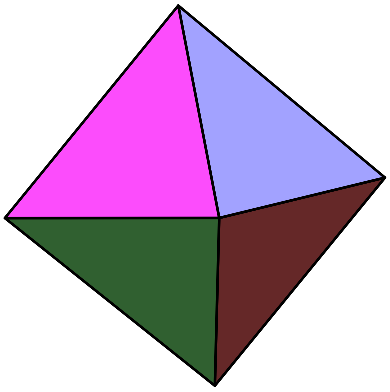
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



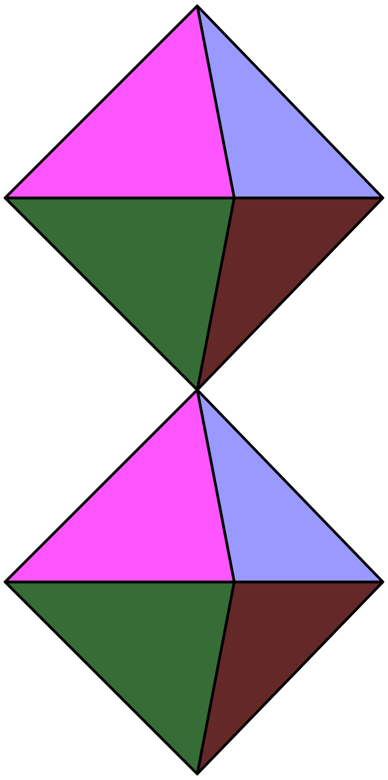
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 36 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



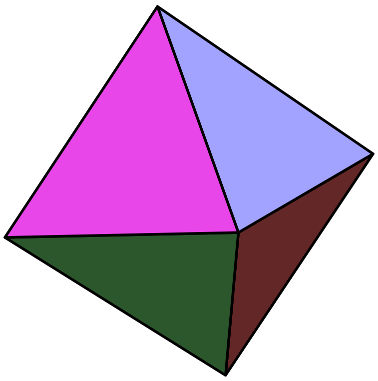
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



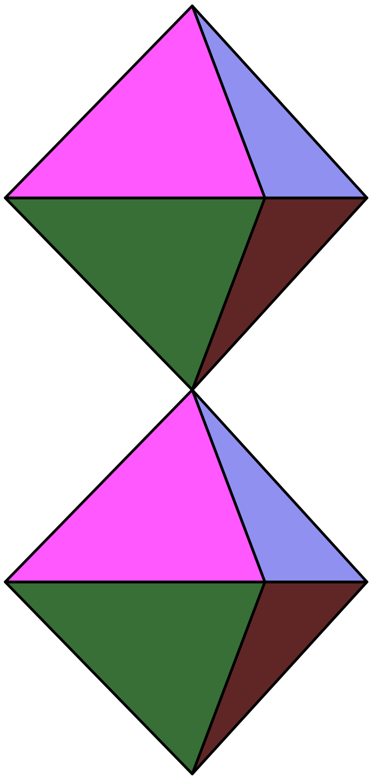
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 37 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

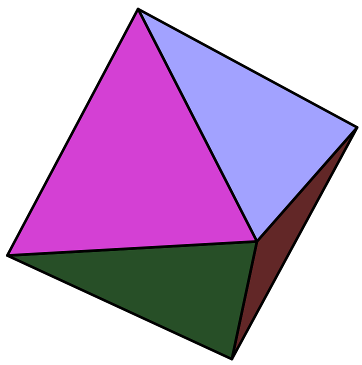


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

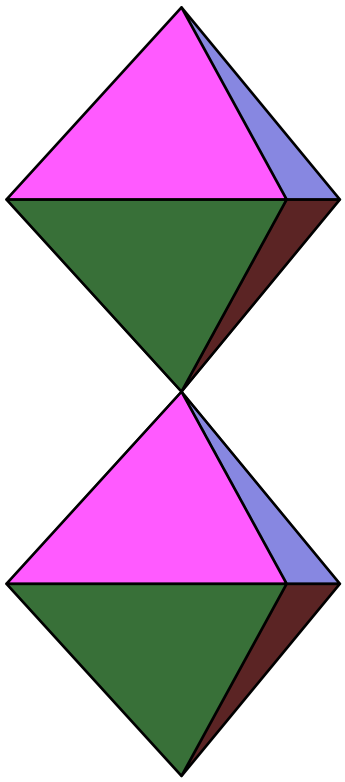


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



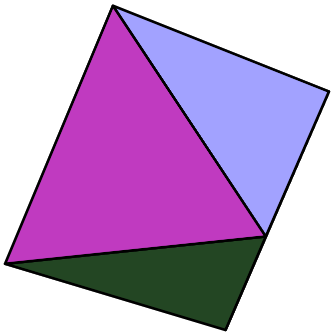
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



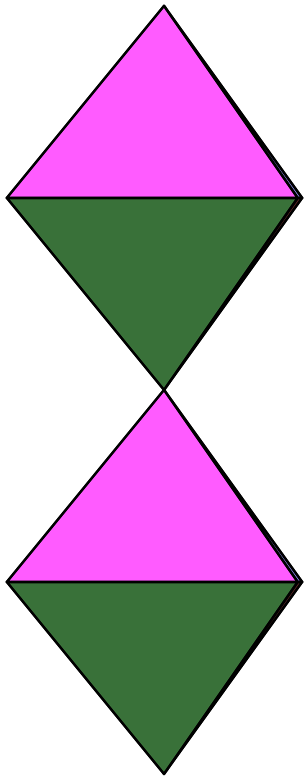
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 39 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

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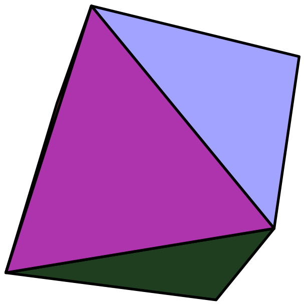
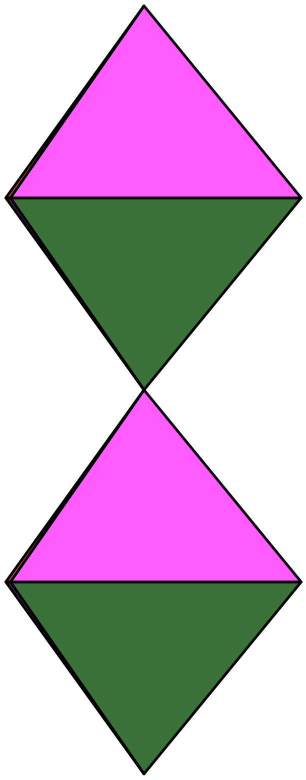
Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

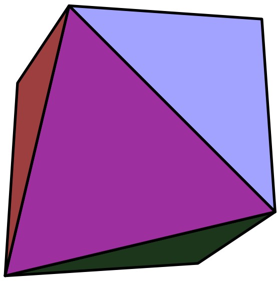


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

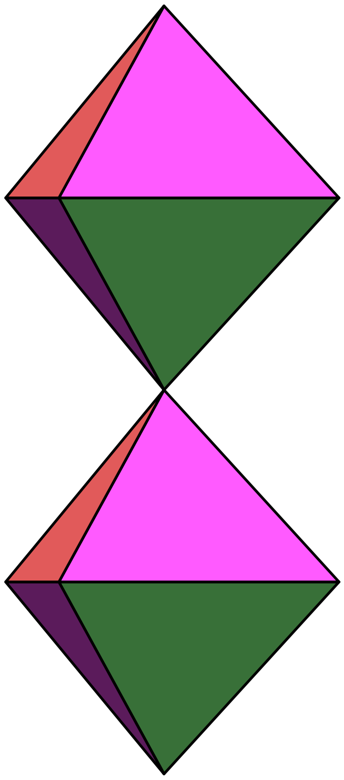


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

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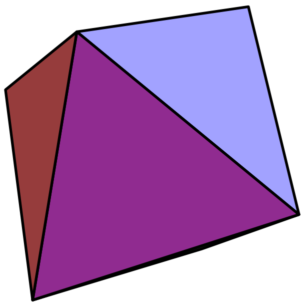
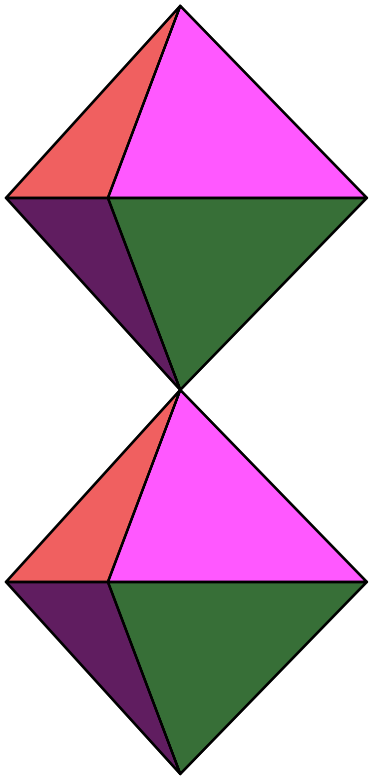
Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

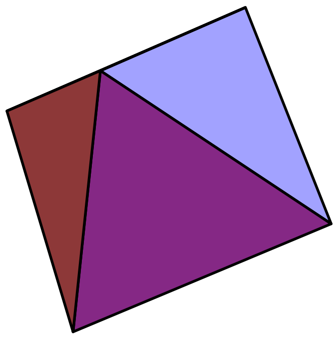


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

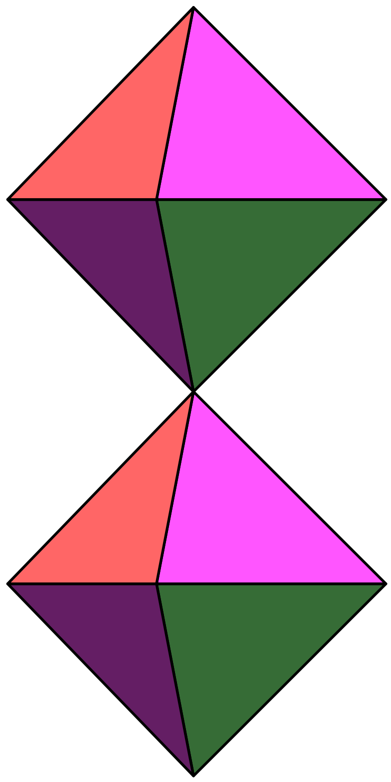


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

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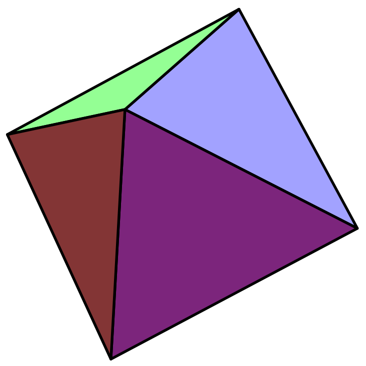
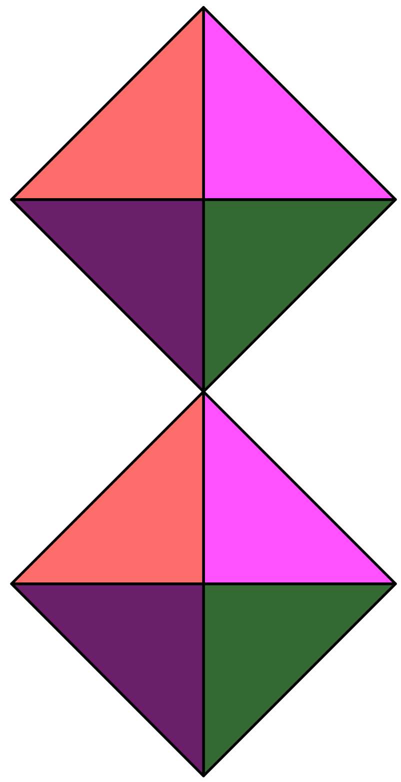
Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

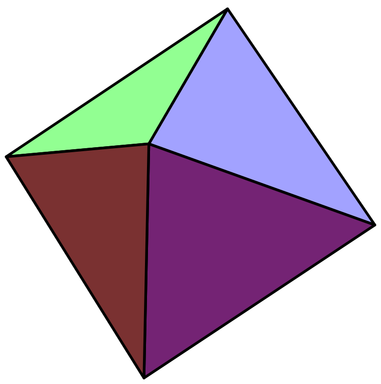


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

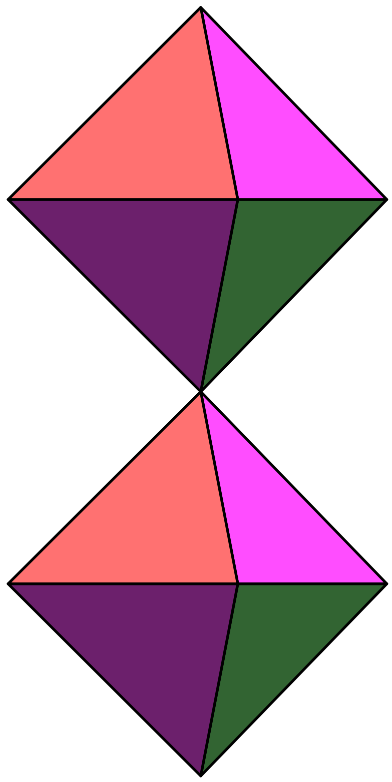


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called 'faces'. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

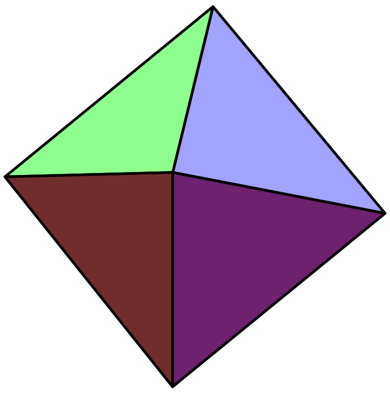


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

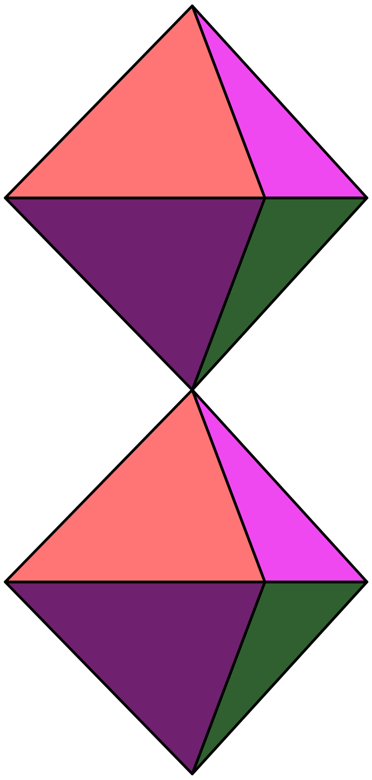


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

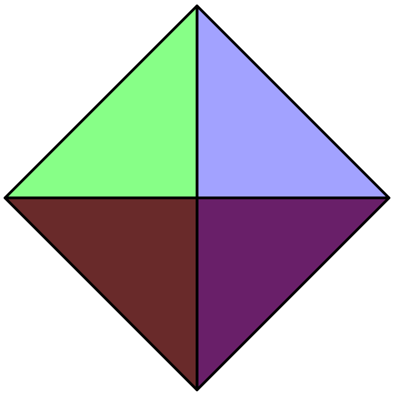


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

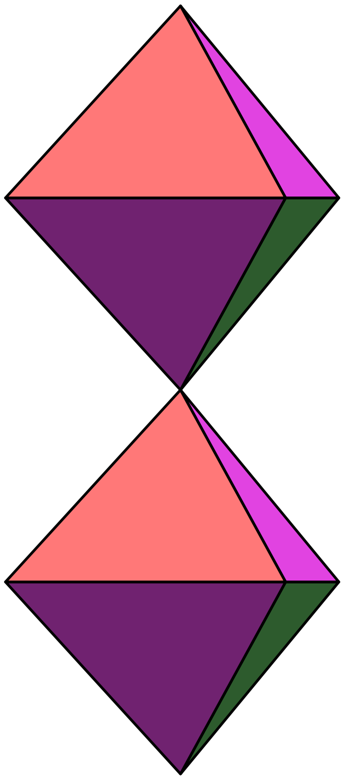


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



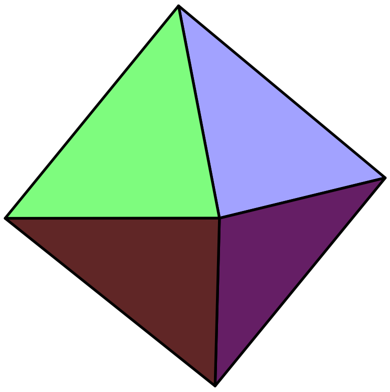
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



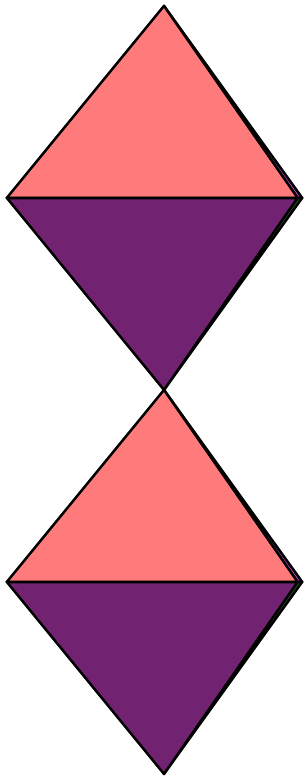
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 48 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

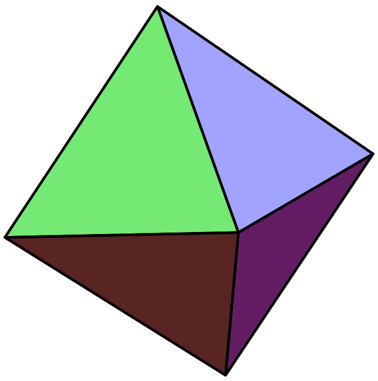


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

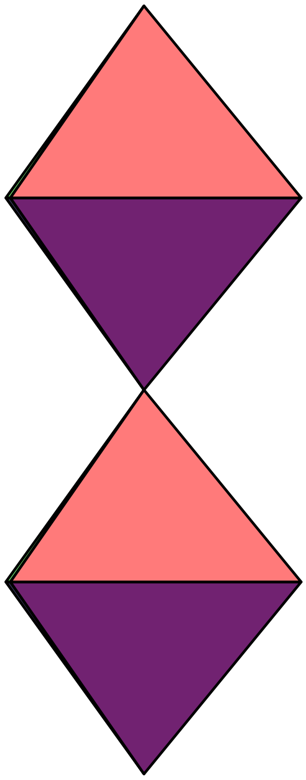


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

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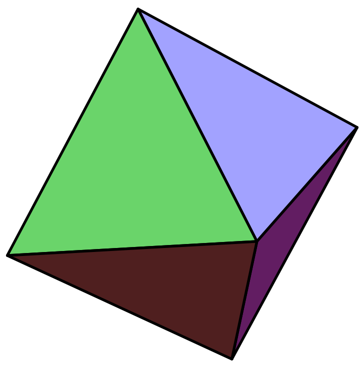
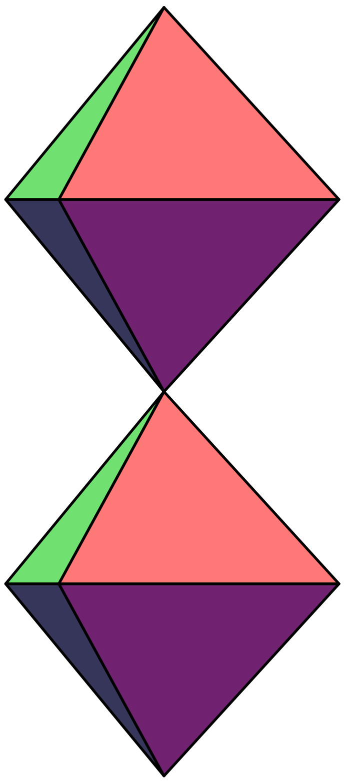
Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

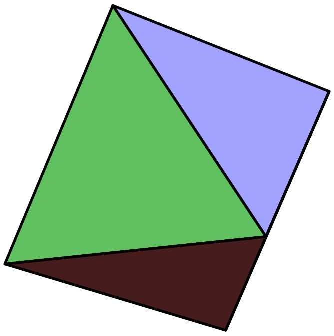


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

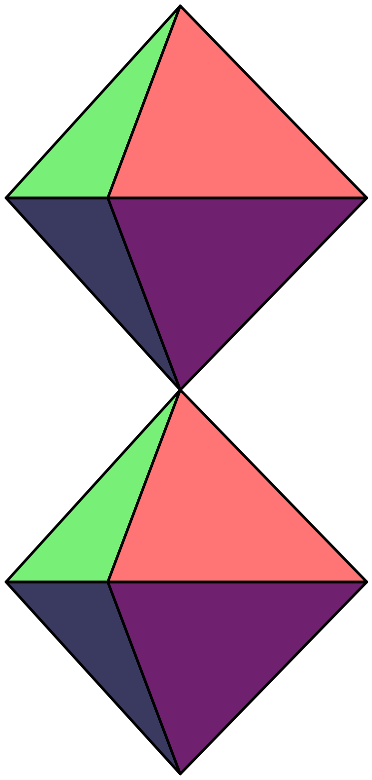


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



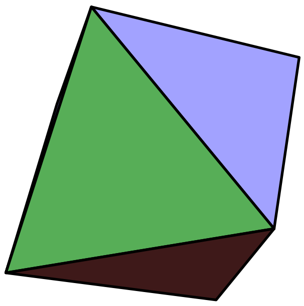
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



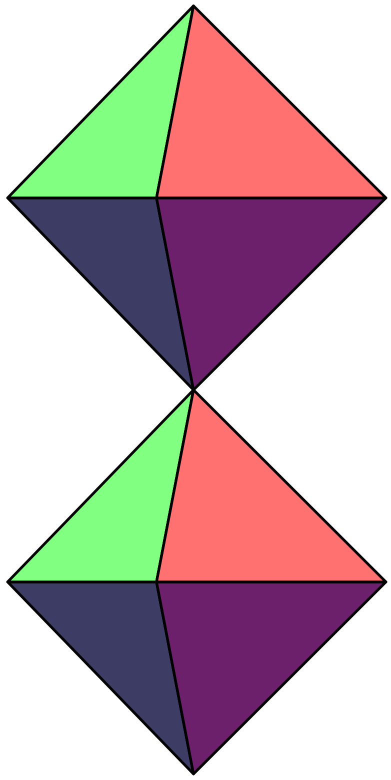
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 52 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



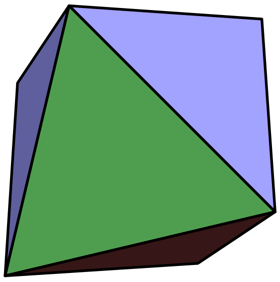
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



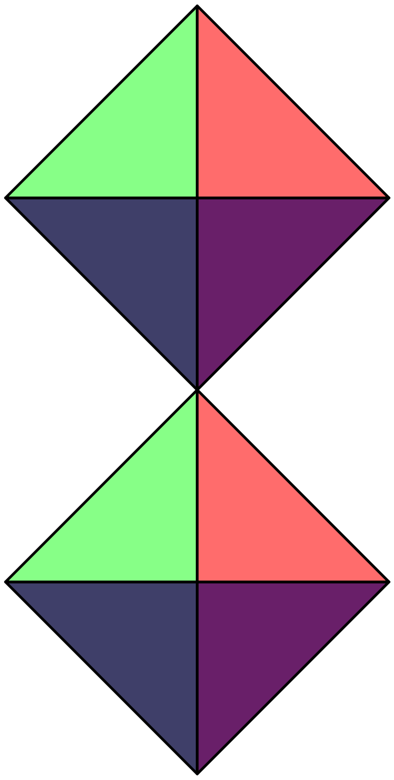
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 53 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.

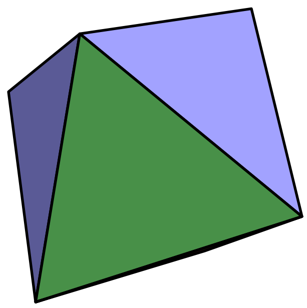


This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.

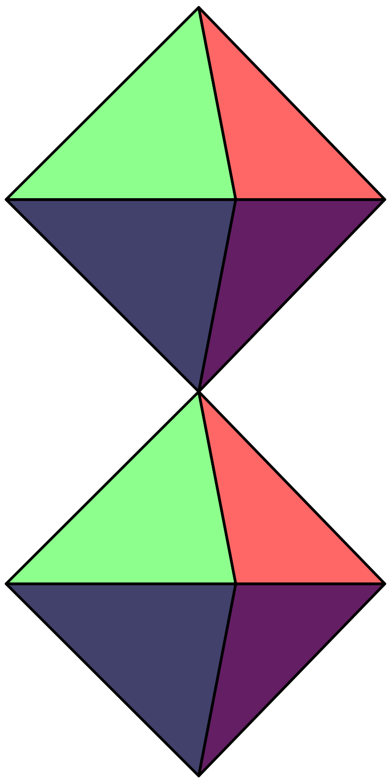


This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



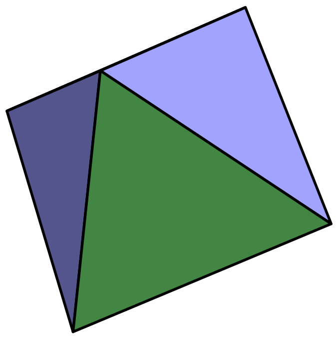
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



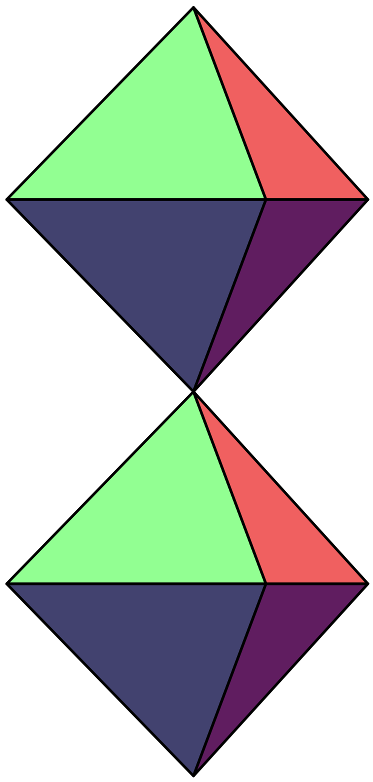
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 55 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



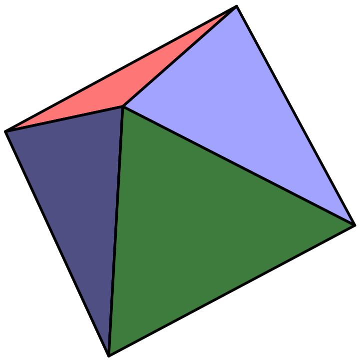
This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



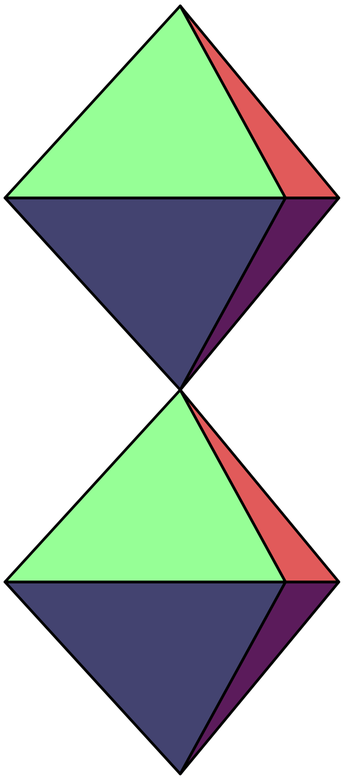
This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 56 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called ’faces’. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



This octahedron is a polyhedron, because it is composed of faces which form a chain around each vertex.



This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

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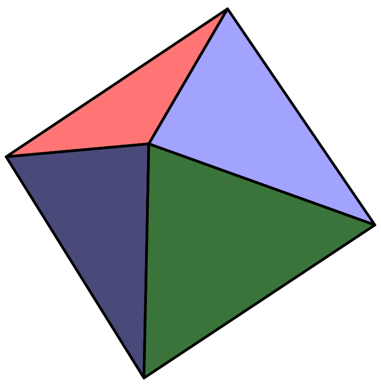

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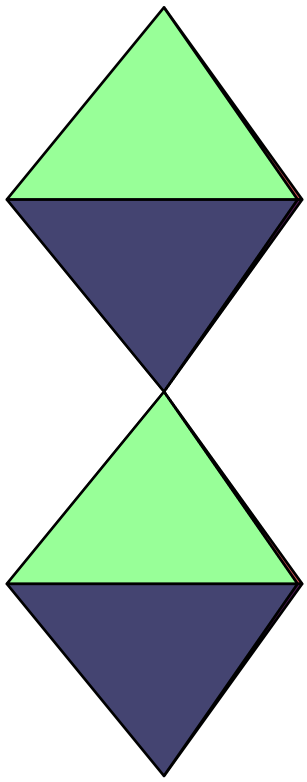

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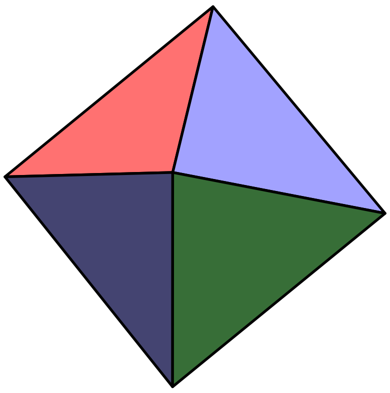

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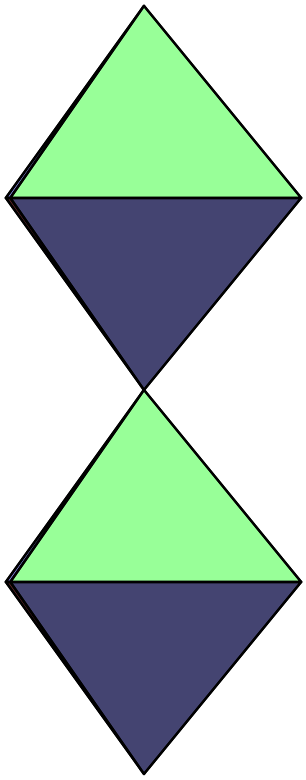

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Animation: 59 of 72

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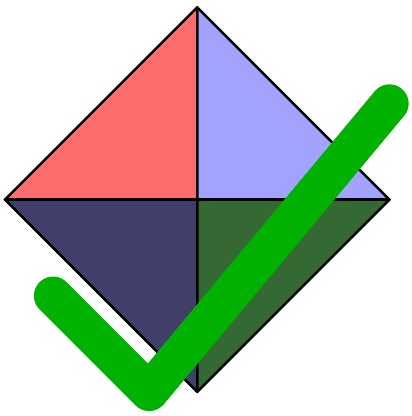

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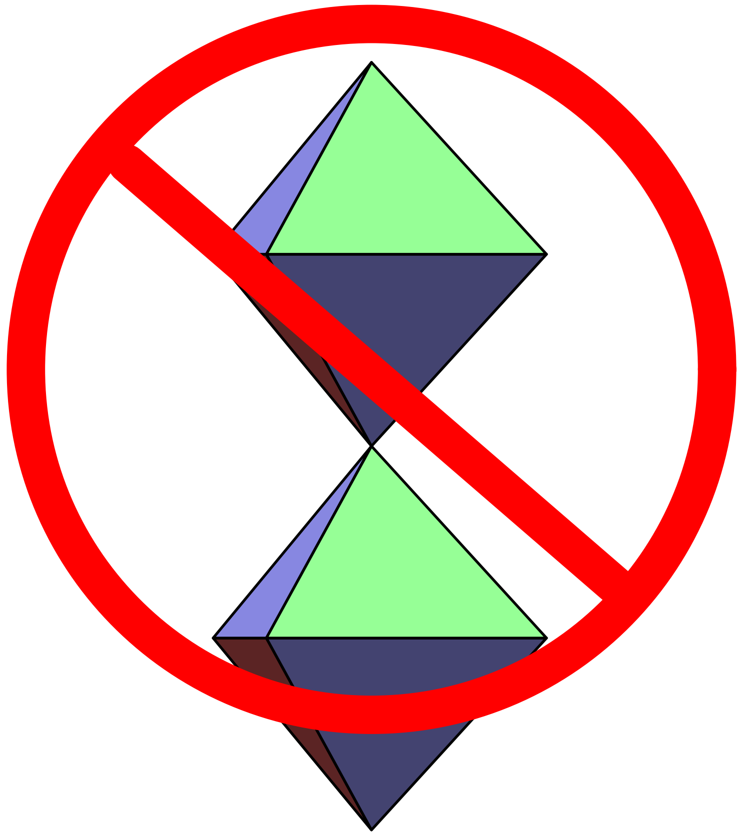

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Animation: 60 of 72

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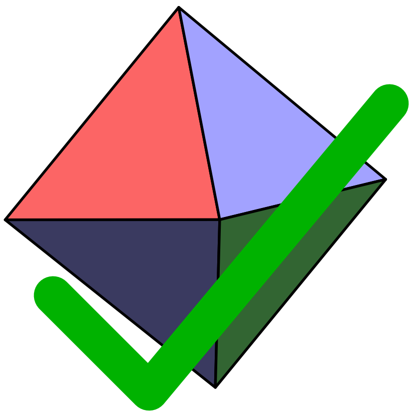

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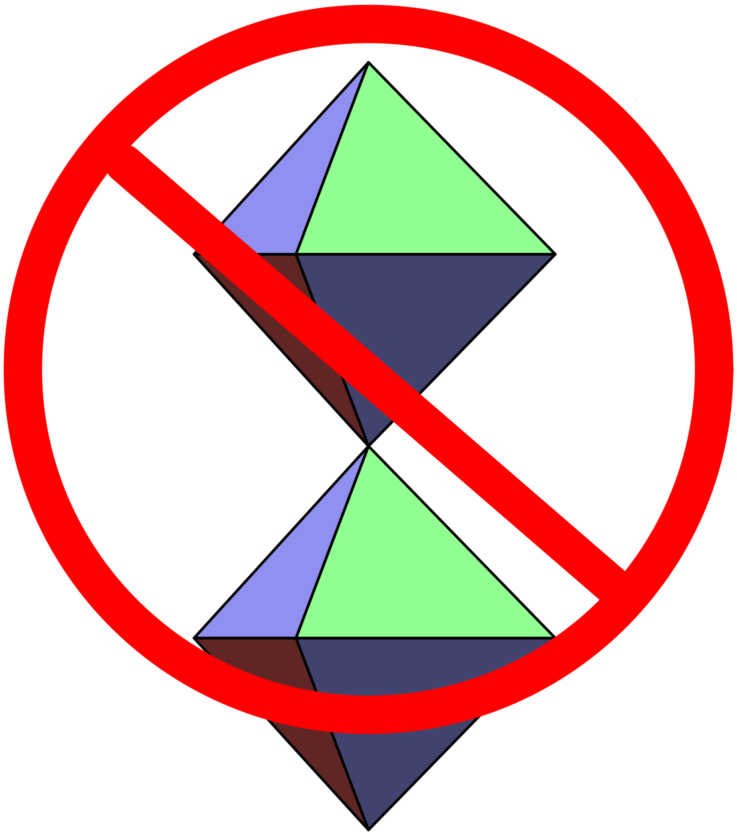

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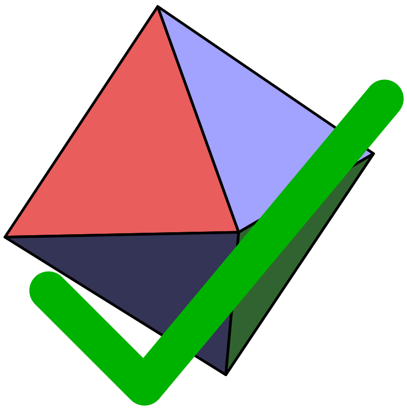

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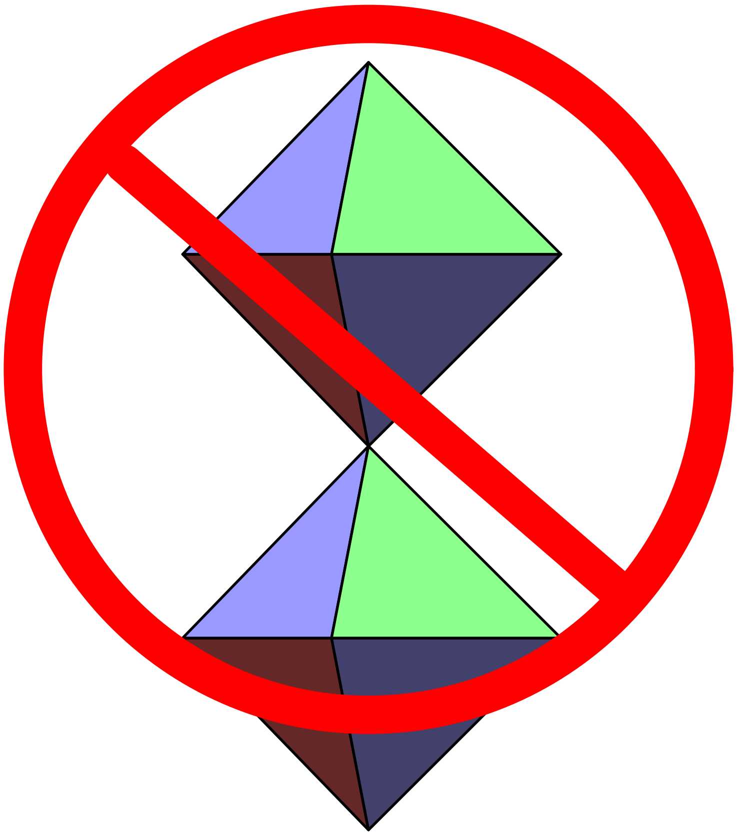

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Animation: 62 of 72

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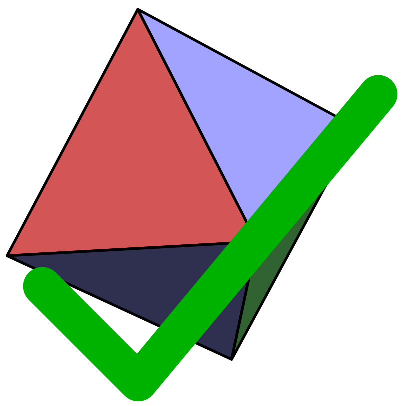

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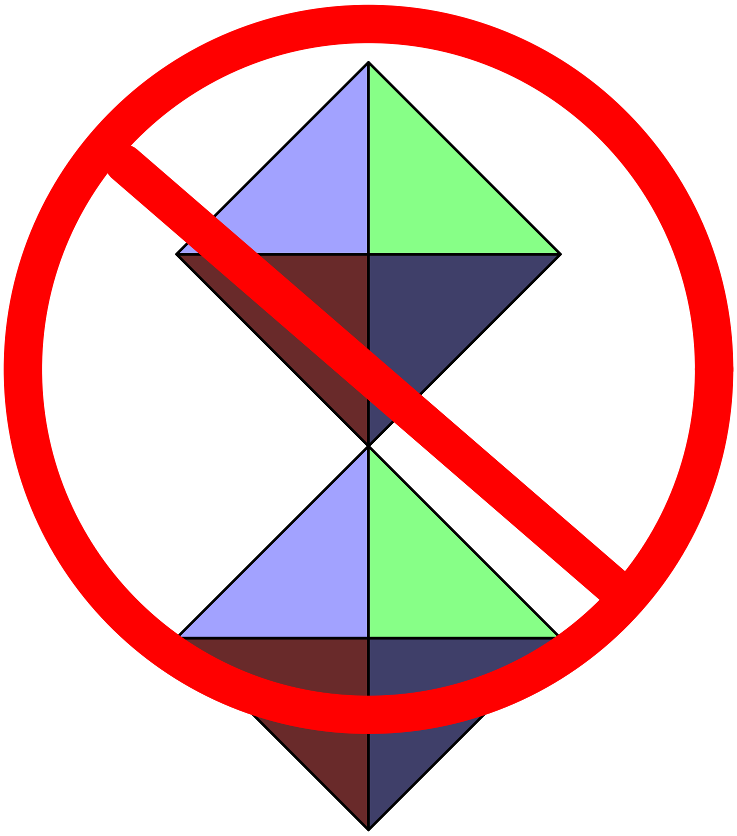

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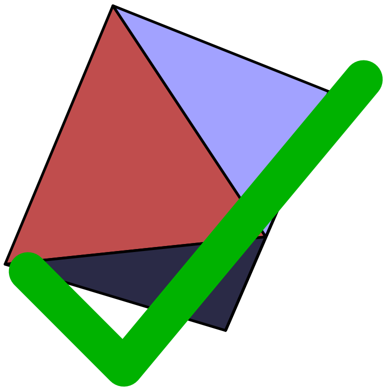

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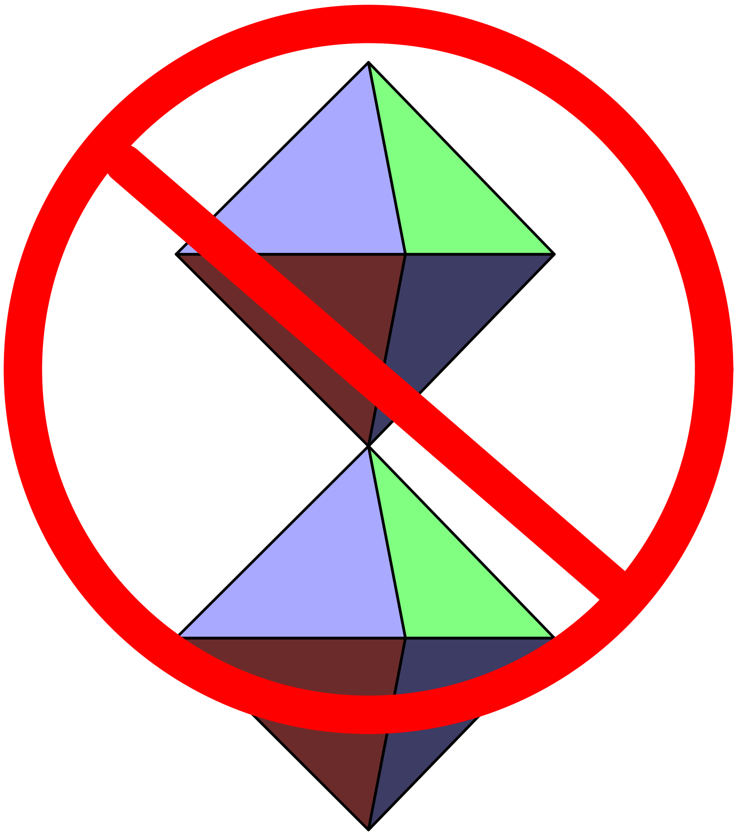

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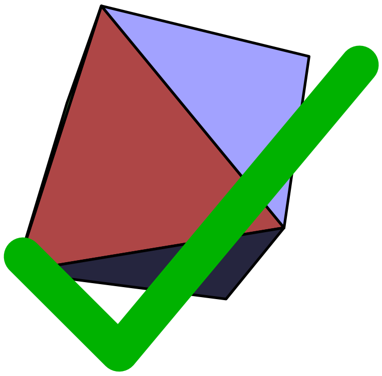

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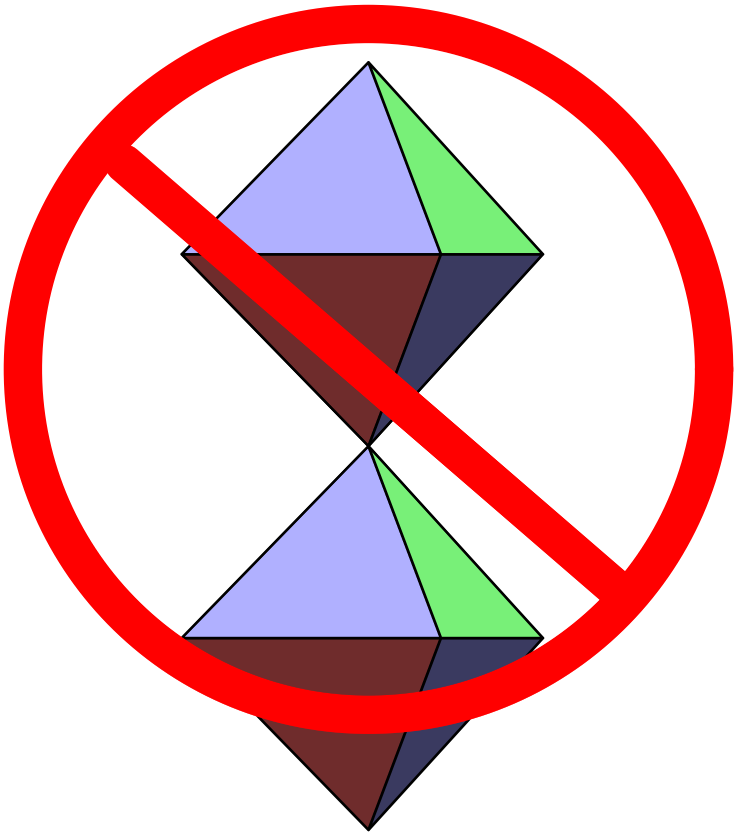

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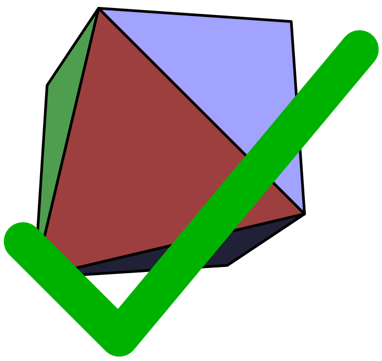
Animation: 65 of 72

Polyhedron: 3D solid made up of polygons. These polygons are called 'faces'. Also, the faces which share a vertex form a chain in which every pair of consecutive polygons share a side.



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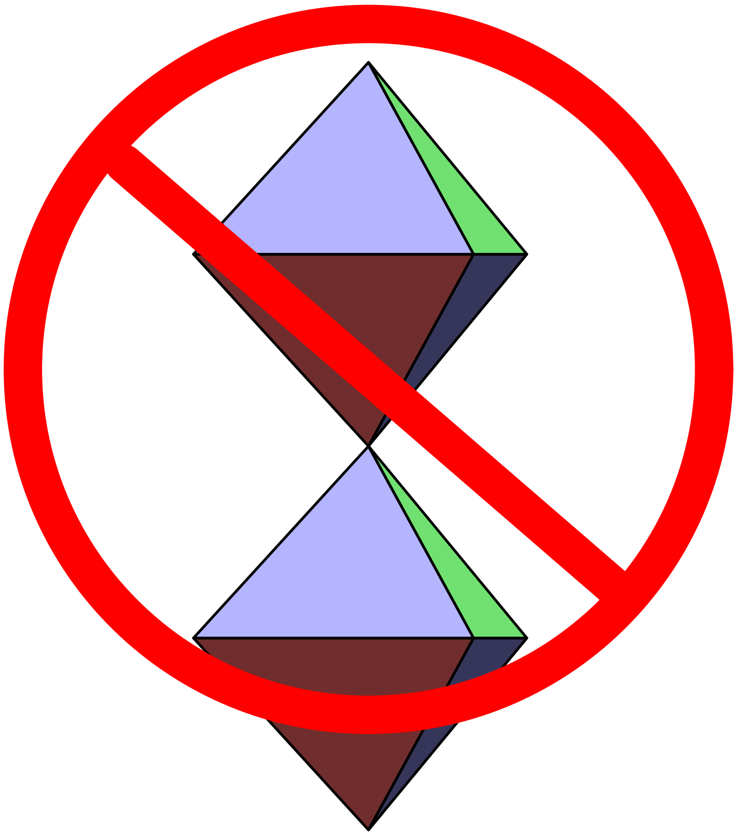

This strange shape is not a polyhedron, because at the center there are faces which share a vertex but do not form a chain.

Animation: 66 of 72

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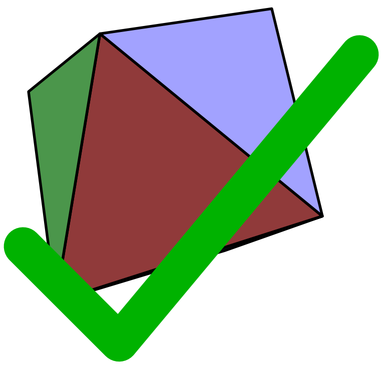

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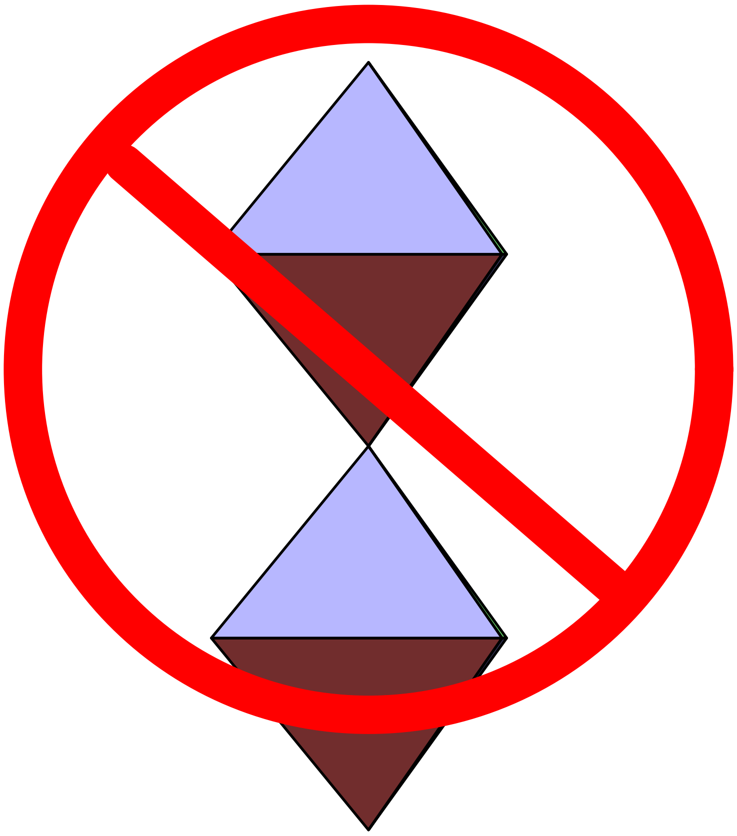

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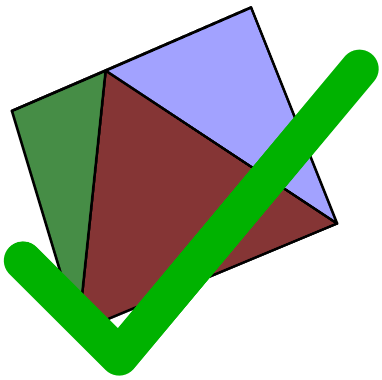

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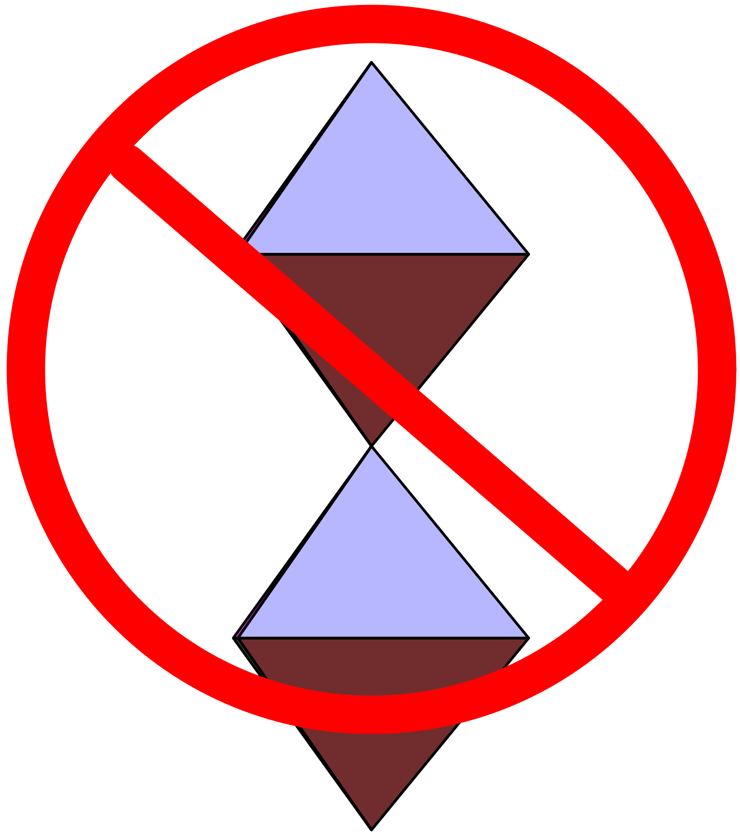

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Animation: 68 of 72

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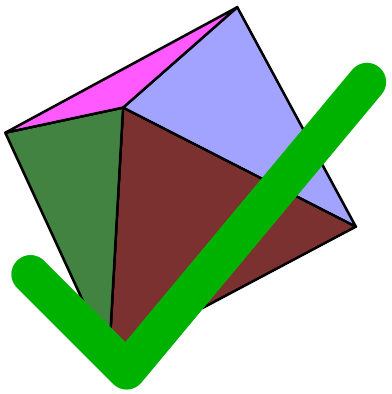

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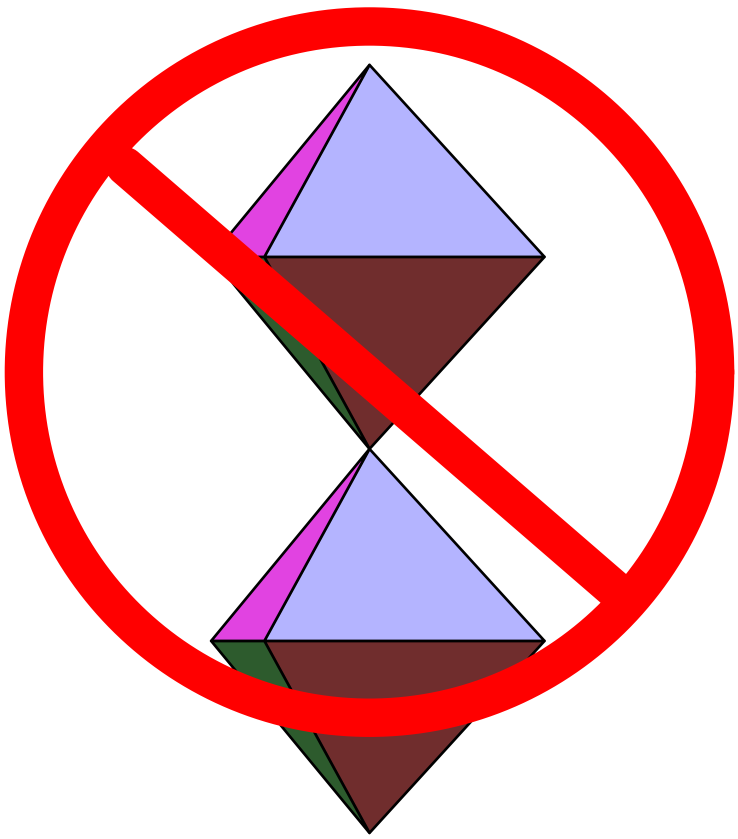

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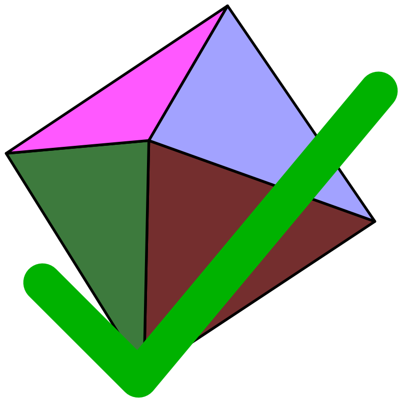

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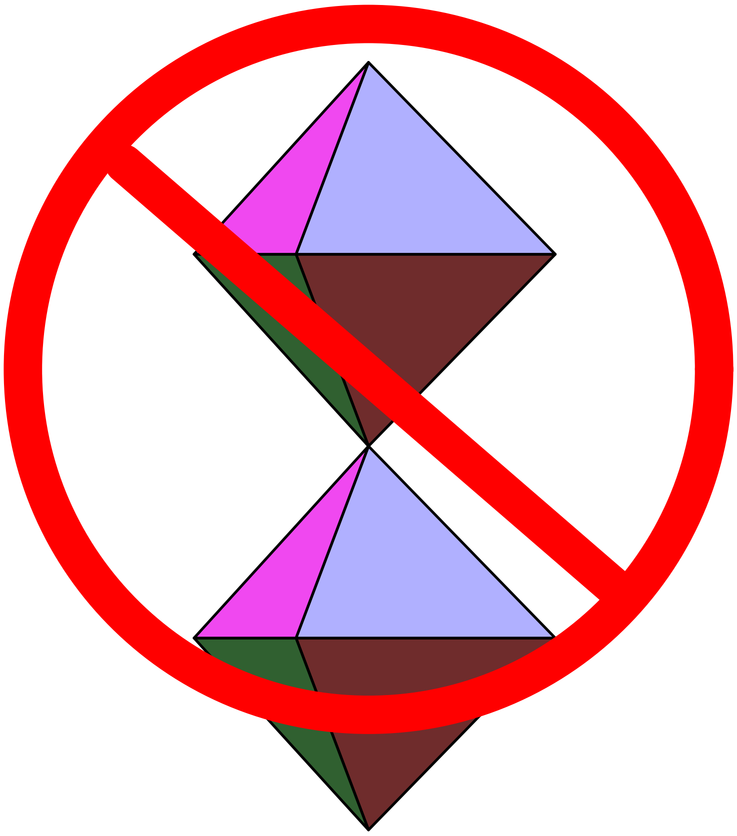

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Animation: 70 of 72

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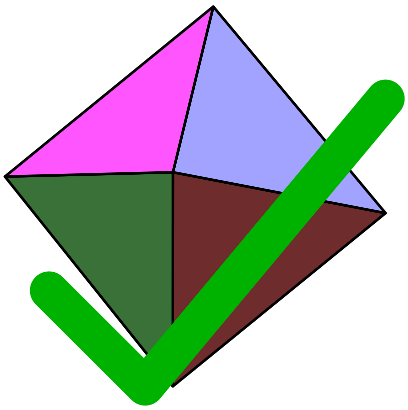

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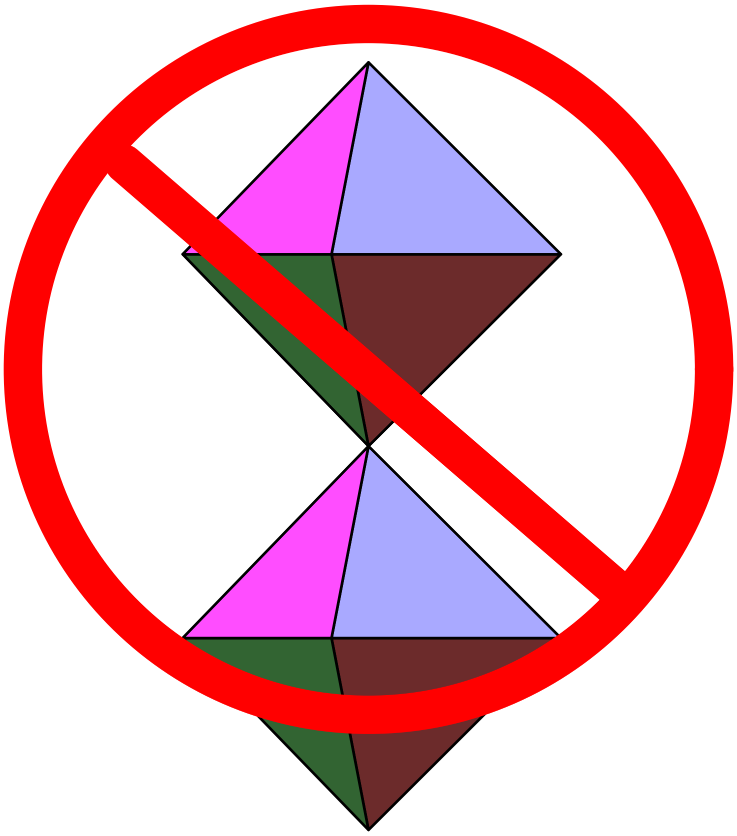

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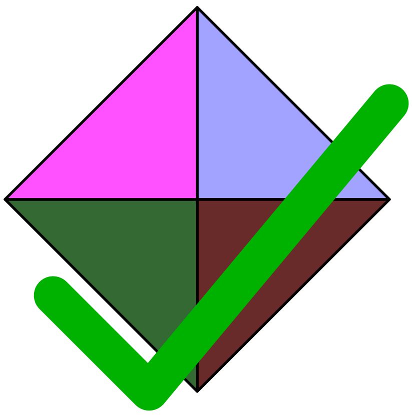

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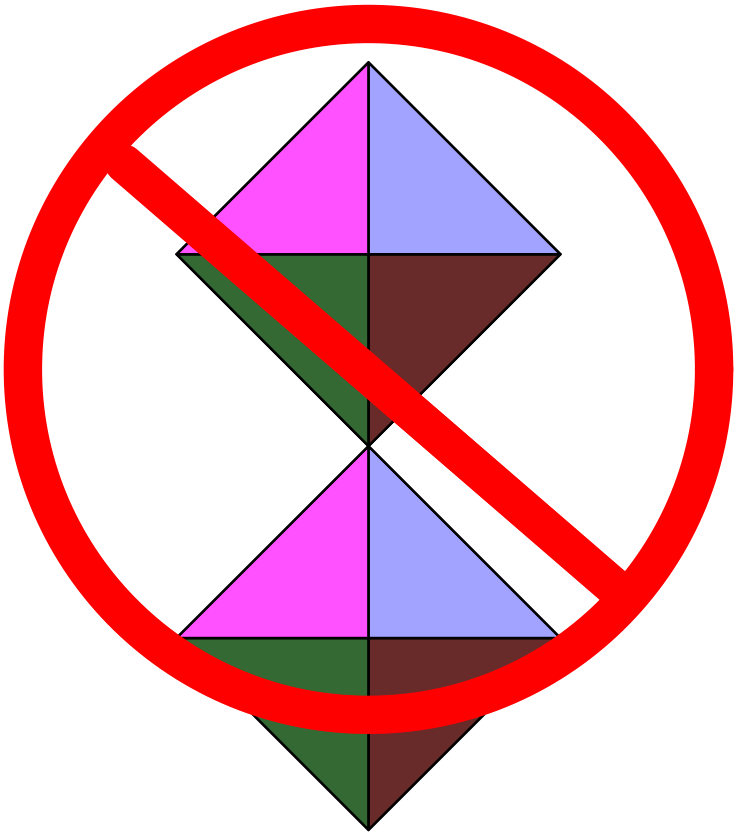

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Animation: 72 of 72

Now, some proof.

I'll show a proof by induction. The following algorithm will always reduce the problem to a base case, which agrees with the theorem.

The steps are also in each example, and the examples should be clear. Skim this if you want a textual explanation.

The steps:

1. Remove a face from the polyhedron, and stretch the rest of it into a planar graph. The removed face corresponds to the exterior of the graph, and thus persists until the base case.
2. Chop up any faces with more than 3 vertices into triangles. Each cut adds 1 face and 1 edge, which maintains the balance of F - E + V = 2.
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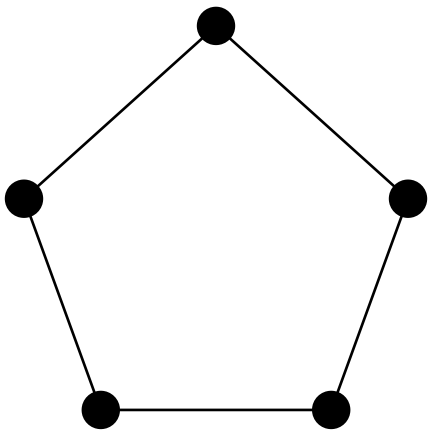

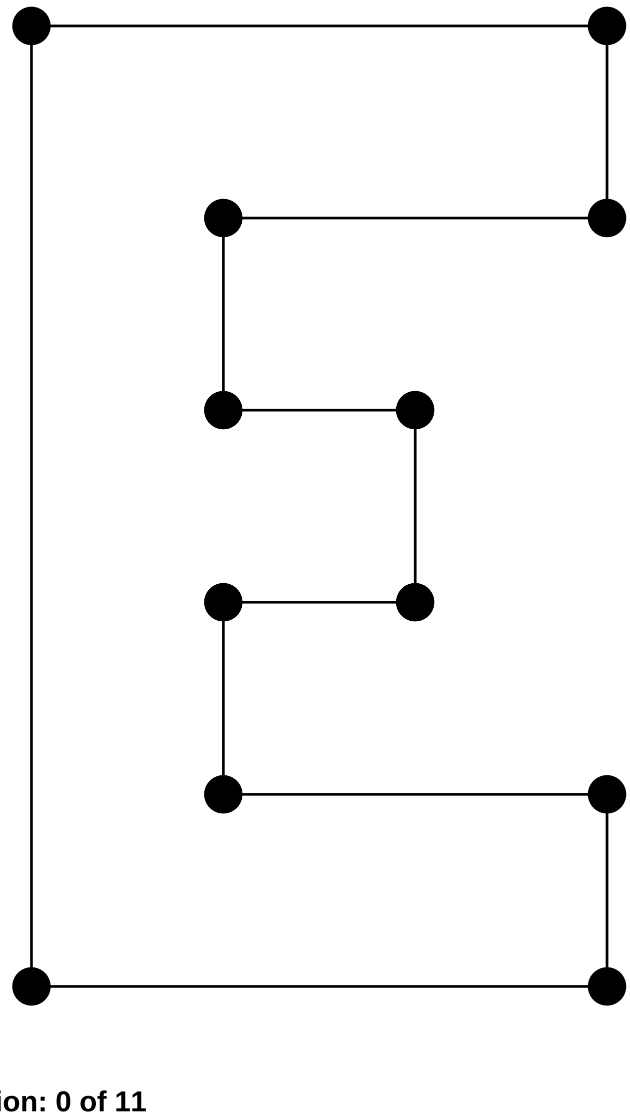

Step 2 can be hard if the polygon is not convex; but that is another story altogether.

Next: less talk, more pictures!

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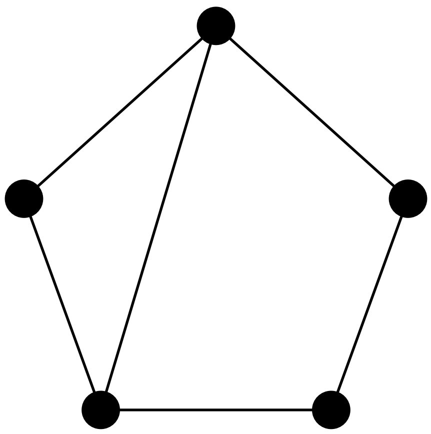

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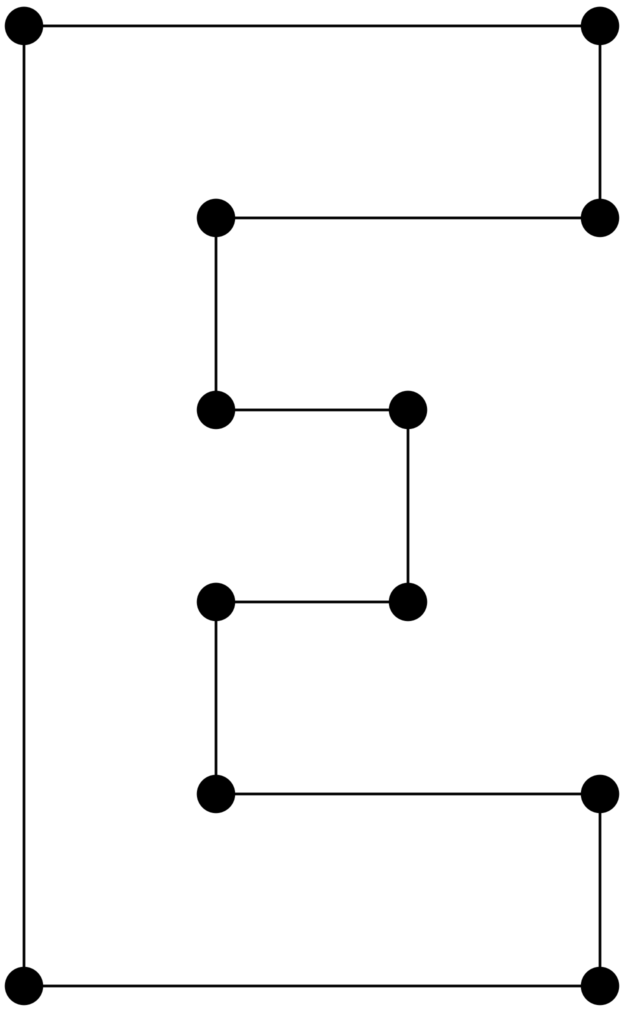

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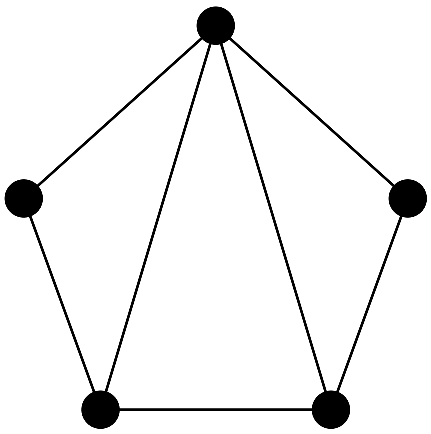

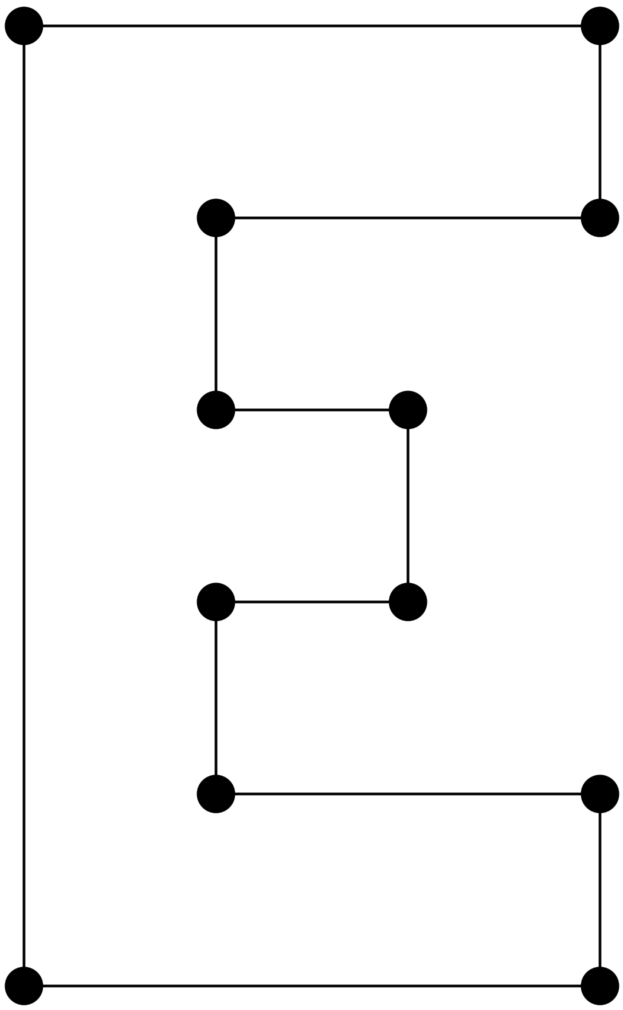

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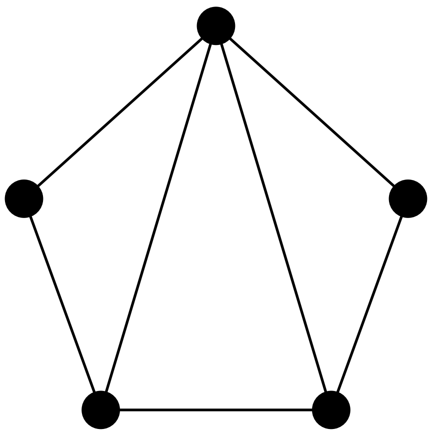

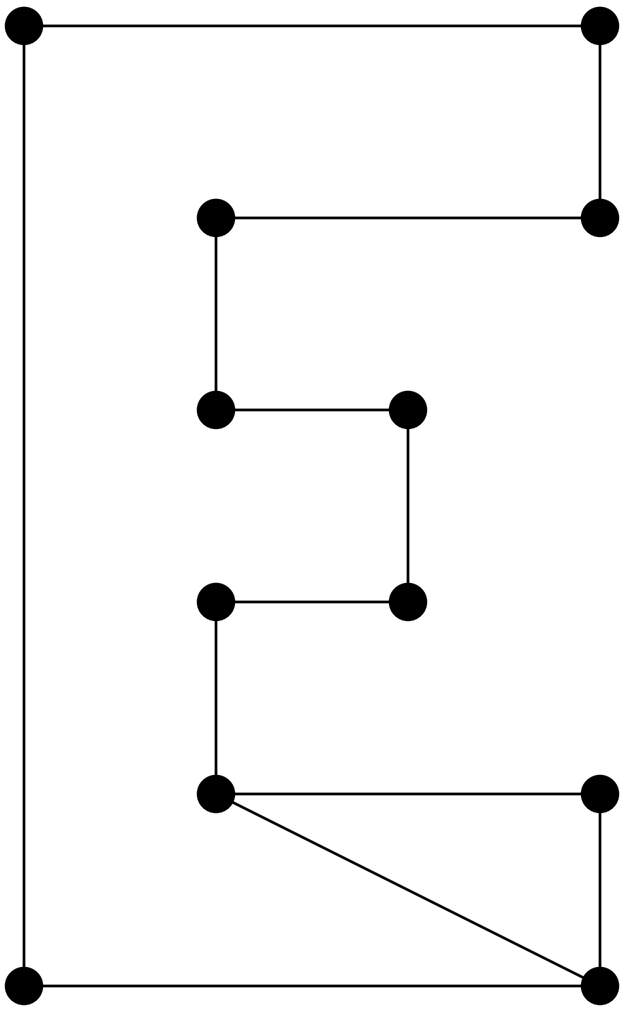

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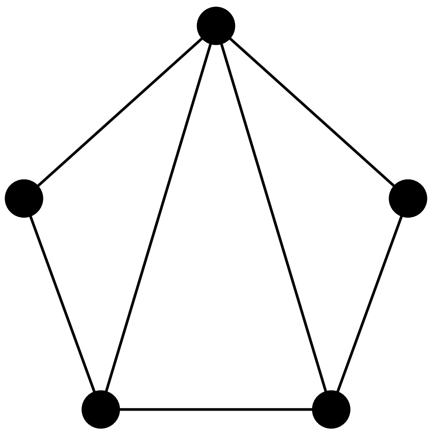

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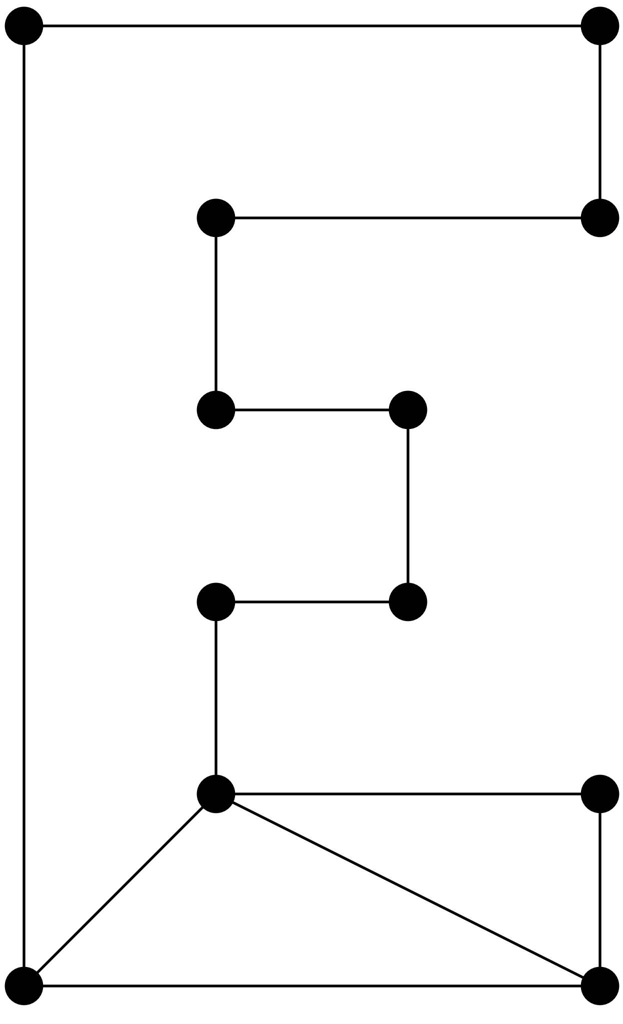

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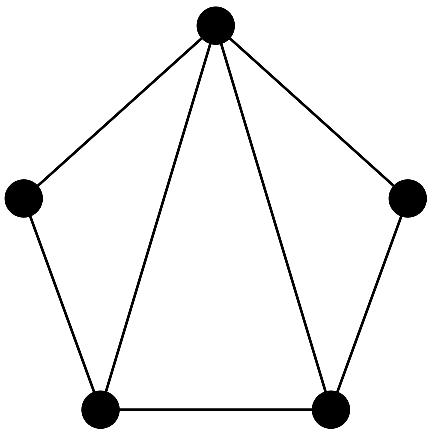

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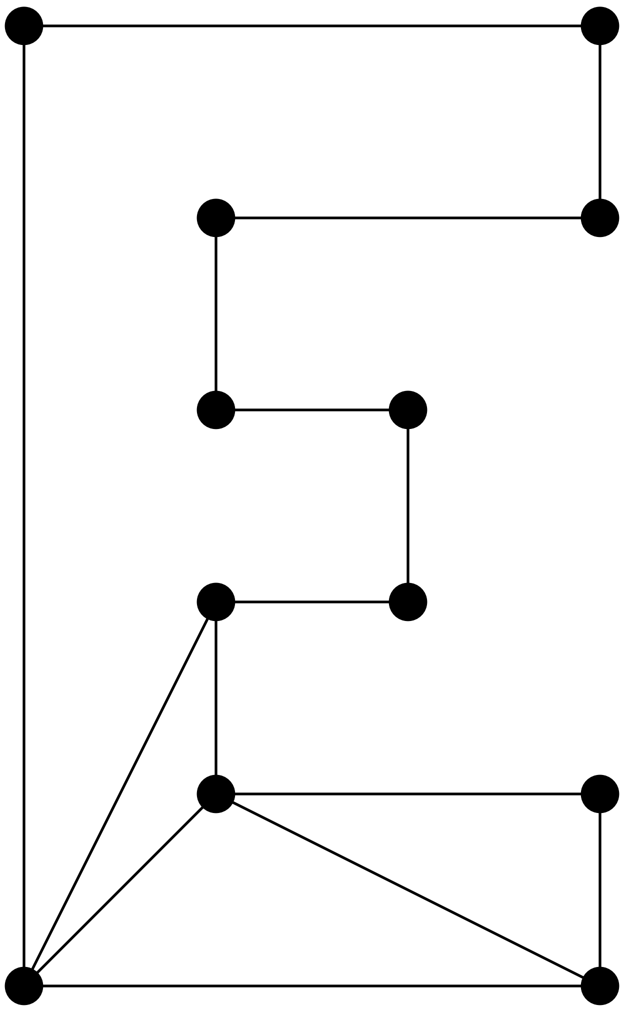

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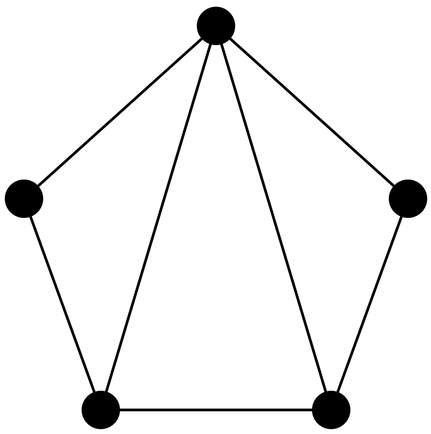

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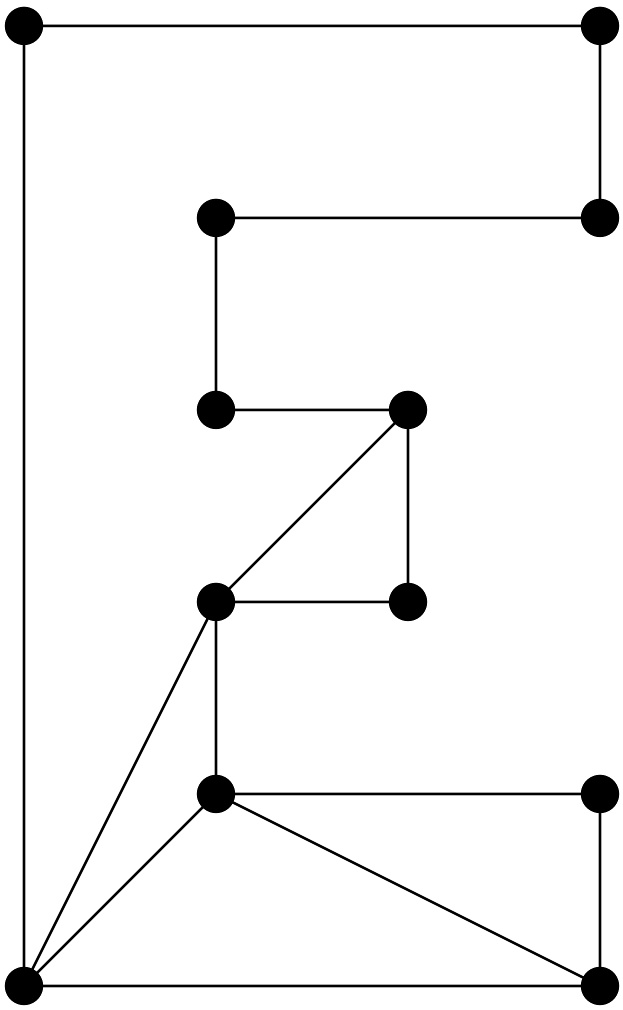

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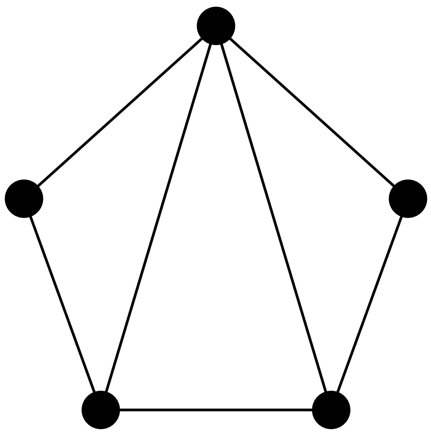

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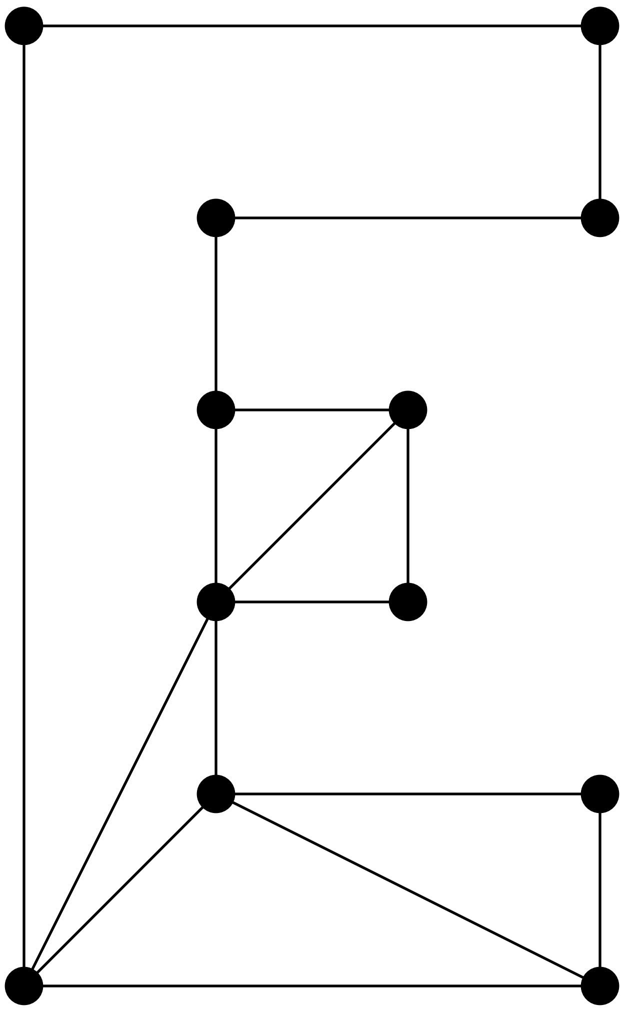

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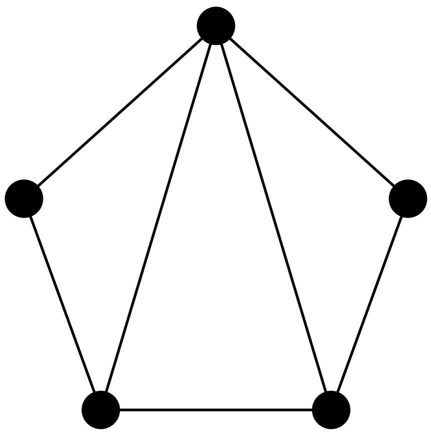

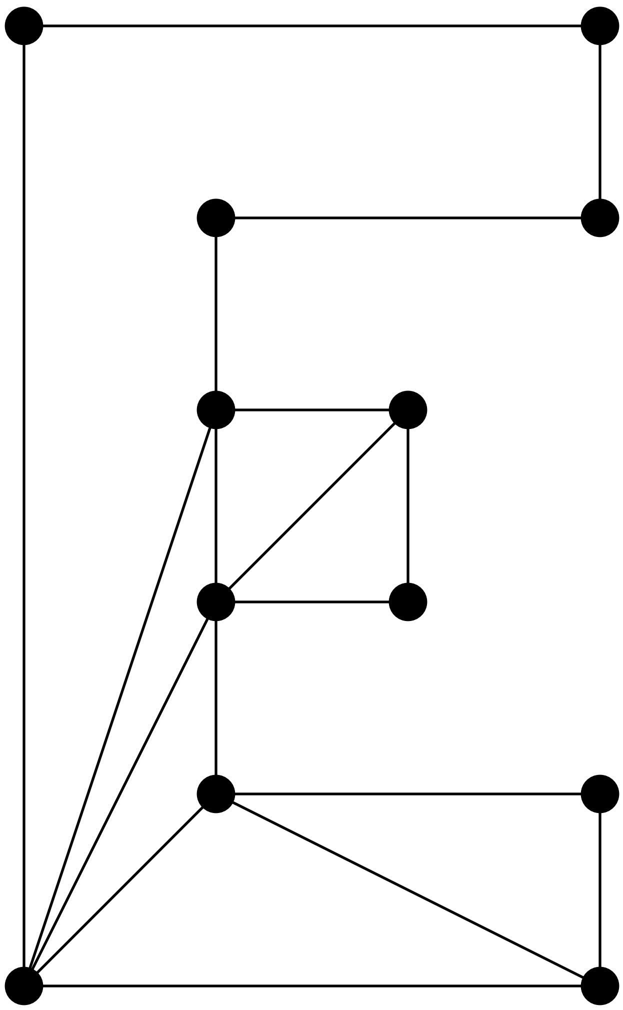

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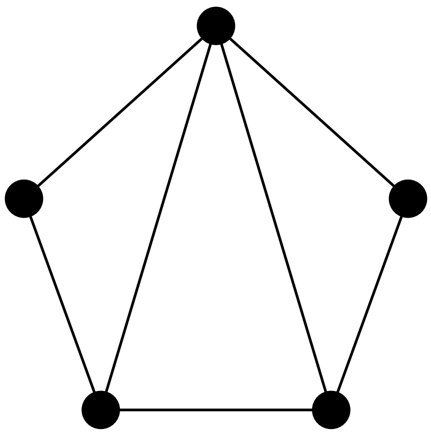

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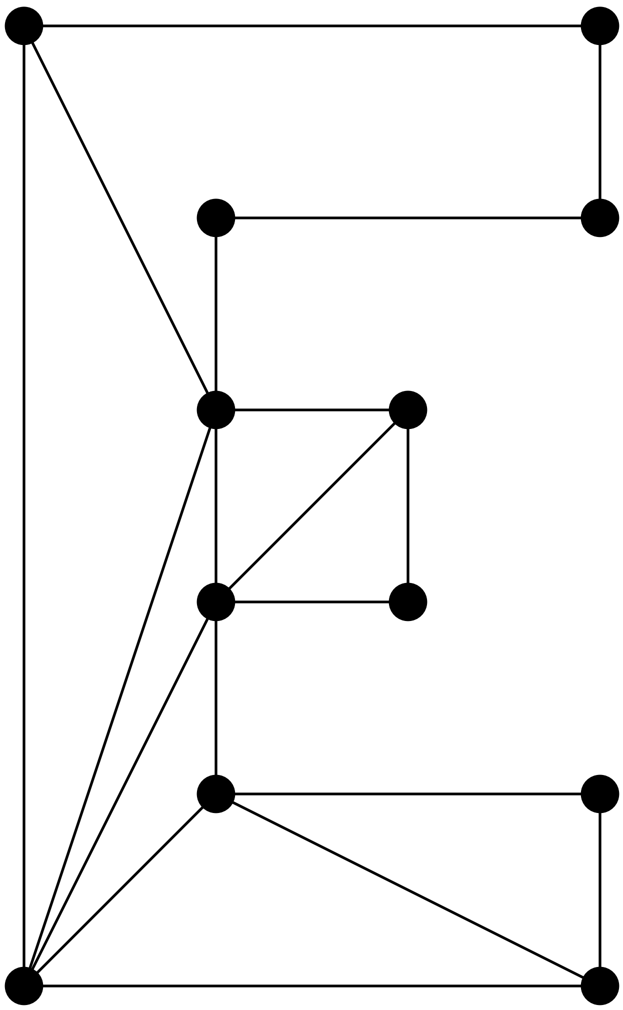

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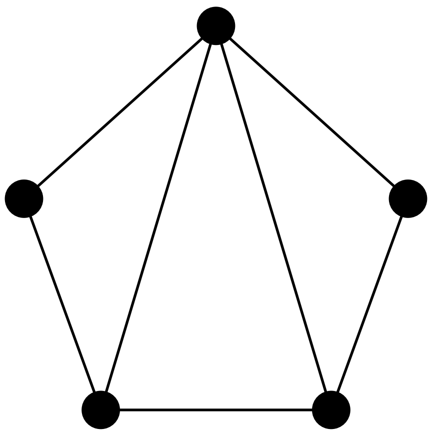

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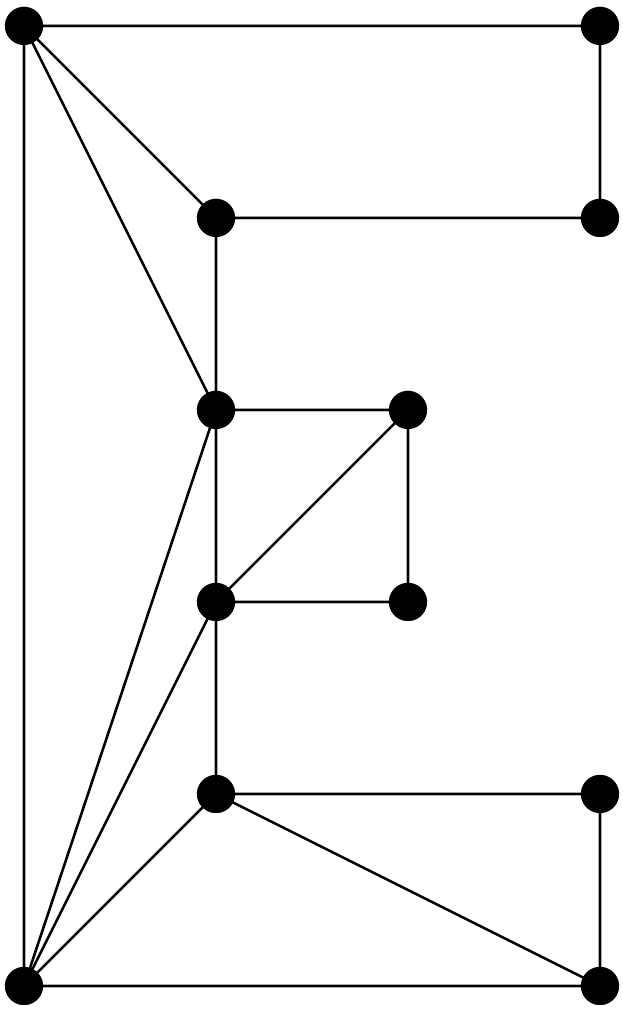

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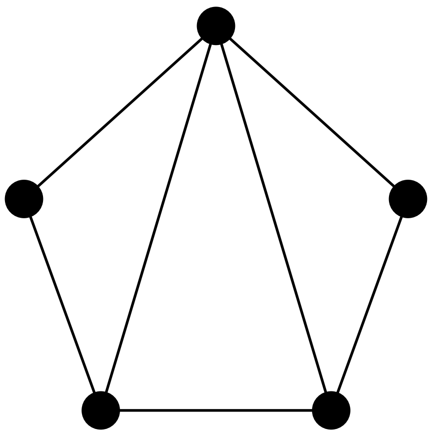

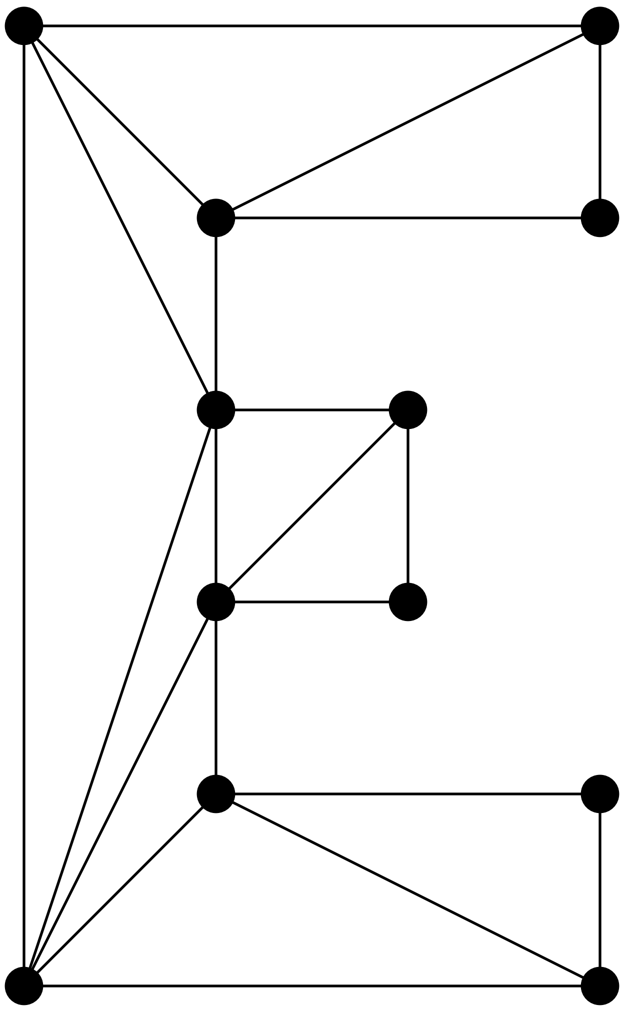

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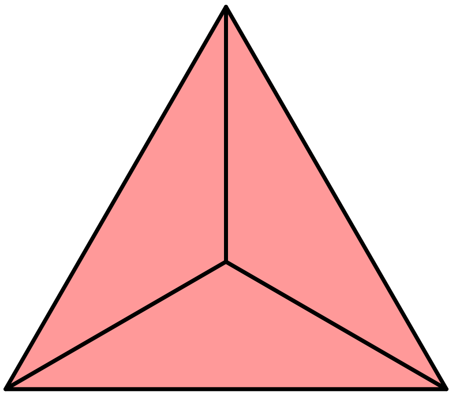

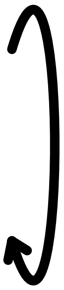

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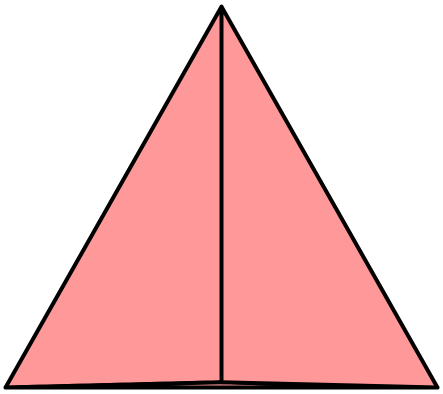

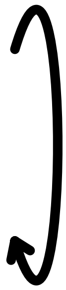

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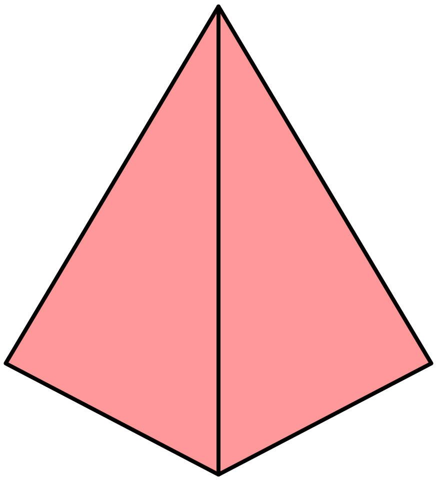

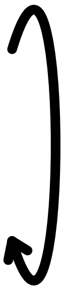

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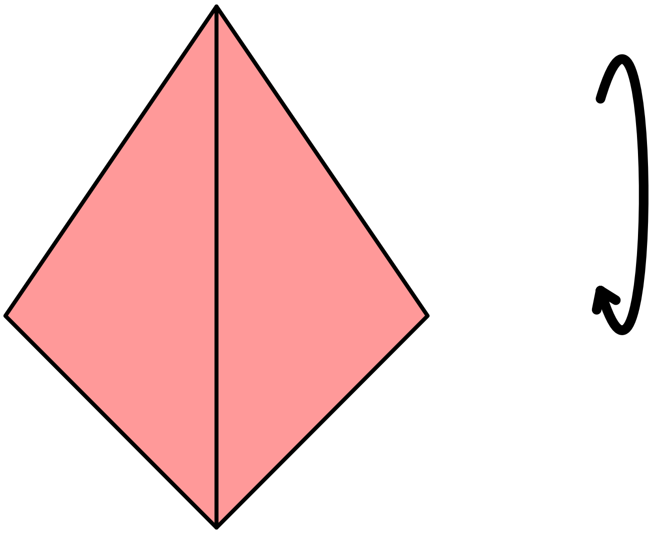

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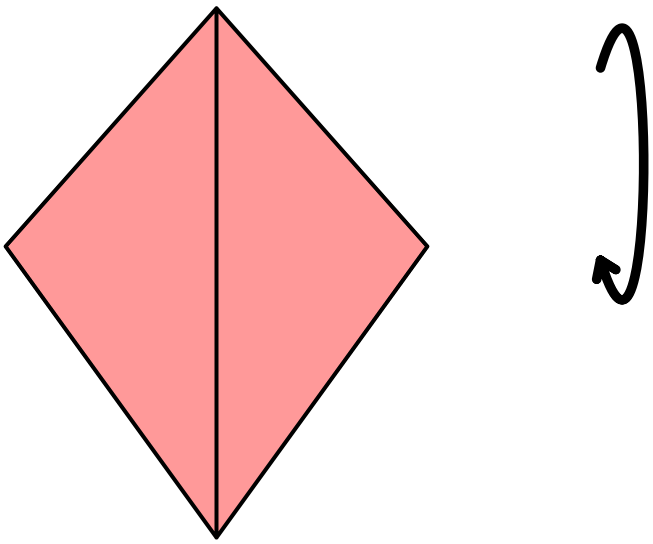

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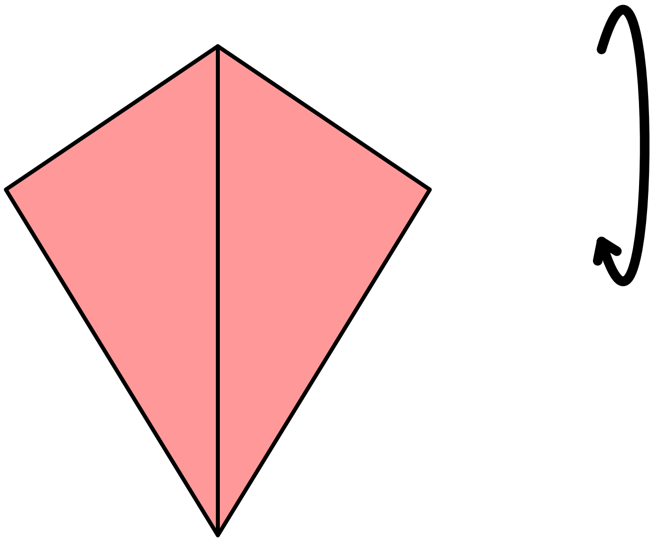

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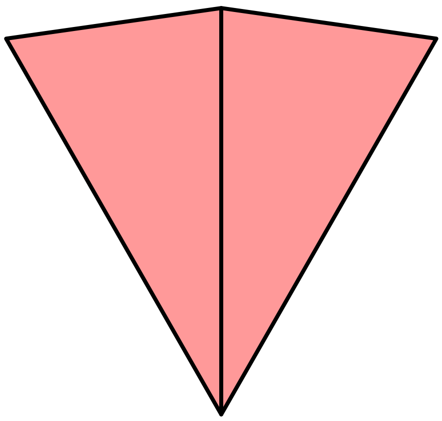

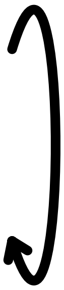

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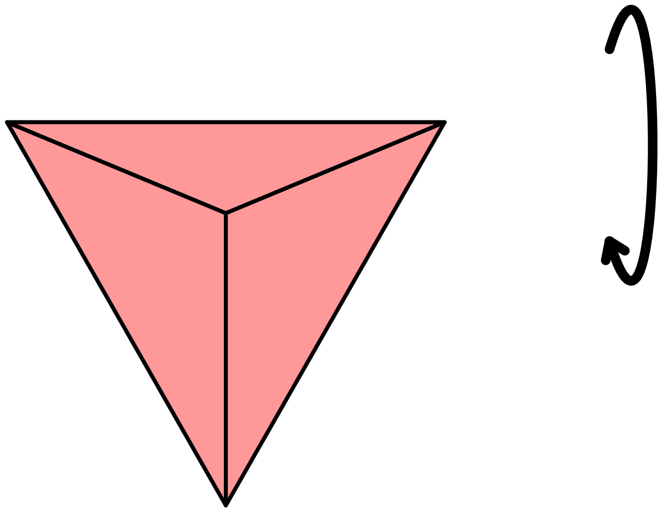

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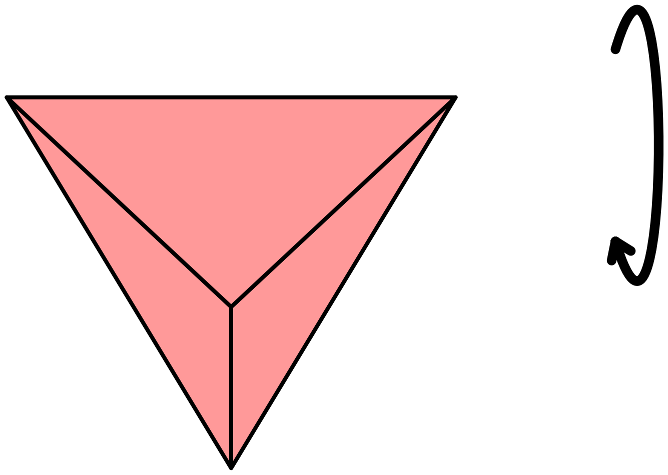

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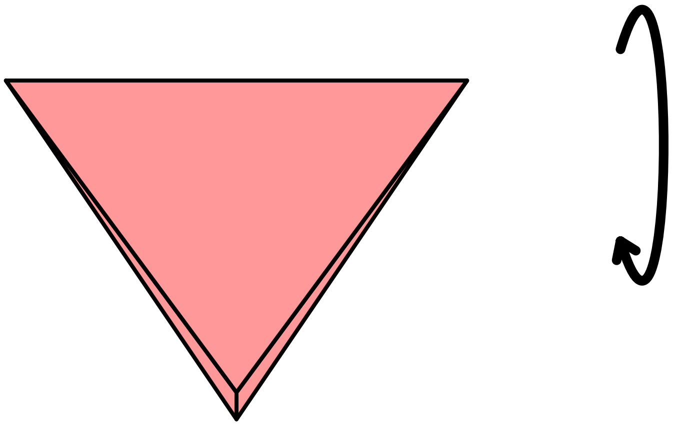

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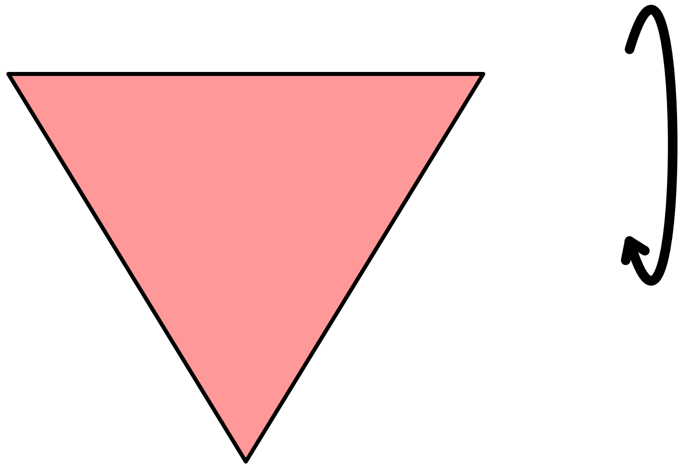

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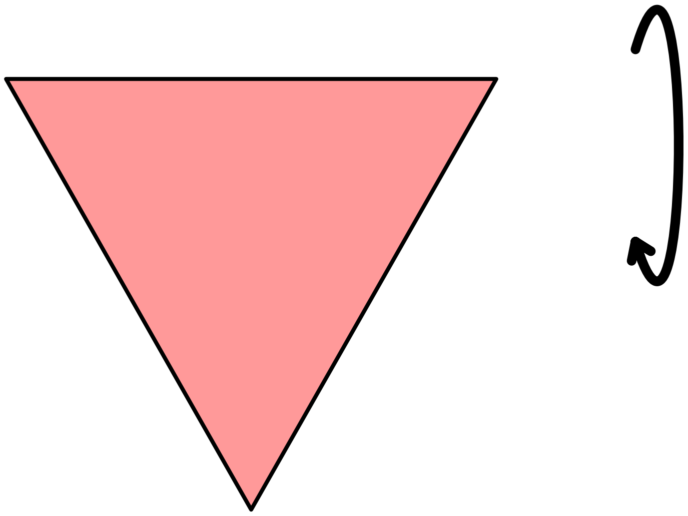

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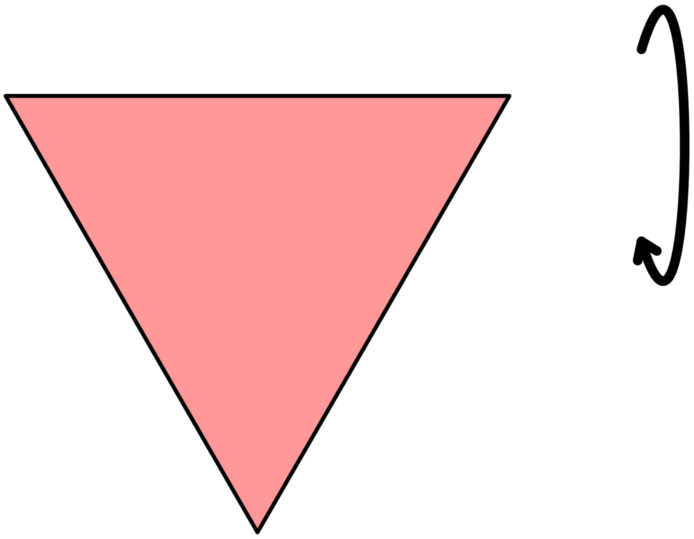

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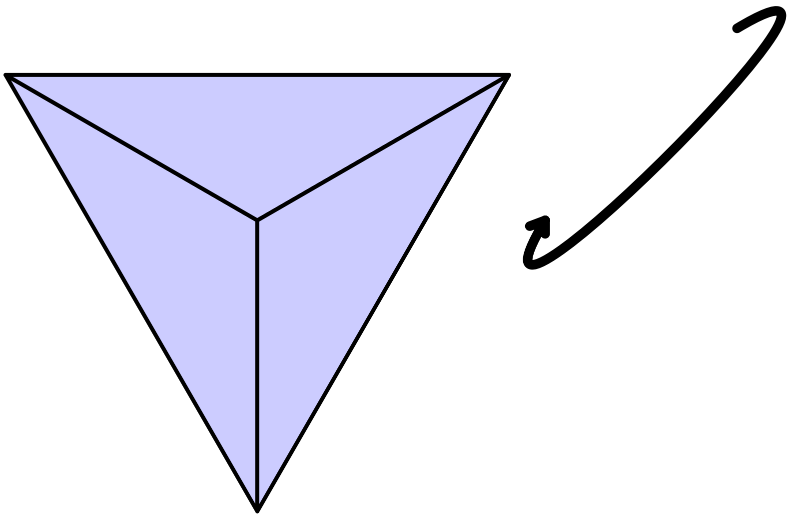

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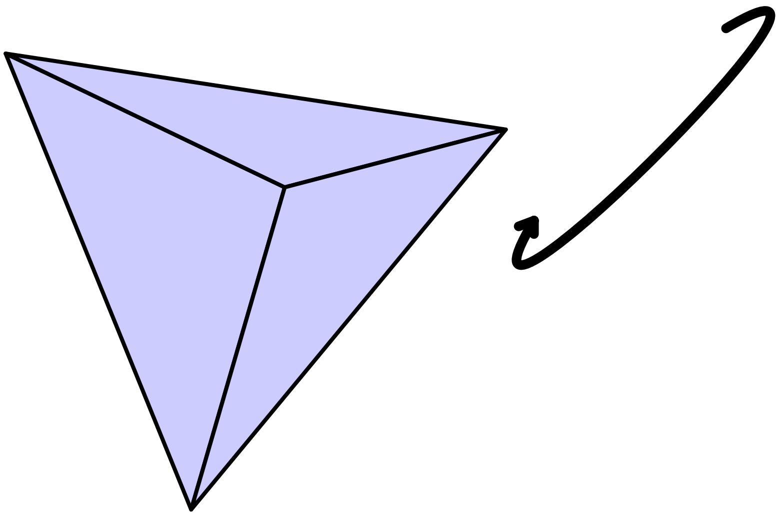

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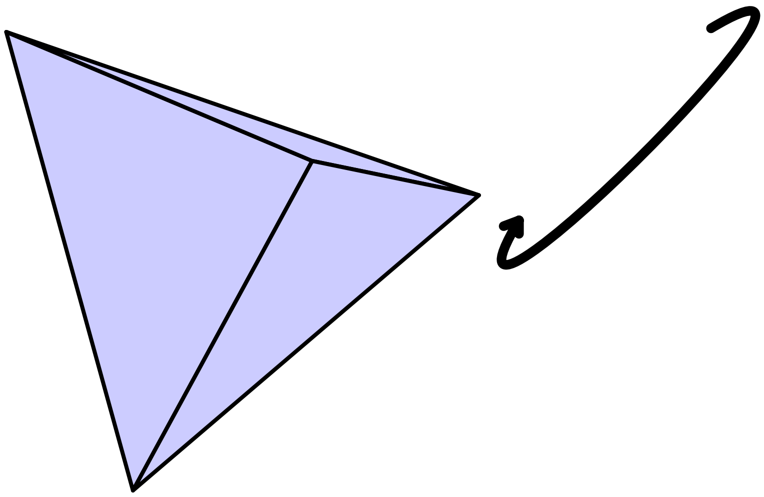

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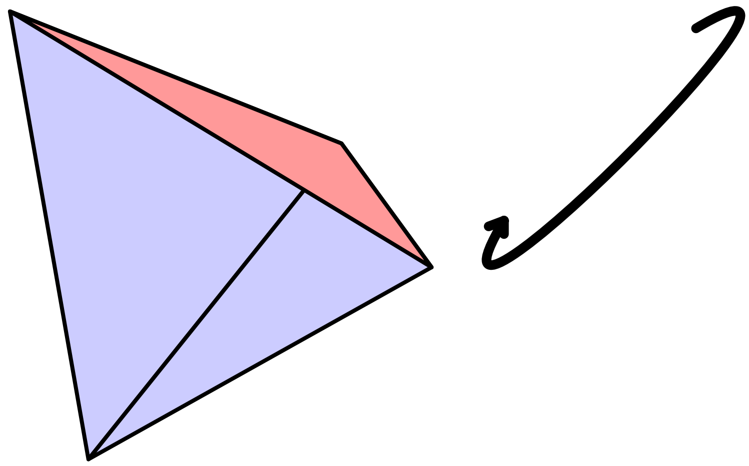

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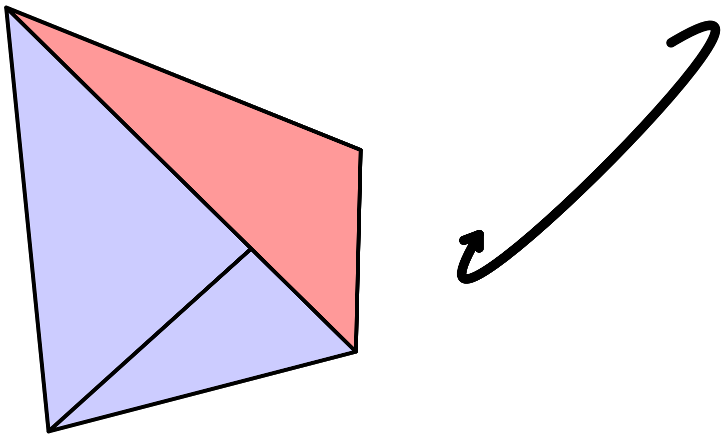

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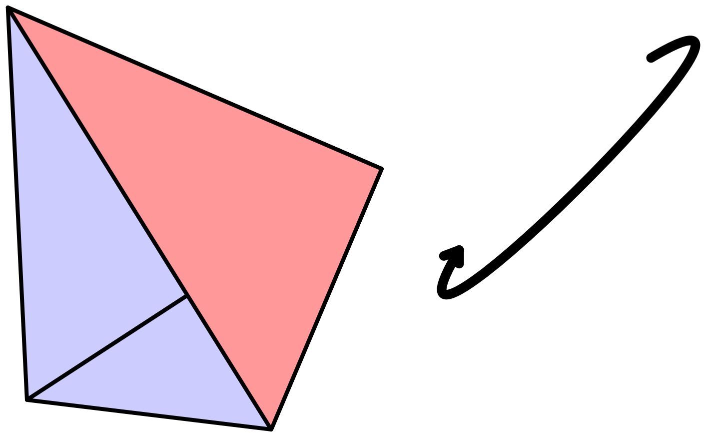

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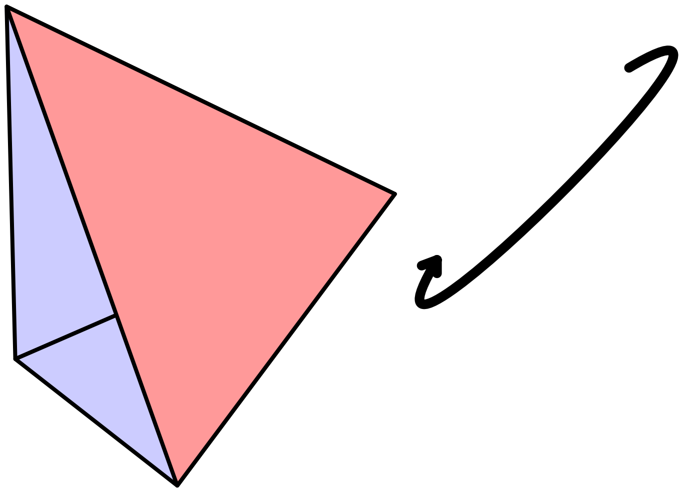

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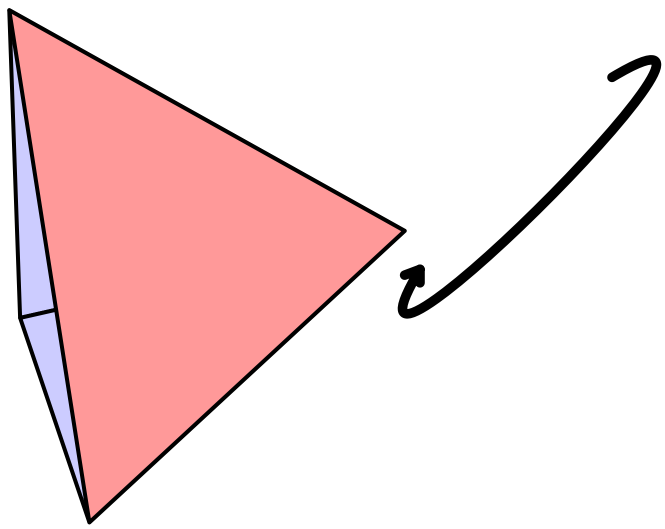

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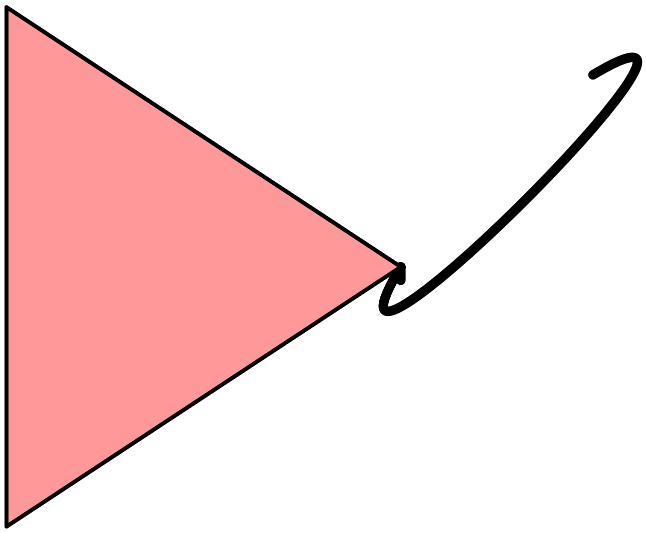

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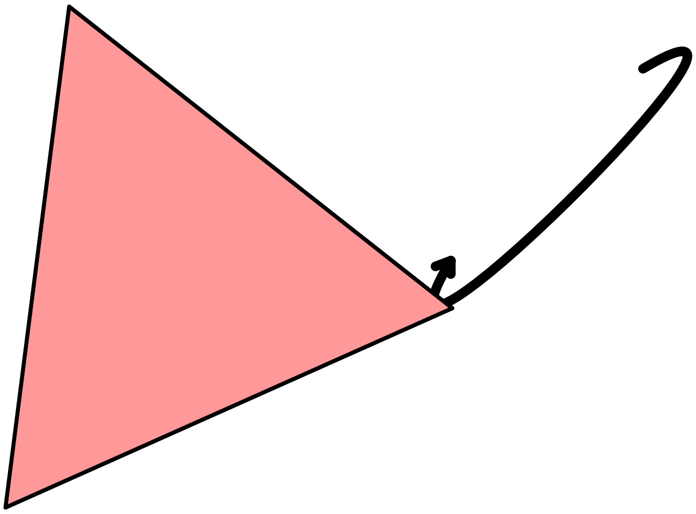

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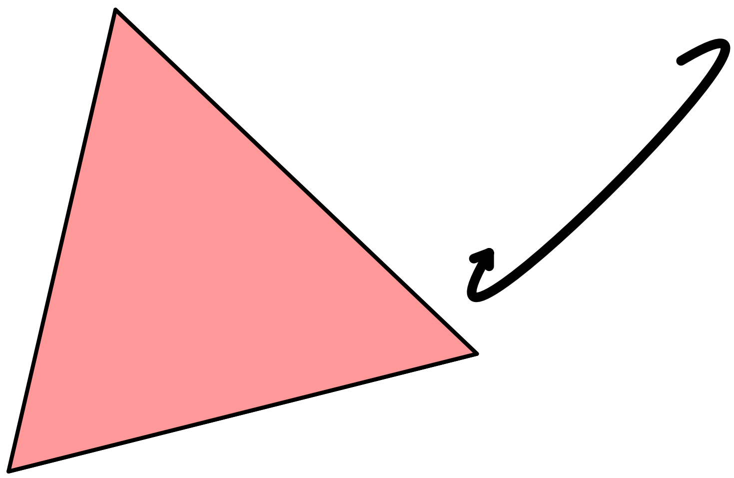

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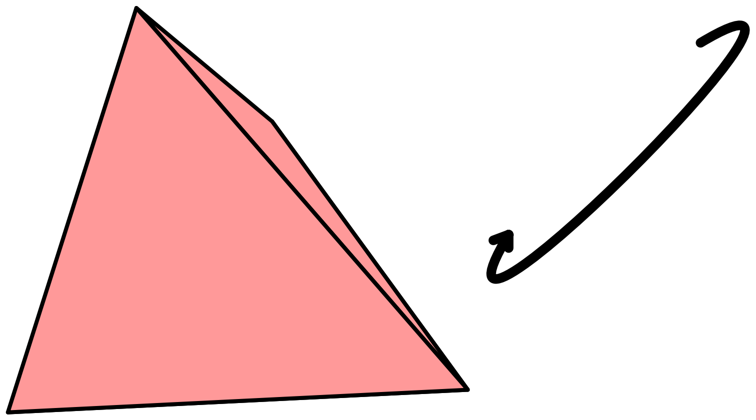

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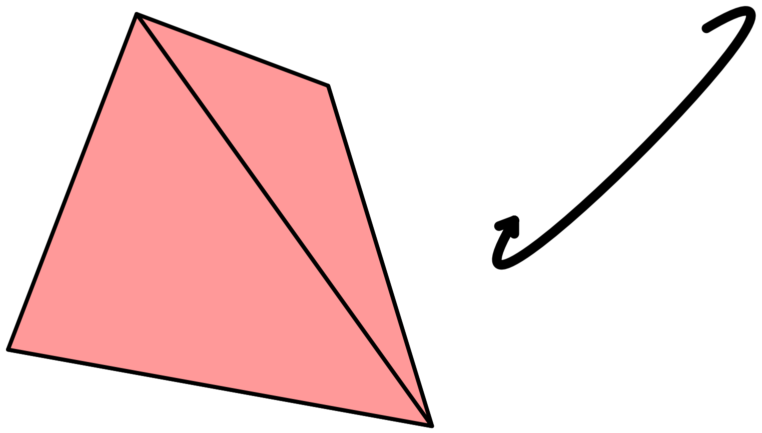

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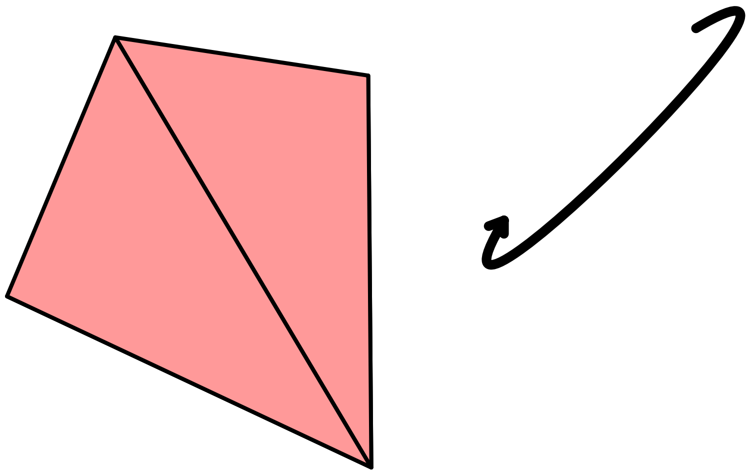

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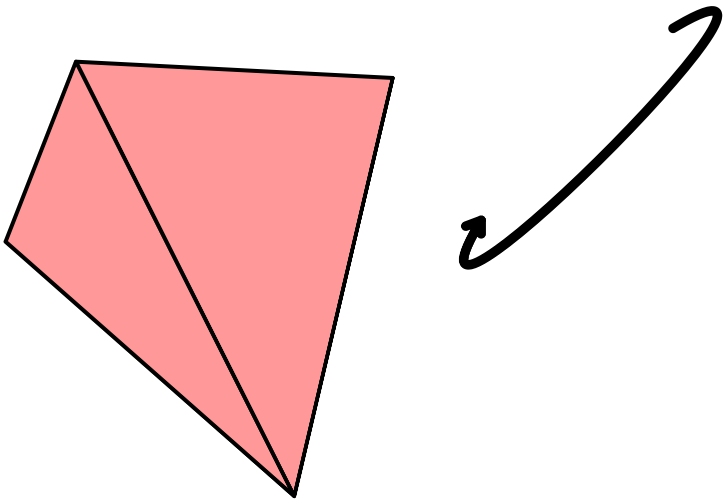

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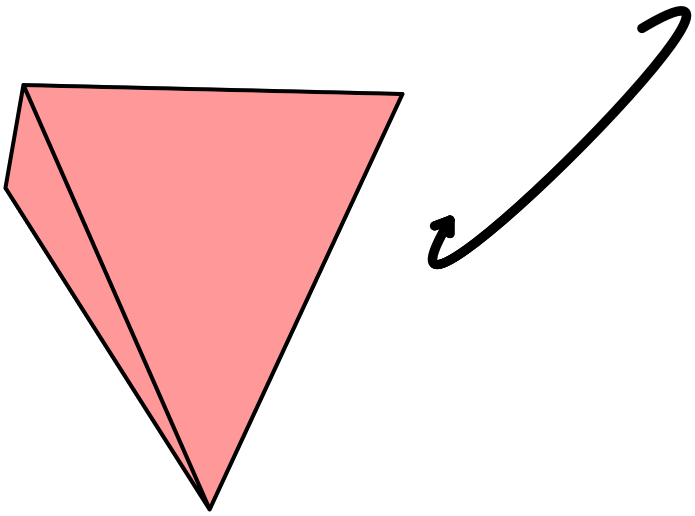

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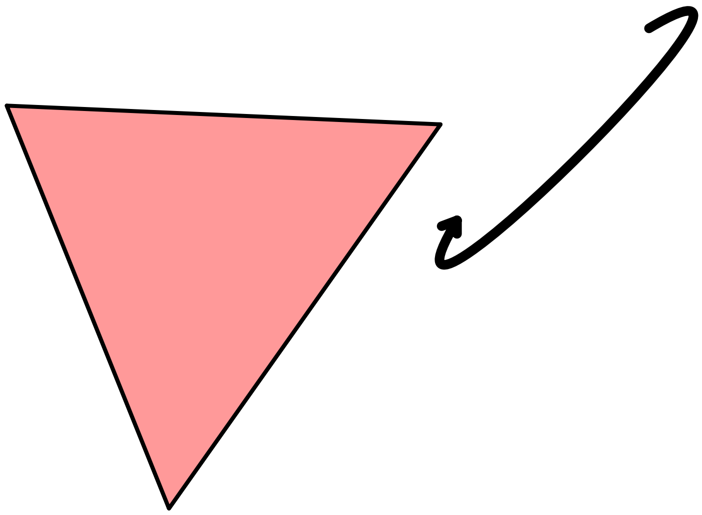


Step	F	E	V	Sum
0	4	6	4	2
1	4	6	4	2

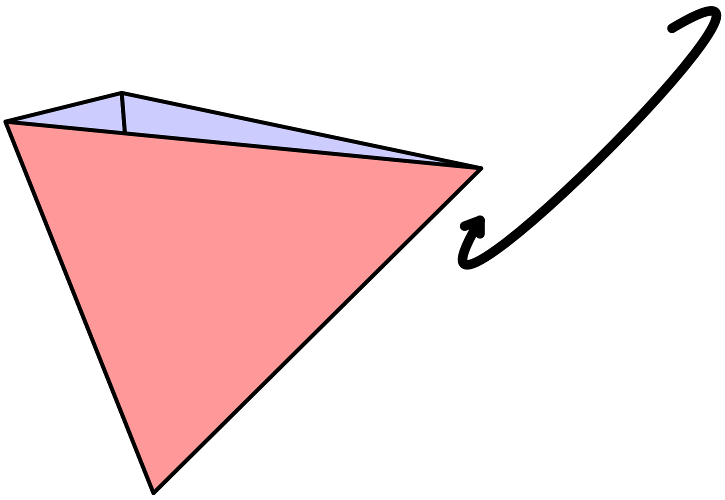
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove 2 edged faces.

Step 4: Remove a 1 edged face.

Example: A tetrahedron



Step	F	E	V	Sum
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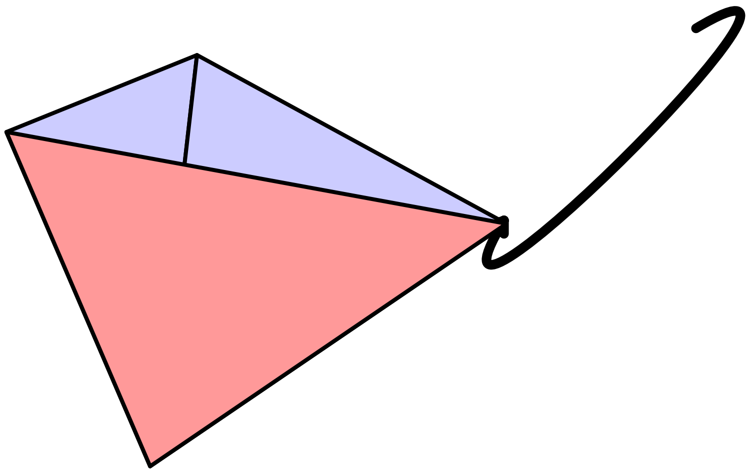

Step	F	E	V	Sum
0	4	6	4	2
1	4	6	4	2

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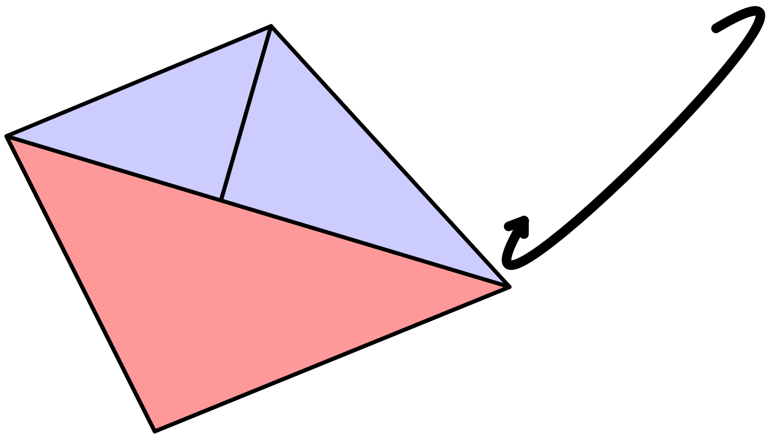

Step	F	E	V	Sum
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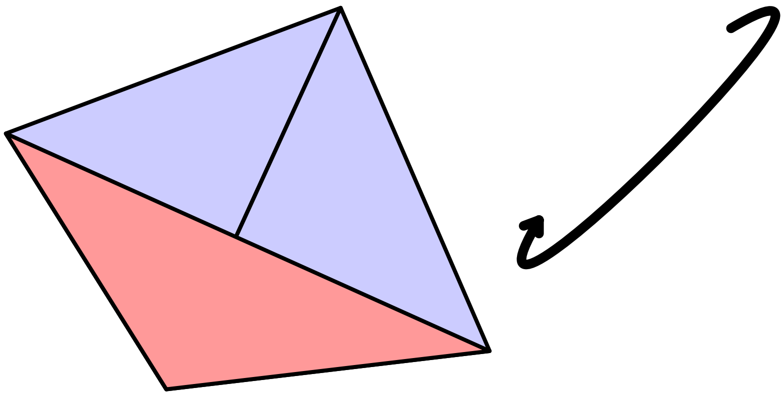

Step	F	E	V	Sum
0	4	6	4	2
1	4	6	4	2

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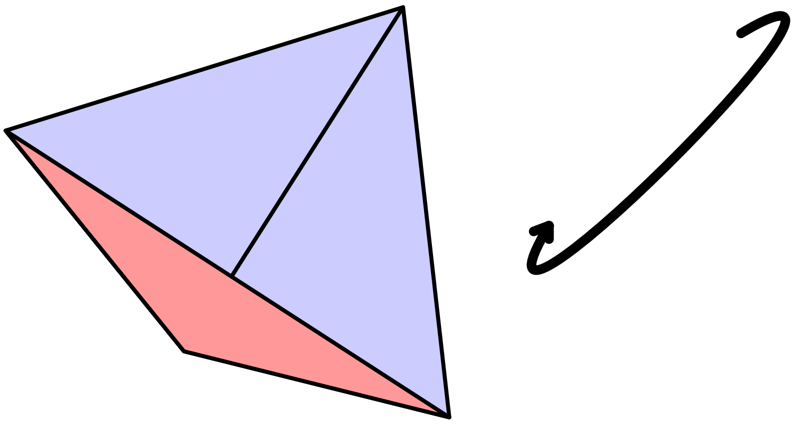

Step	F	E	V	Sum
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1	4	6	4	2

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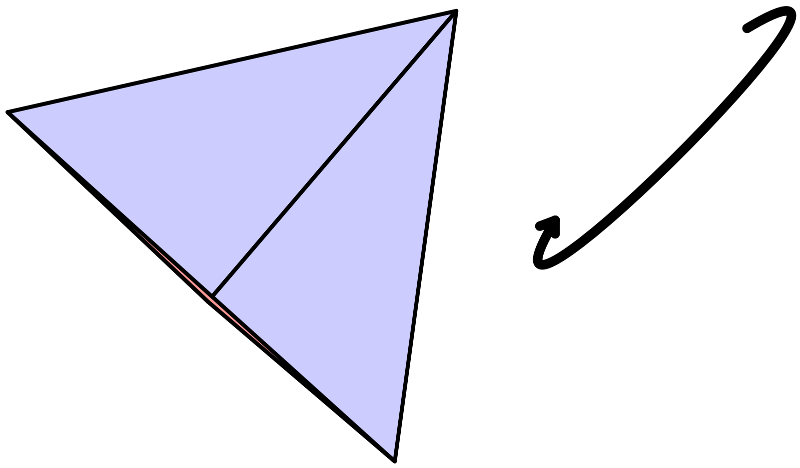
Example: A tetrahedron



Step	F	E	V	Sum
0	4	6	4	2
1	4	6	4	2

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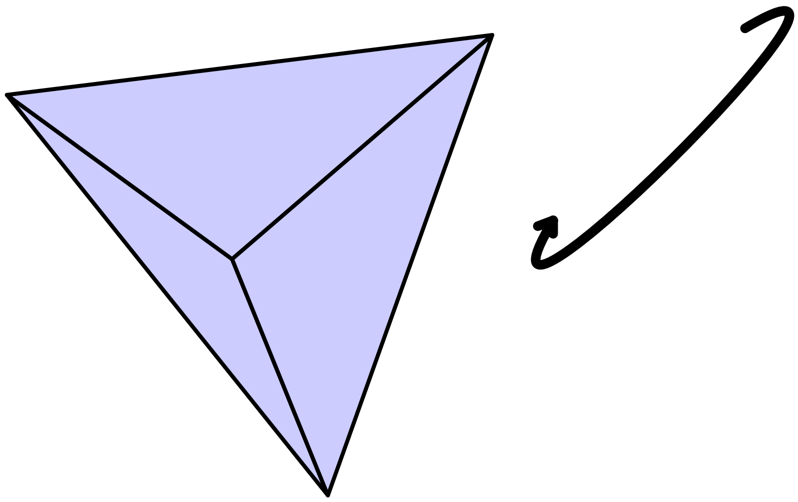
Example: A tetrahedron



Step	F	E	V	Sum
0	4	6	4	2
1	4	6	4	2

Step 1: Remove a face; reduce to graph.

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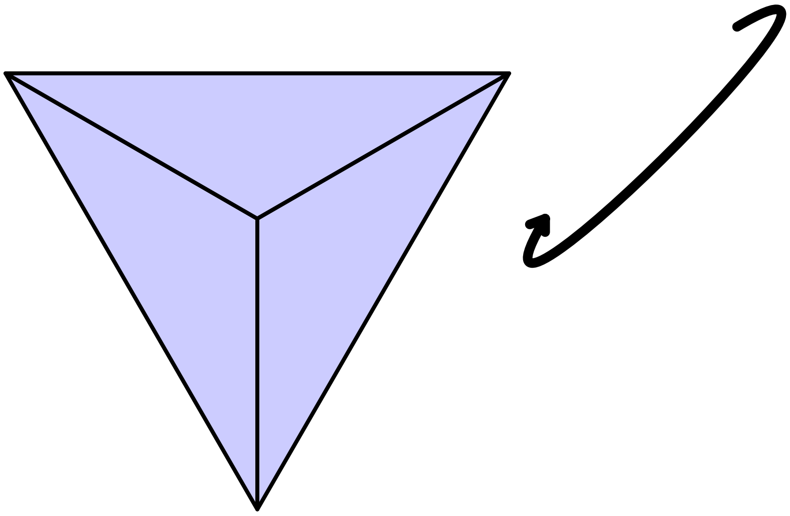
Example: A tetrahedron



Step	F	E	V	Sum
0	4	6	4	2
1	4	6	4	2

Step 1: Remove a face; reduce to graph.

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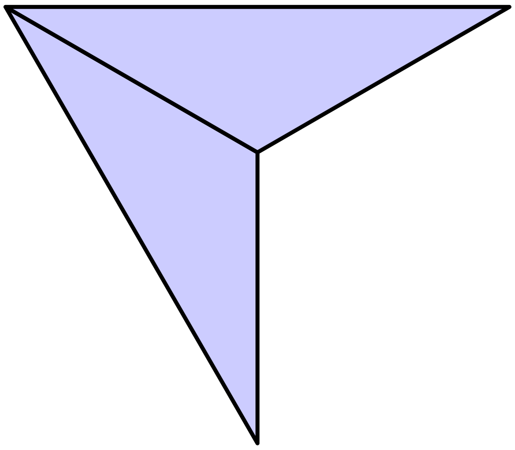
Example: A tetrahedron



Step	F	E	V	Sum
0	4	6	4	2
1	4	6	4	2
4	3	5	4	2

Step 1: Remove a face; reduce to graph.

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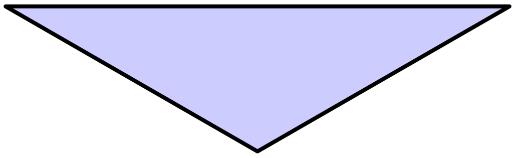
Example: A tetrahedron



Step	F	E	V	Sum
0	4	6	4	2
1	4	6	4	2
4	3	5	4	2
3	2	3	3	2

We are down to a triangle, which has 2 faces, 3 vertices and 3 edges. This is our base case.

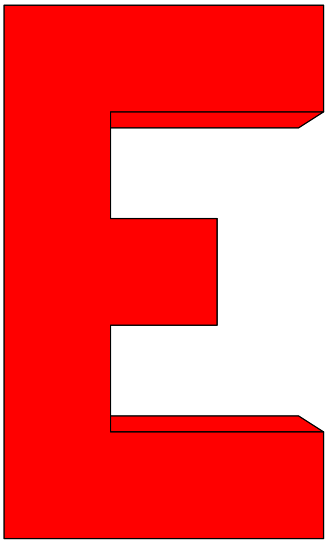
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove 2 edged faces.

Step 4: Remove a 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2

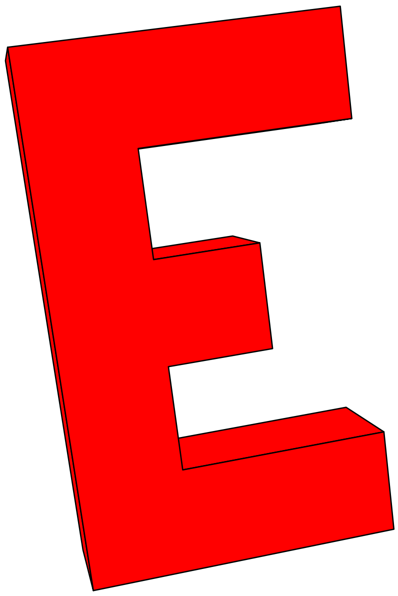
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



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0	14	36	24	2

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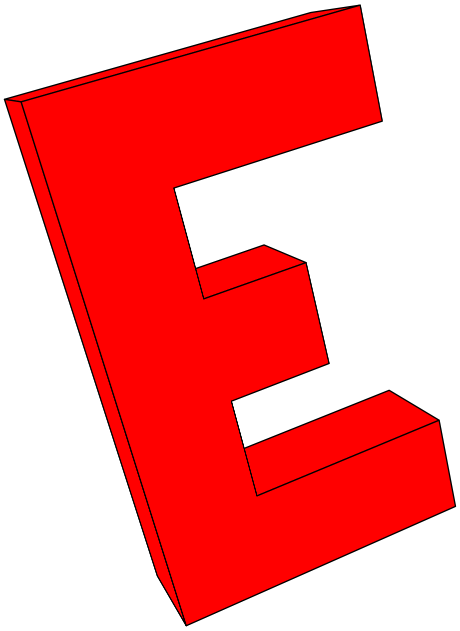
Non-convex example: a capital E



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0	14	36	24	2

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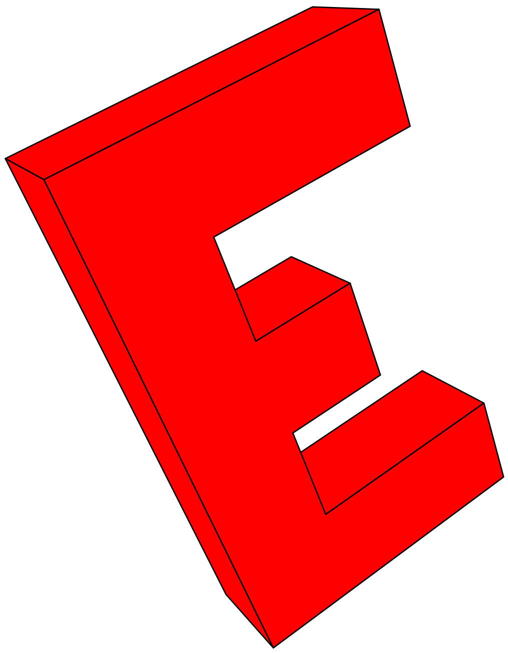
Non-convex example: a capital E



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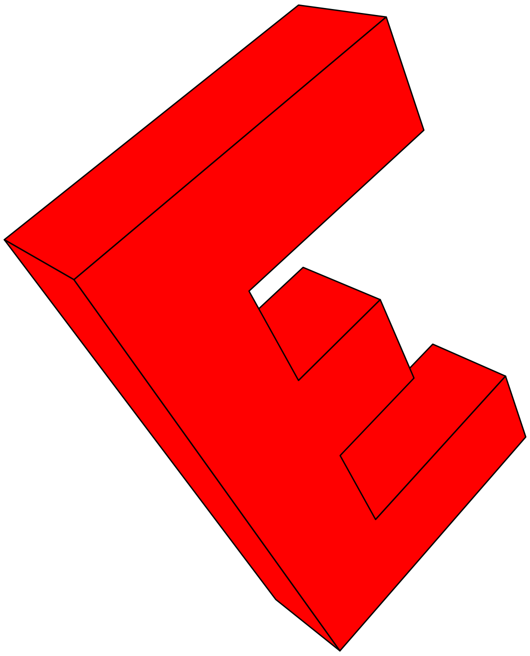
Non-convex example: a capital E



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0	14	36	24	2

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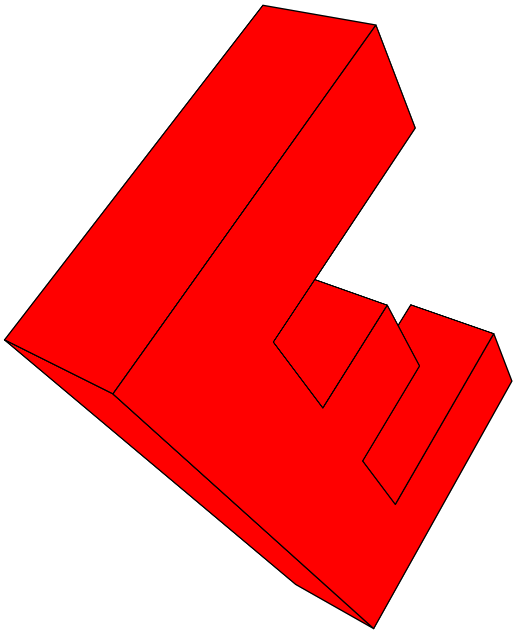
Non-convex example: a capital E



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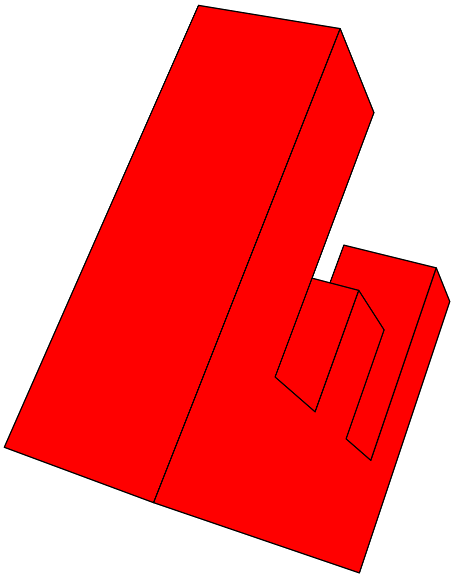
Non-convex example: a capital E



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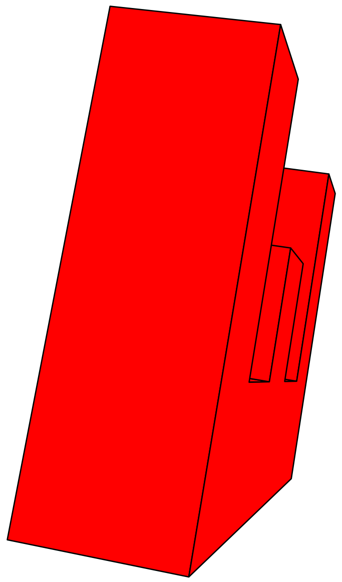

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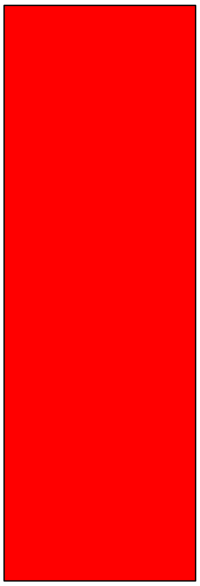

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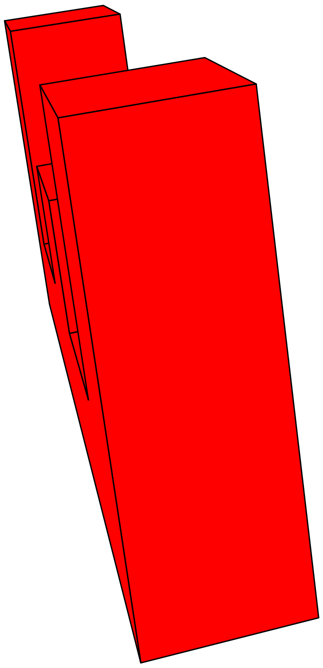

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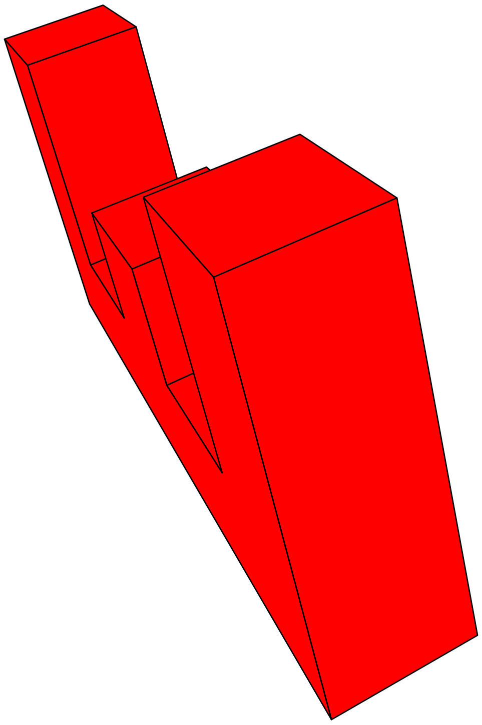

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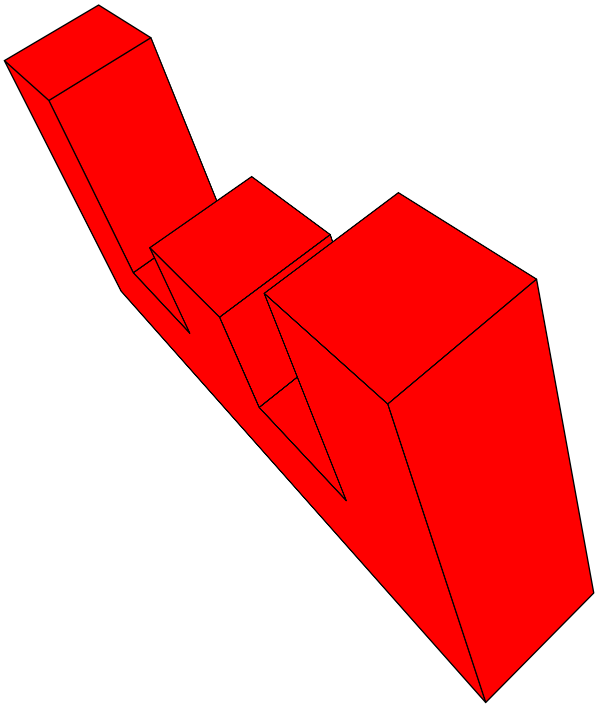

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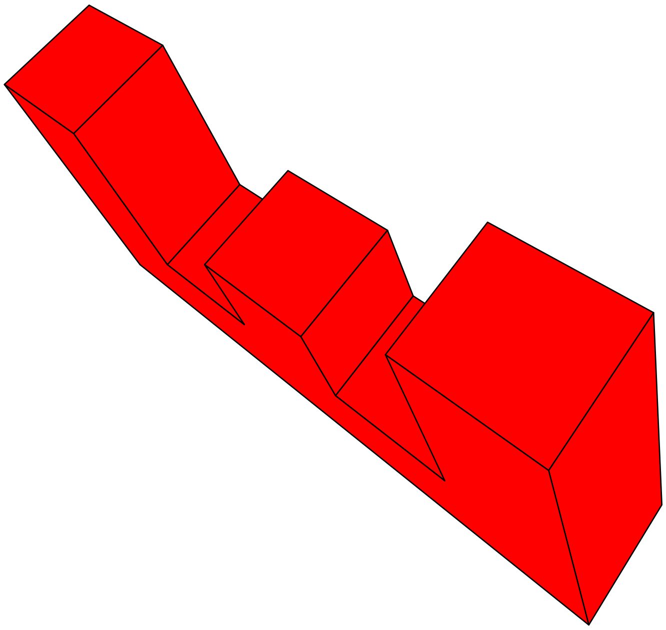

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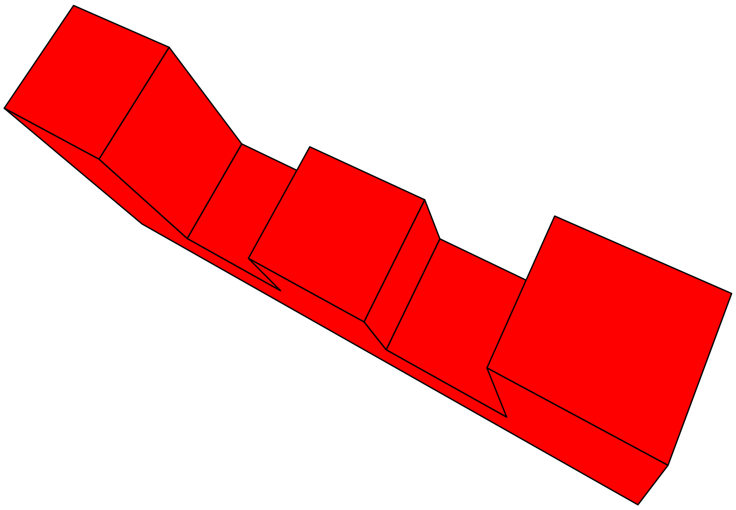

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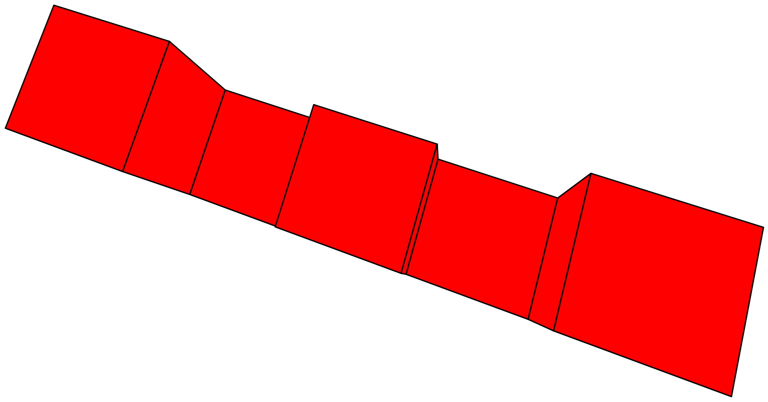

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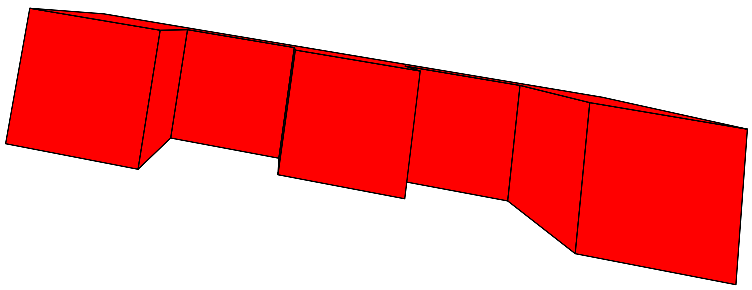

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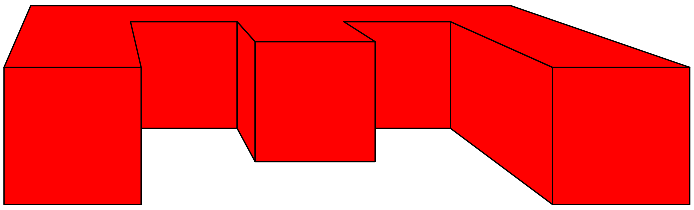

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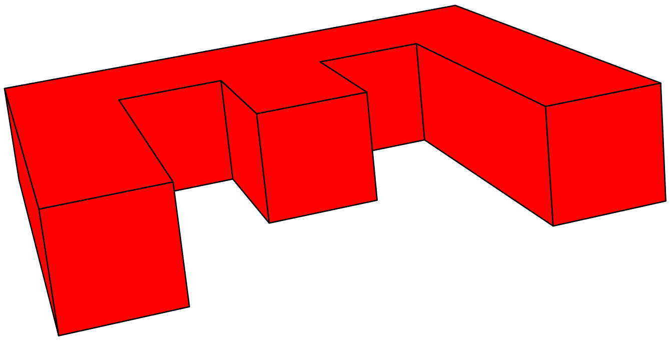

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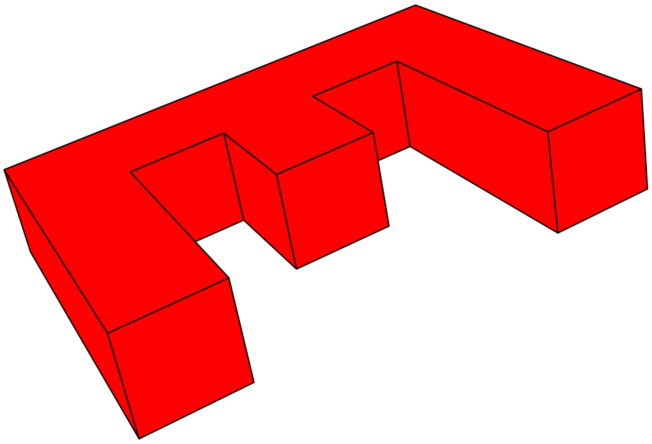

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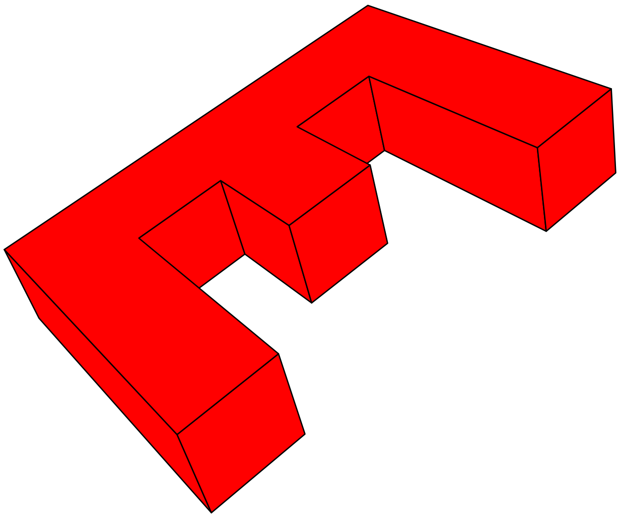

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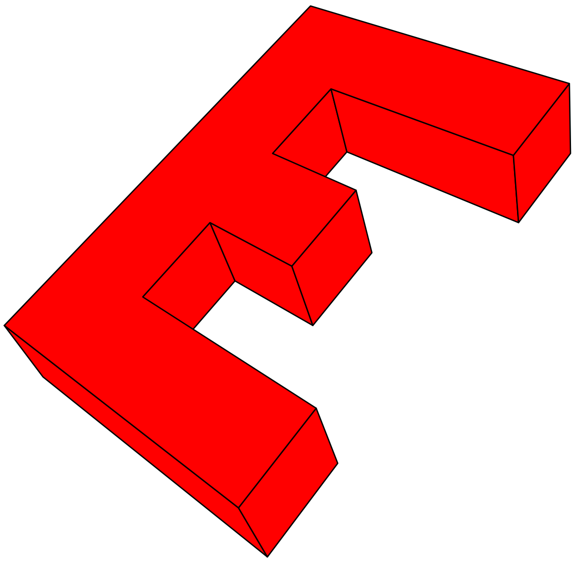

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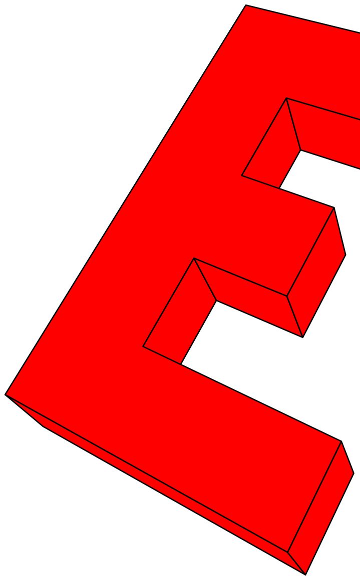

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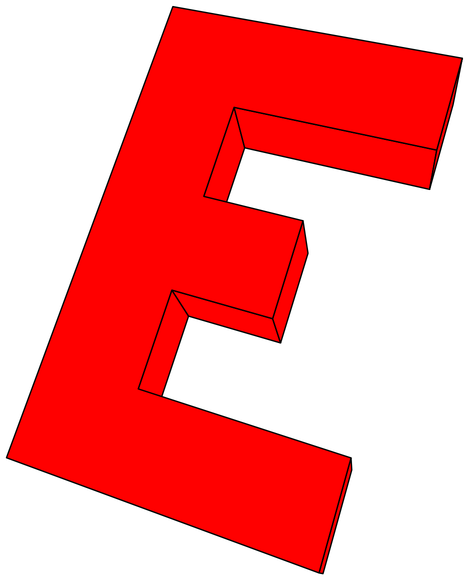

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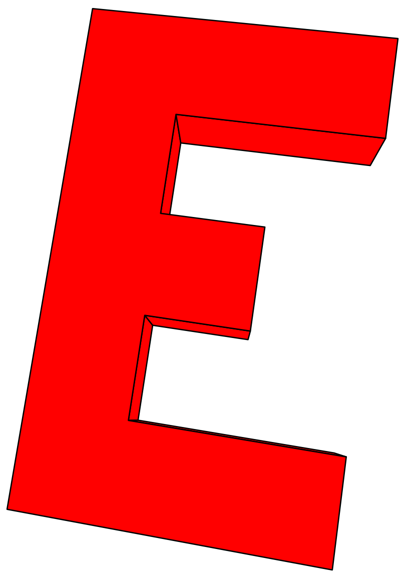

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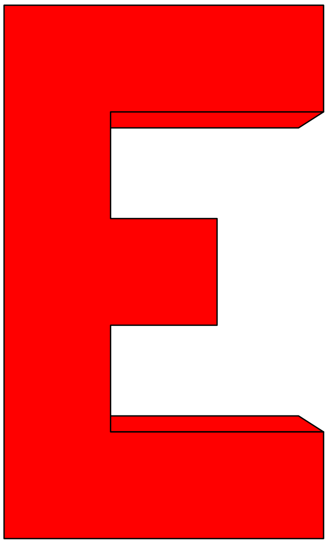

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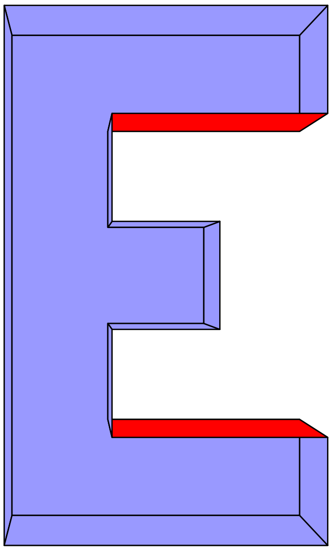

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0	14	36	24	2
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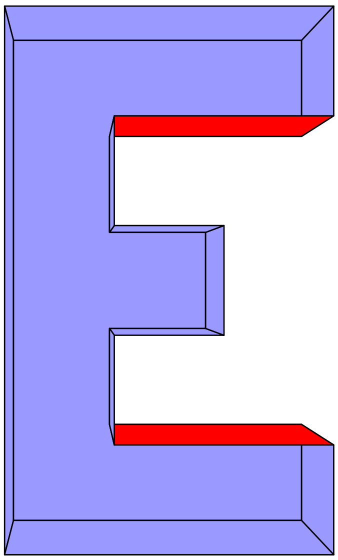
Non-convex example: a capital E



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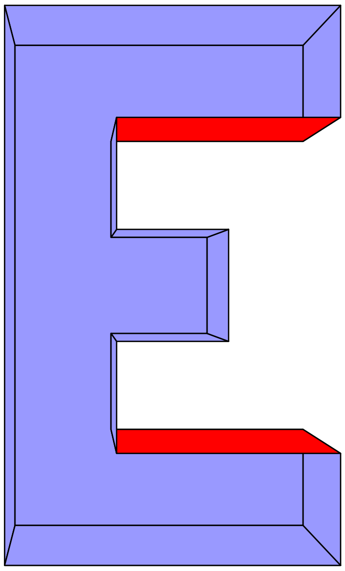

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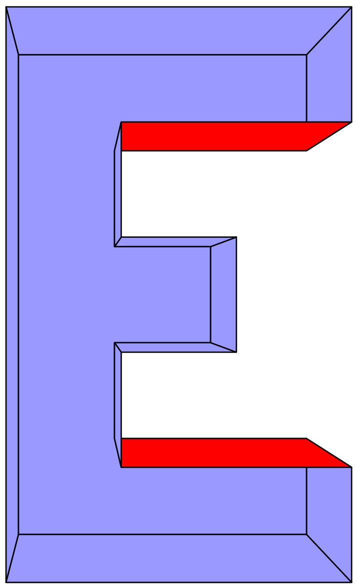

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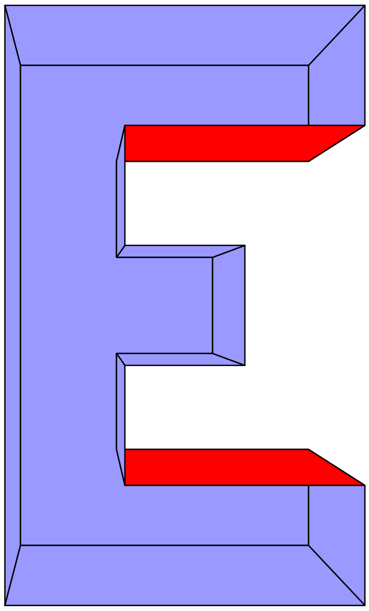
Non-convex example: a capital E



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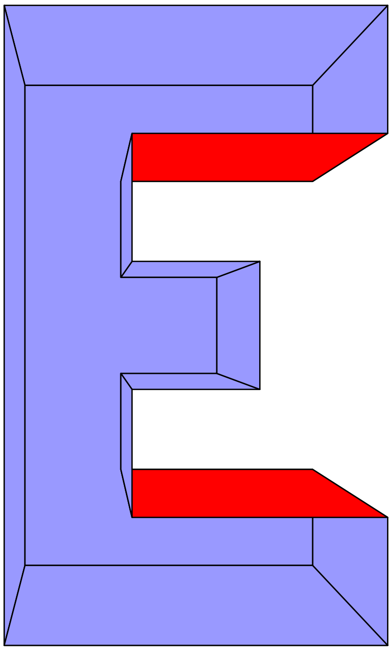
Non-convex example: a capital E



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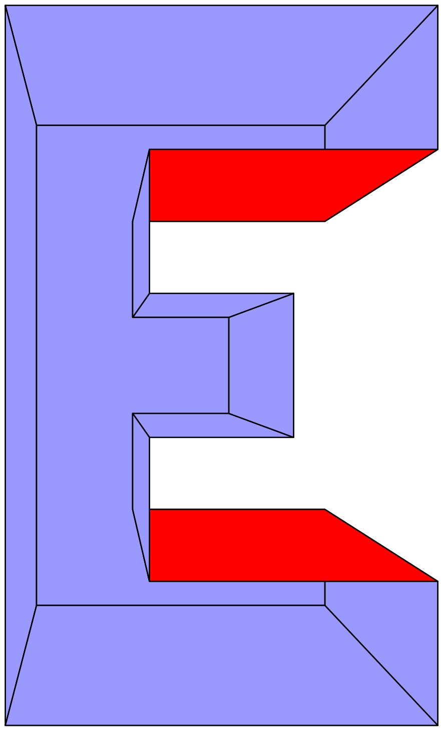
Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2

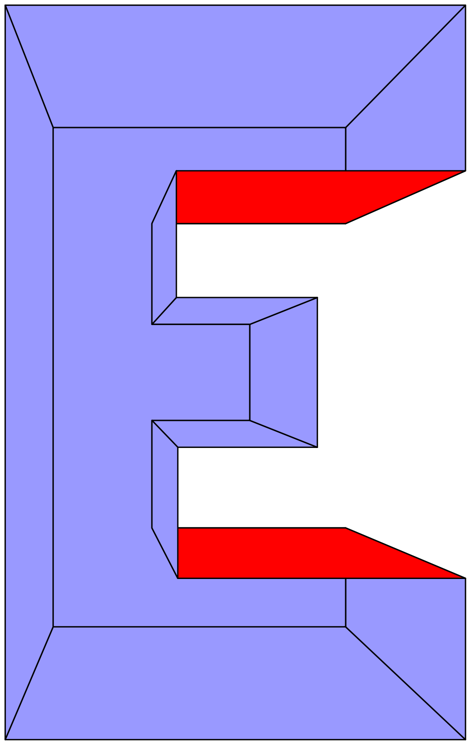
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2

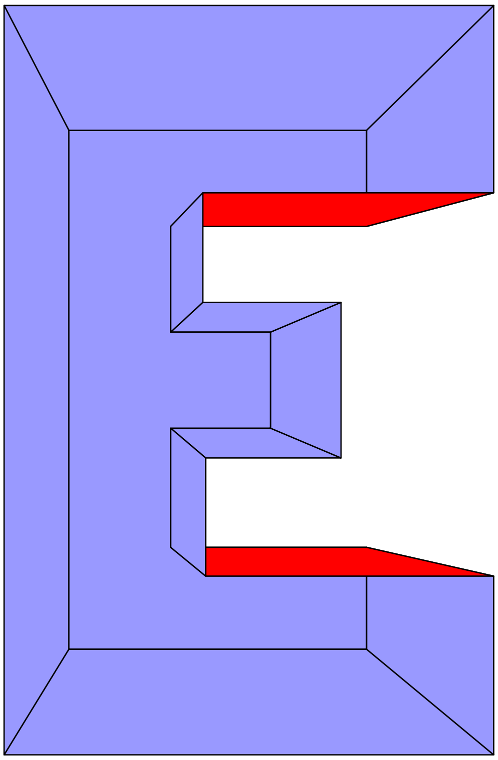
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2

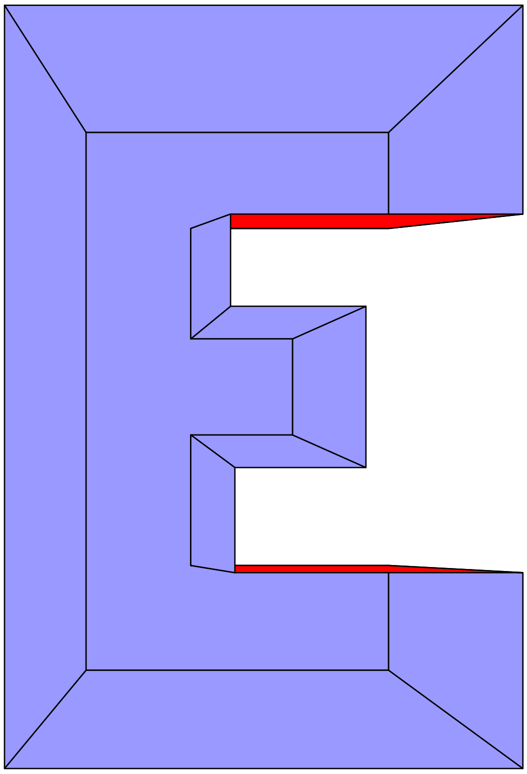
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2

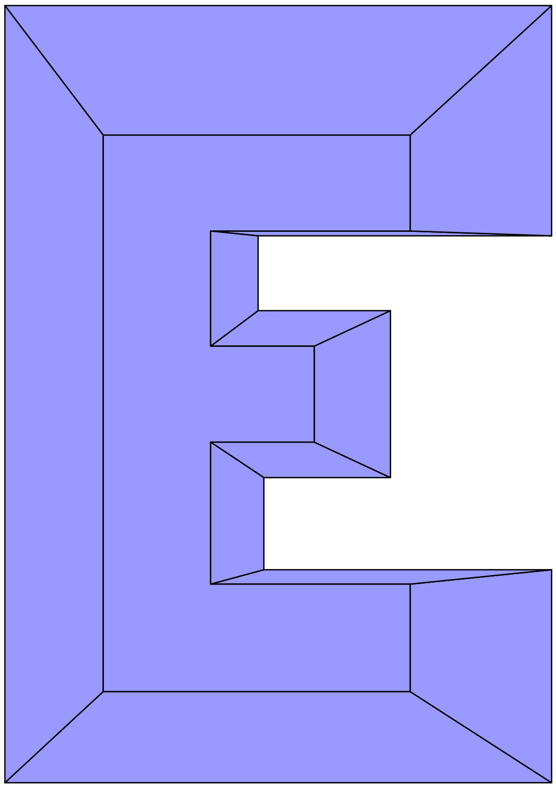
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2

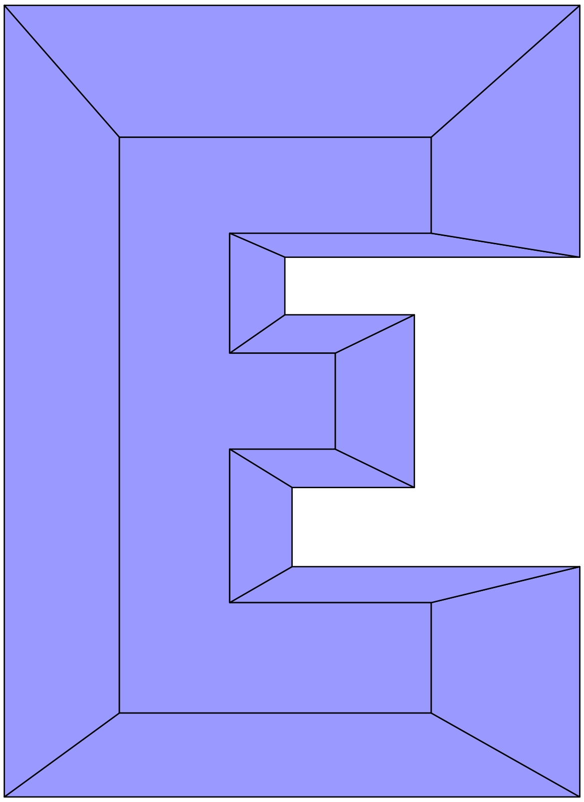
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2

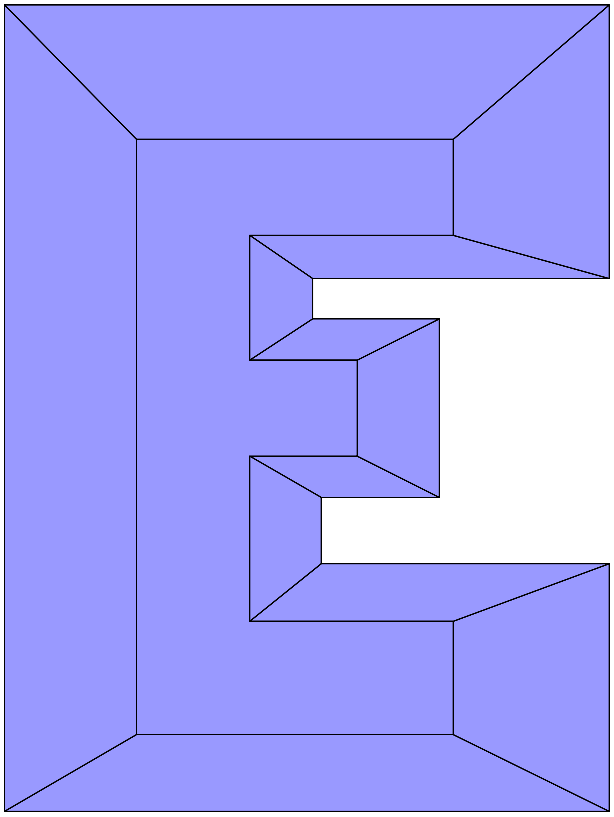
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E

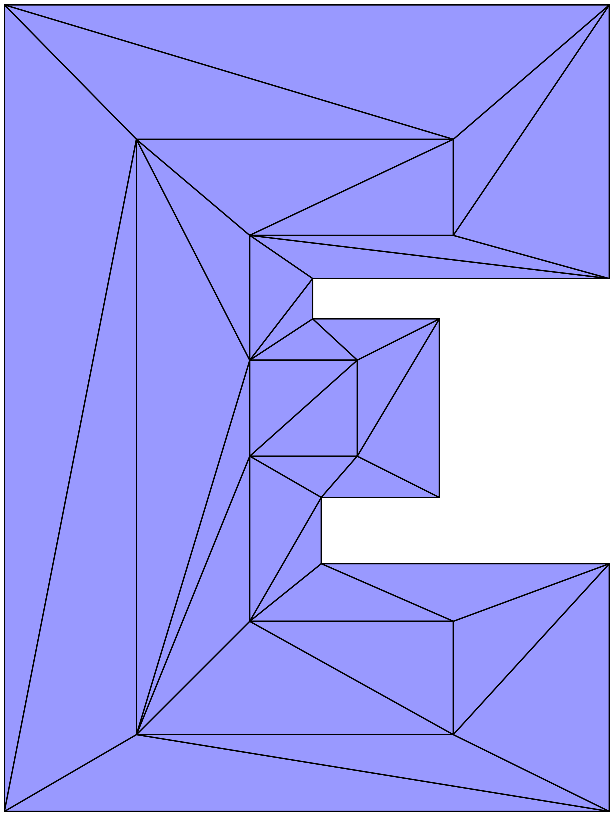


Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2

We have now reduced the polyhedron to a planar graph. Remember, the outside of the graph corresponds to the removed face.

Step 1: Remove a face; reduce to graph.
Step 2: Break all faces into triangles.
Step 3: Remove all 2 edged faces.
Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2

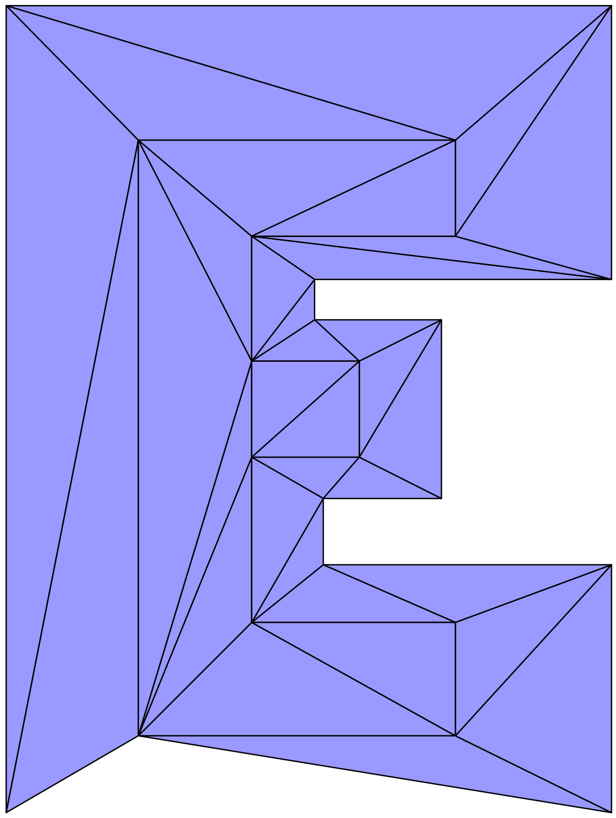
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2

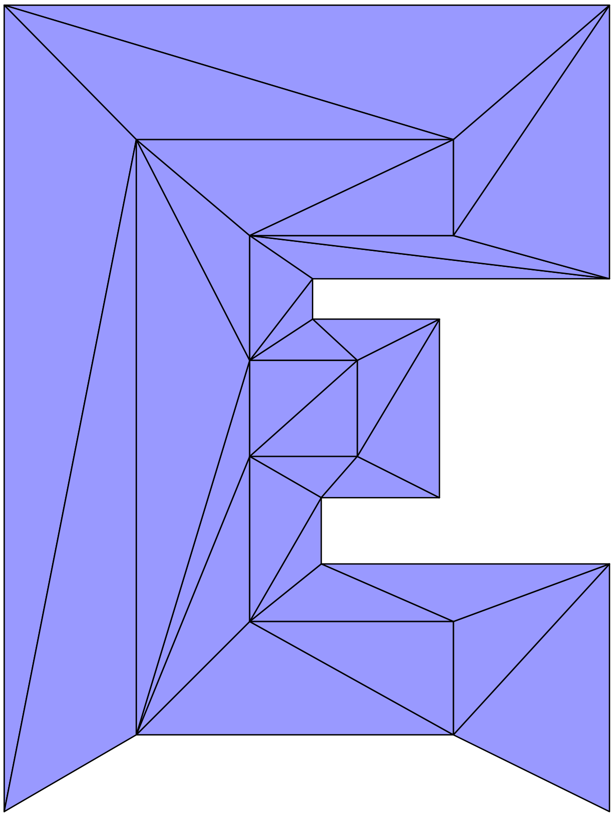
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2

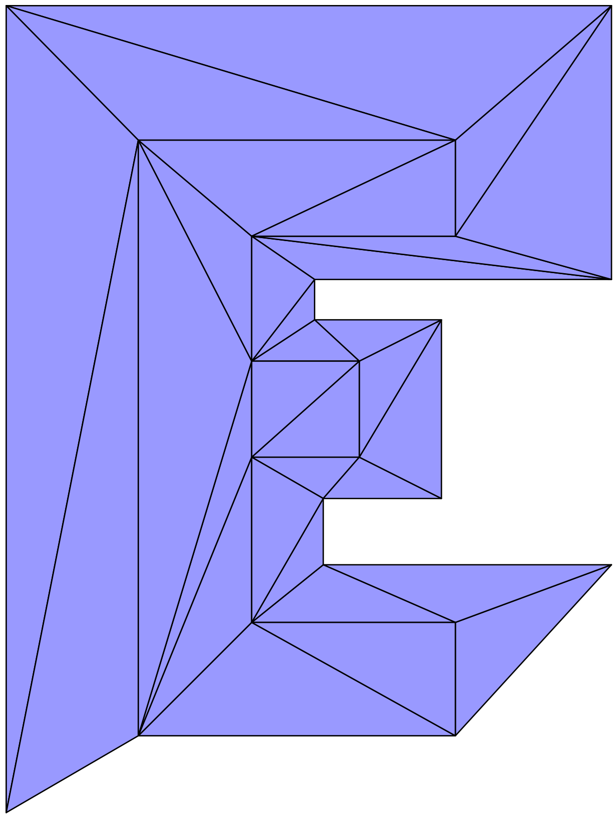
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2

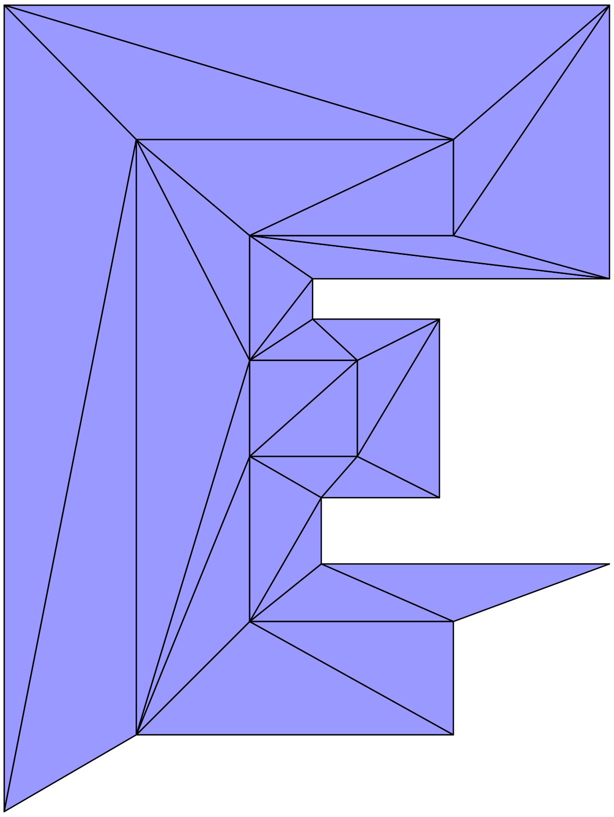
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2

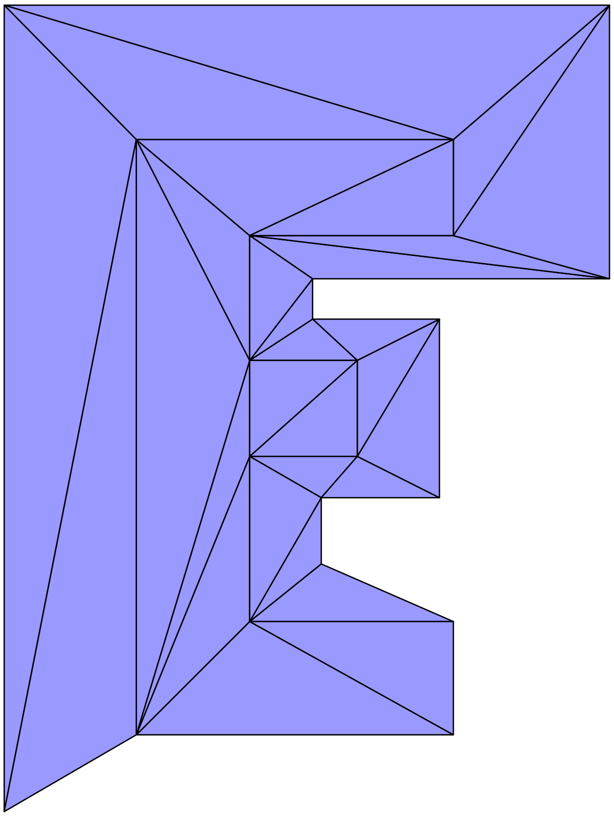
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2

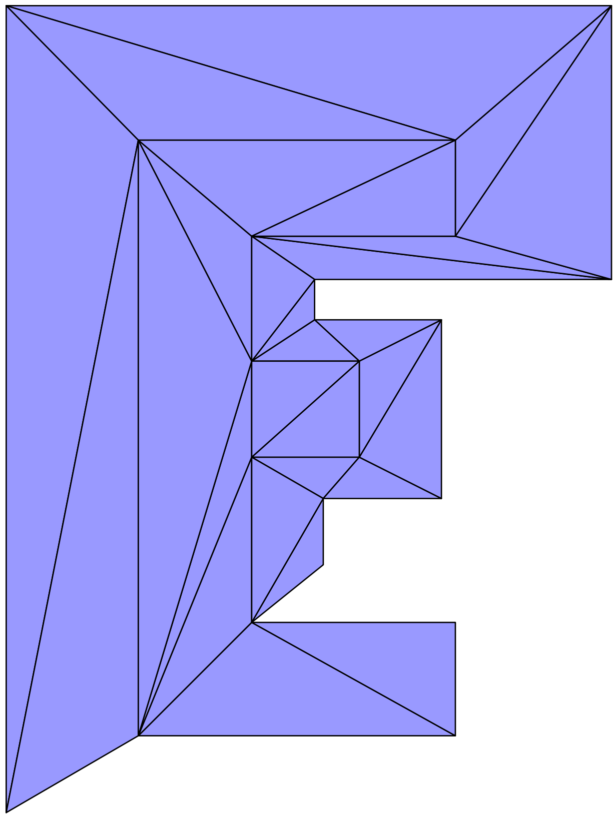
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2

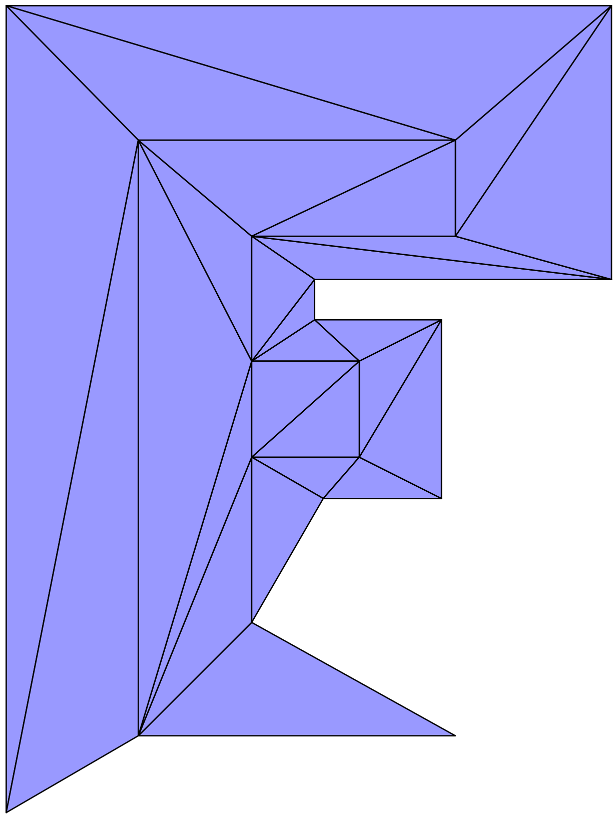
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2

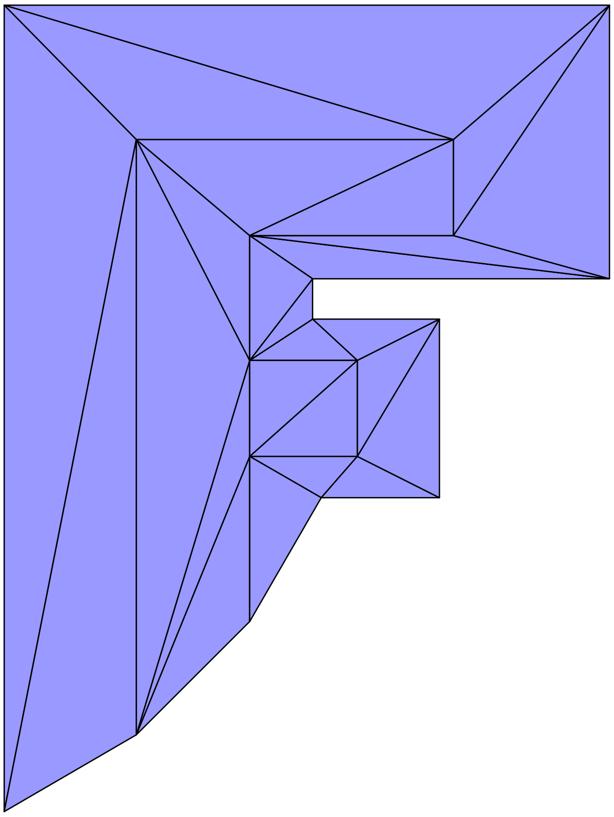
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2

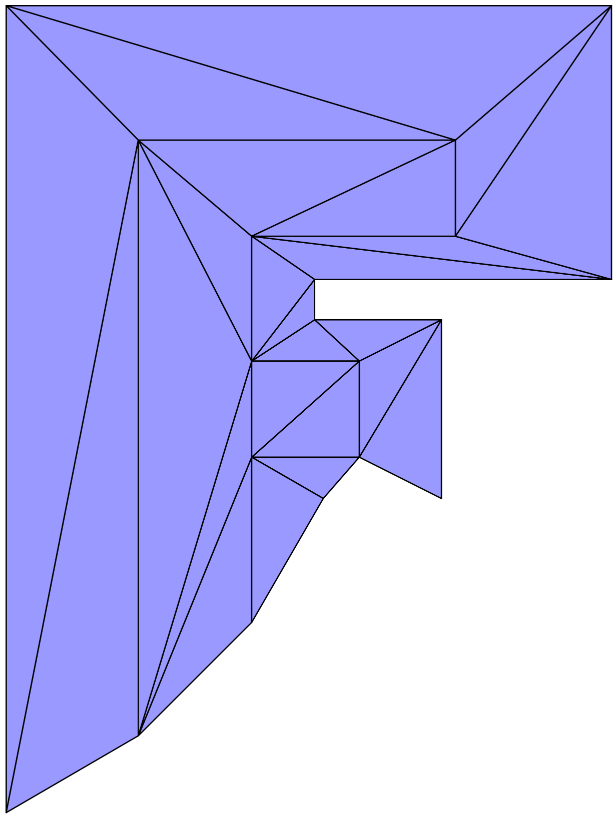
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2

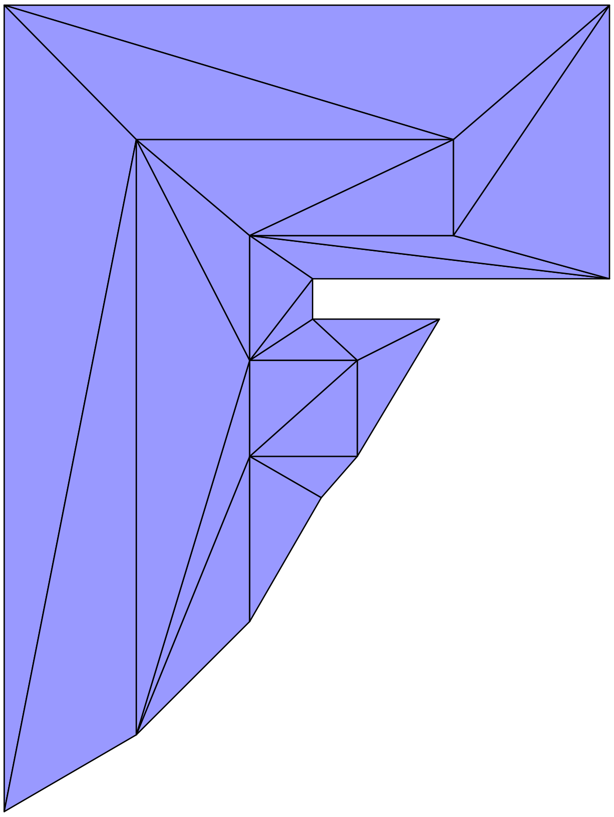
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2

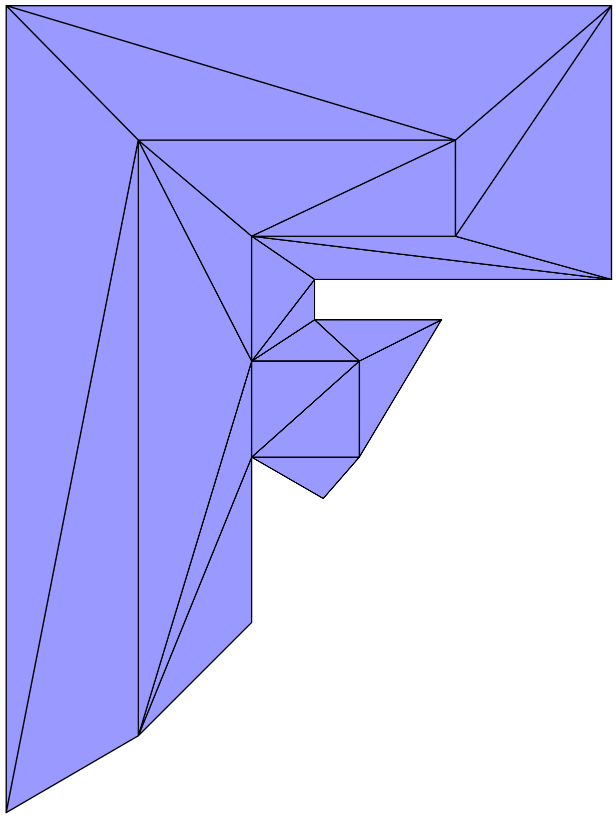
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2

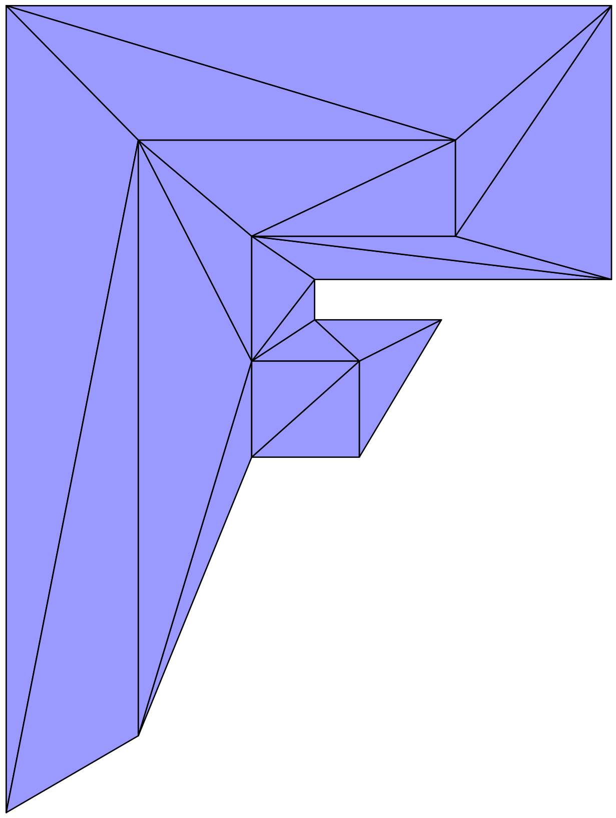
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2

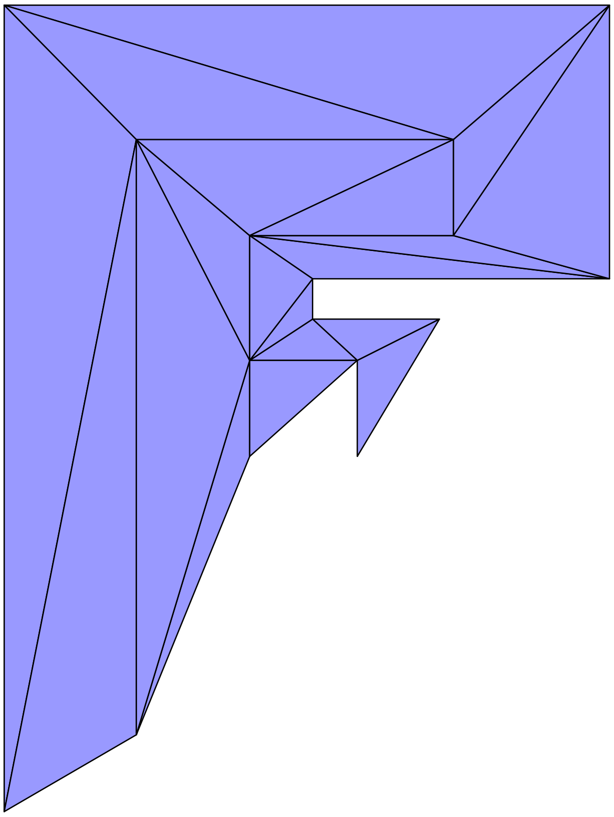
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2

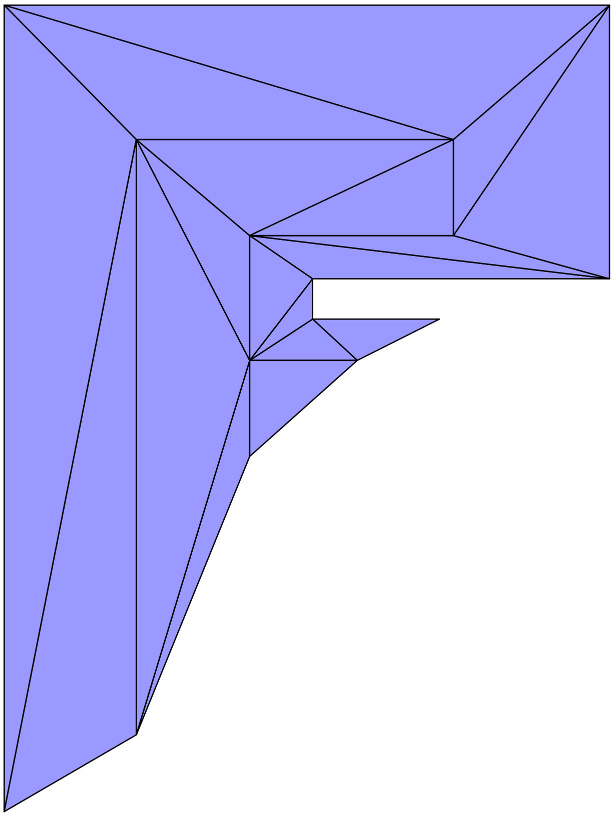
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2

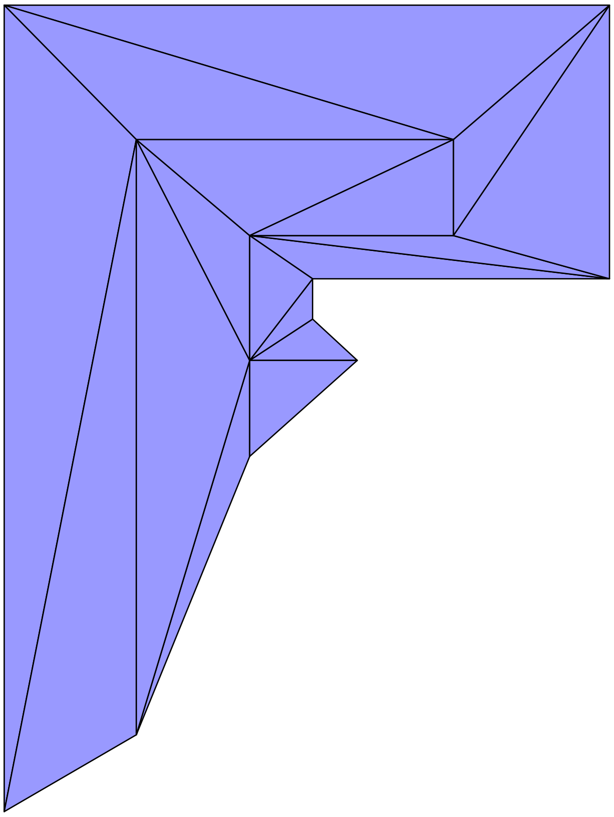
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2

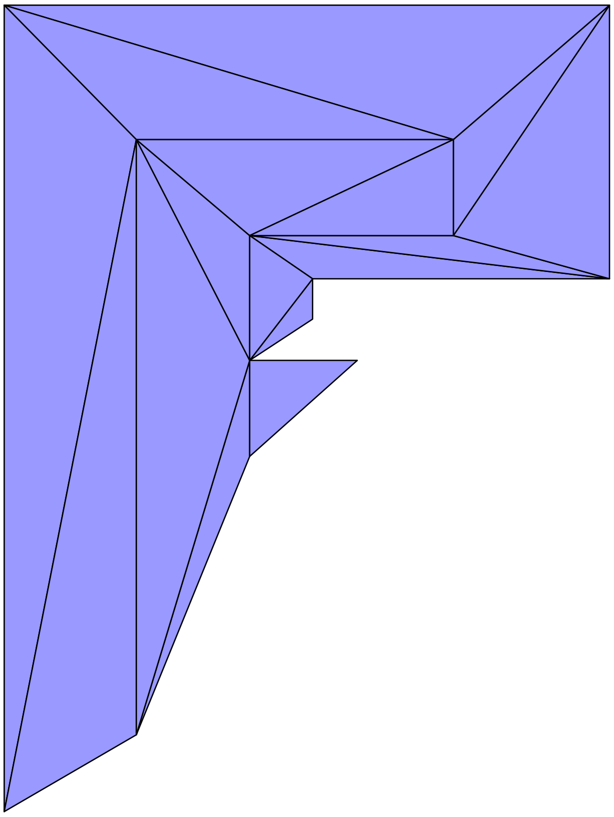
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2

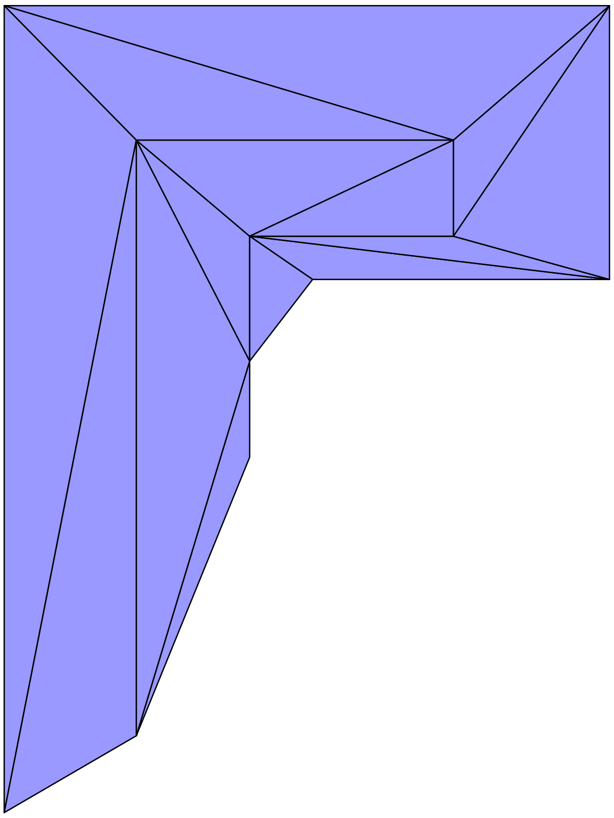
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2

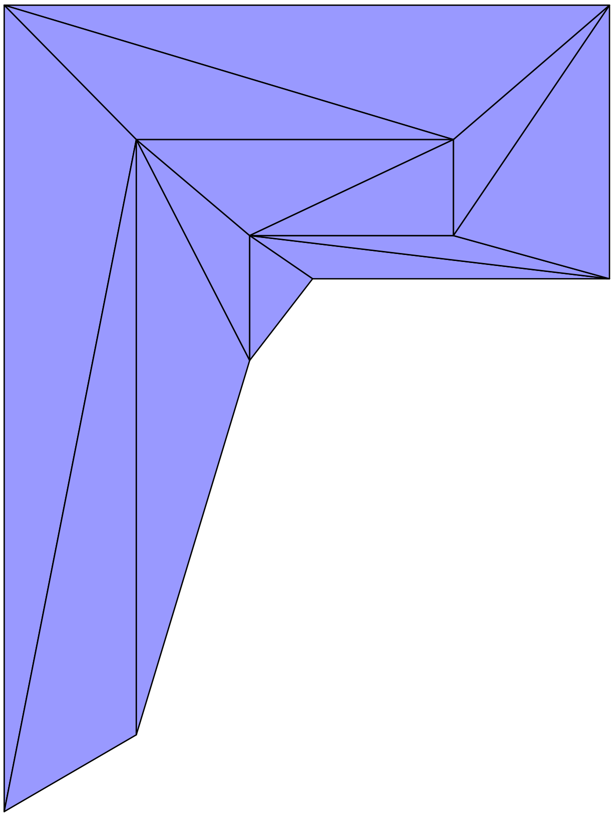
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2

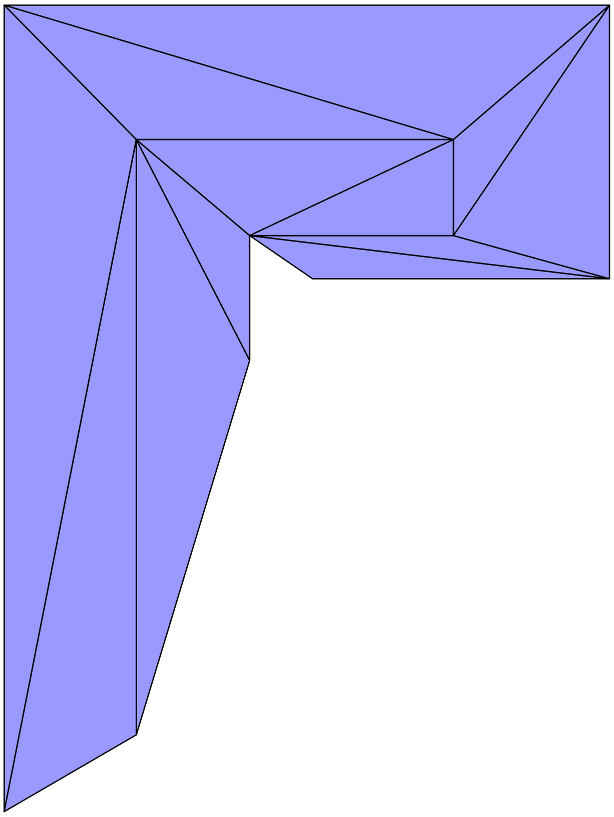
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2

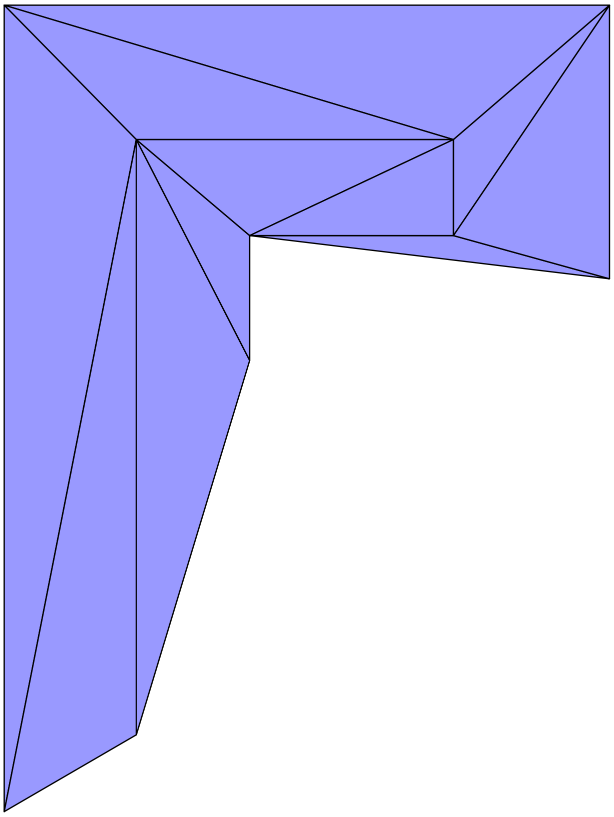
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2

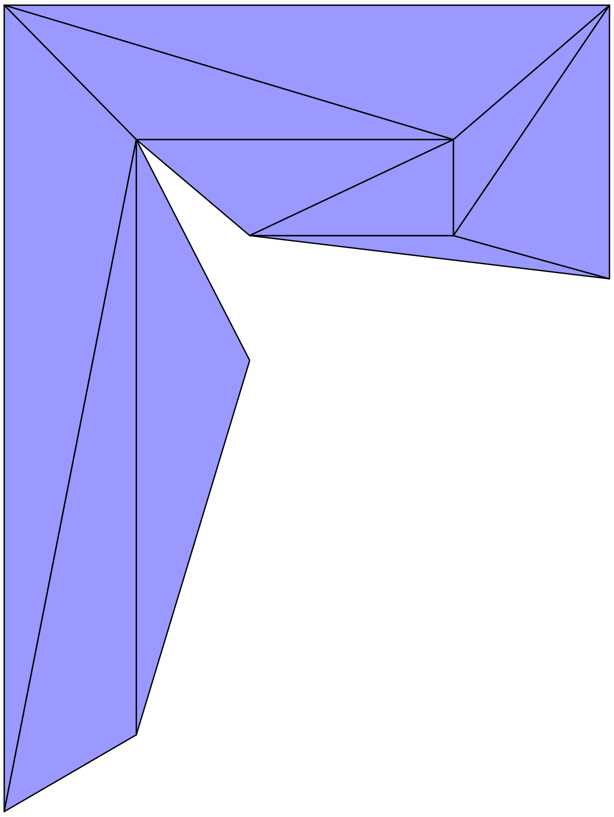
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2
4	11	19	10	2

Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

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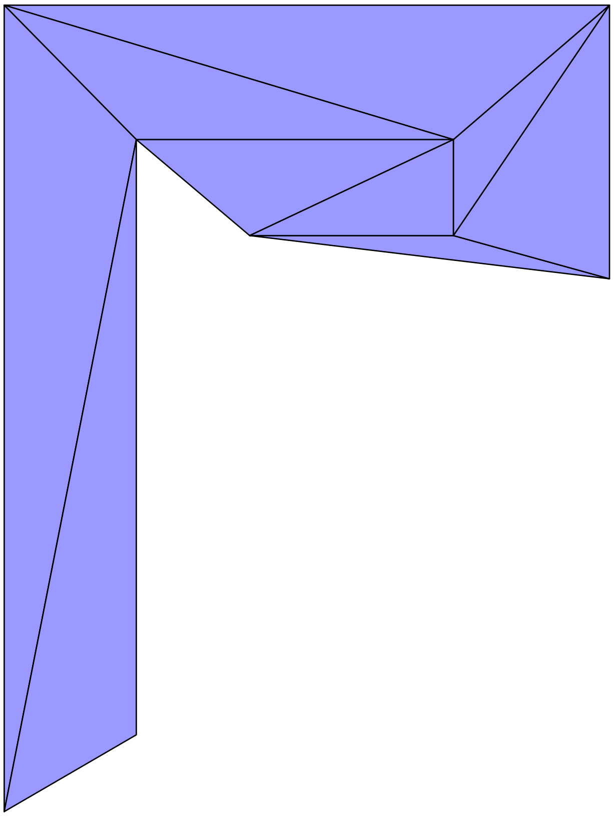
Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2
4	11	19	10	2
3	10	17	9	2

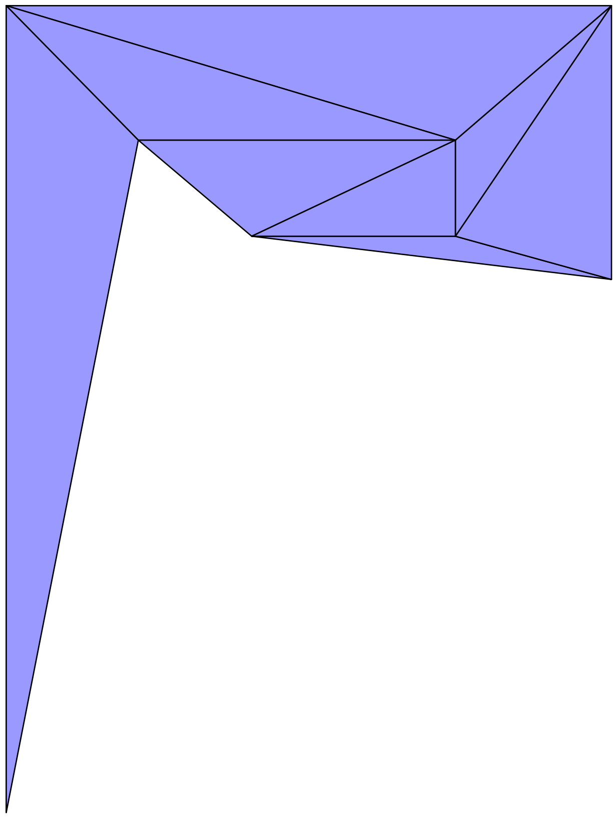
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2
4	11	19	10	2
3	10	17	9	2
3	9	15	8	2

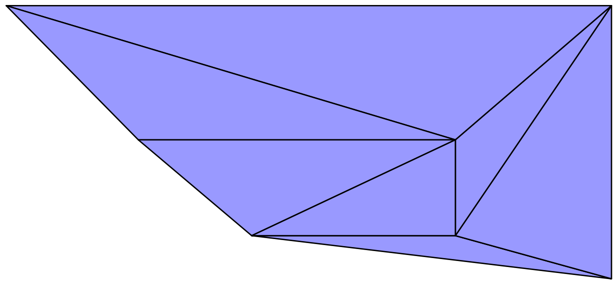
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2
4	11	19	10	2
3	10	17	9	2
3	9	15	8	2
3	8	13	7	2

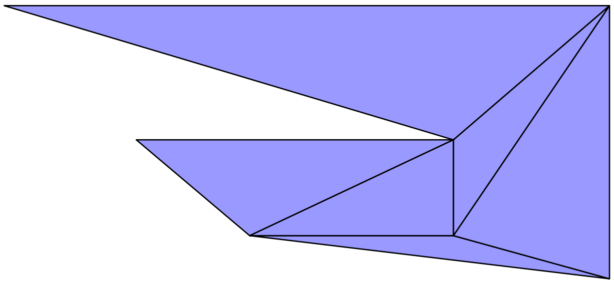
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2
4	11	19	10	2
3	10	17	9	2
3	9	15	8	2
3	8	13	7	2
4	7	12	7	2

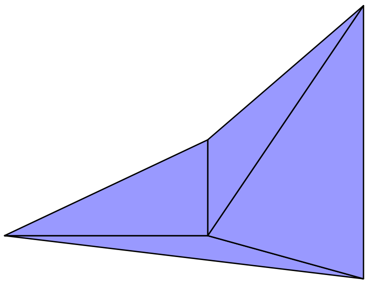
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2
4	11	19	10	2
3	10	17	9	2
3	9	15	8	2
3	8	13	7	2
4	7	12	7	2
3	5	8	5	2

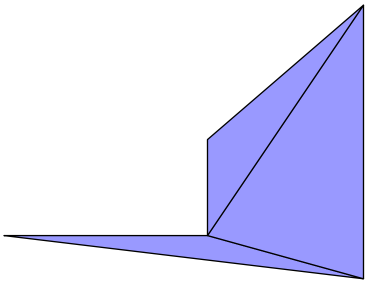
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2
4	11	19	10	2
3	10	17	9	2
3	9	15	8	2
3	8	13	7	2
4	7	12	7	2
3	5	8	5	2
4	4	7	5	2

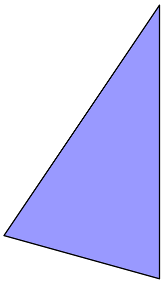
Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Non-convex example: a capital E



Once more we have arrive at a triangle.

Step	F	E	V	Sum
0	14	36	24	2
0	14	36	24	2
1	14	36	24	2
2	35	57	24	2
4	34	56	24	2
4	33	55	24	2
3	32	53	23	2
4	31	52	23	2
3	30	50	22	2
4	29	49	22	2
3	27	45	20	2
3	26	43	19	2
4	25	42	19	2
3	24	40	18	2
4	23	39	18	2
3	21	35	16	2
4	20	34	16	2
3	19	32	15	2
3	18	30	14	2
4	17	29	14	2
3	15	25	12	2
3	14	23	11	2
4	13	22	11	2
3	12	20	10	2
4	11	19	10	2
3	10	17	9	2
3	9	15	8	2
3	8	13	7	2
4	7	12	7	2
3	5	8	5	2
4	4	7	5	2
3	2	3	3	2

Step 1: Remove a face; reduce to graph.

Step 2: Break all faces into triangles.

Step 3: Remove all 2 edged faces.

Step 4: Remove a single 1 edged face.

Consequences:

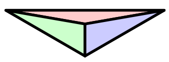
There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~360.0

Animation: frame 0 of 54



Consequences:

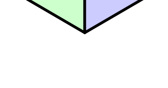
There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~342.947

Animation: frame 1 of 54



Consequences:

There are only five regular convex polyhedra.

Proof:

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Sum of angles around vertex: ~304.611

Consequences:

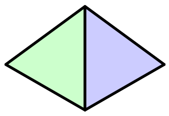
There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~263.123

Animation: frame 3 of 54



Consequences:

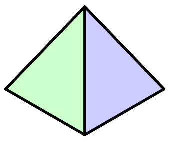
There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~226.567

Animation: frame 4 of 54



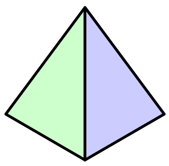
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~196.511



Animation: frame 5 of 54

Consequences:

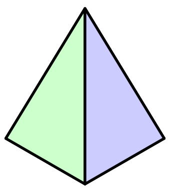
There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~172.263

Animation: frame 6 of 54



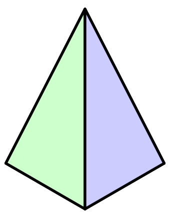
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~152.679



Animation: frame 7 of 54

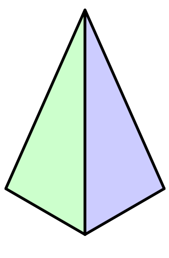
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~136.719



Animation: frame 8 of 54

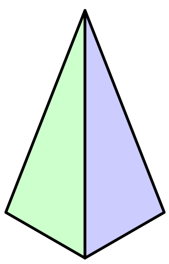
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the ’pyramid’ gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~123.558



Animation: frame 9 of 54

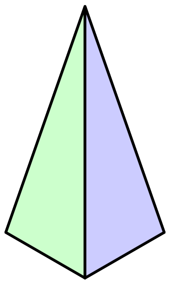
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~112.571



Animation: frame 10 of 54

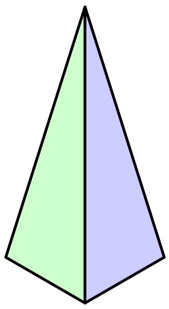
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~103.29



Animation: frame 11 of 54

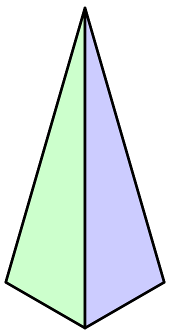
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~95.365



Animation: frame 12 of 54

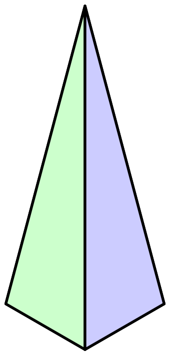
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~88.5298



Animation: frame 13 of 54

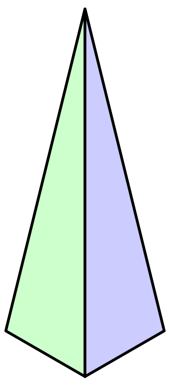
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~82.5813



Animation: frame 14 of 54

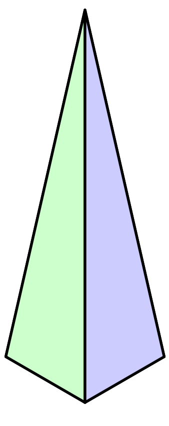
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~77.362



Animation: frame 15 of 54

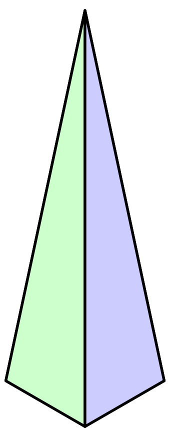
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~72.7489



Animation: frame 16 of 54

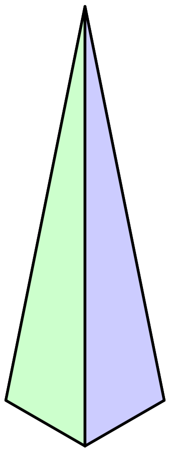
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~68.6443



Animation: frame 17 of 54

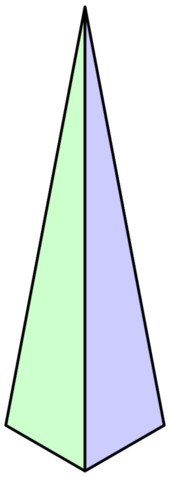
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~64.9701



Animation: frame 18 of 54

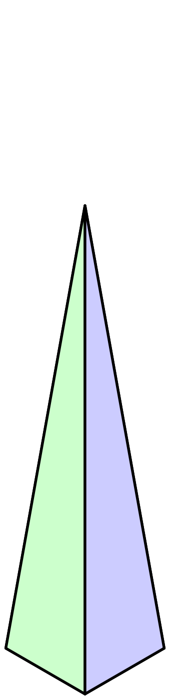
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~61.6631



Animation: frame 19 of 54

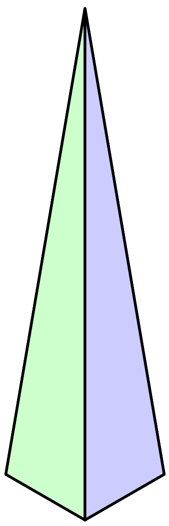
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the ’pyramid’ gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~58.6717



Animation: frame 20 of 54

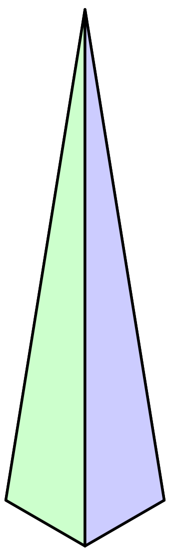
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~55.9533



Animation: frame 21 of 54

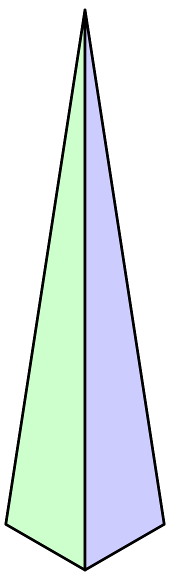
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~53.4727



Animation: frame 22 of 54

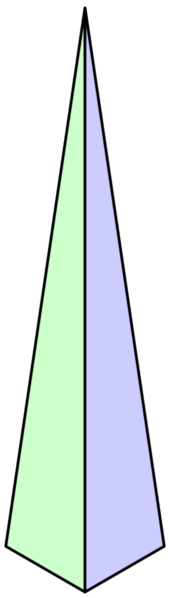
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the ’pyramid’ gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~51.2004



Animation: frame 23 of 54

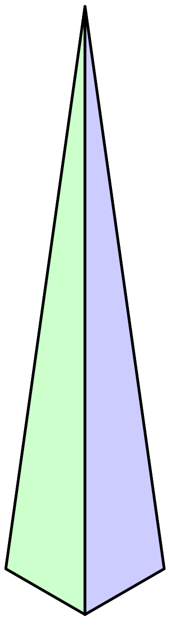
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~49.1114



Animation: frame 24 of 54

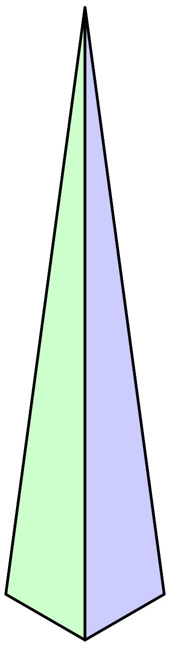
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~47.1846



Animation: frame 25 of 54

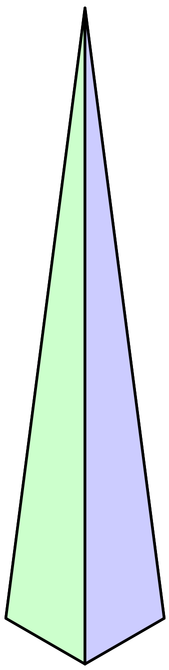
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~45.402



Animation: frame 26 of 54

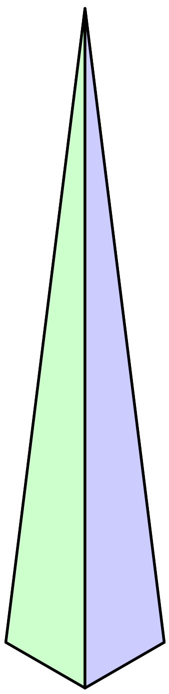
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~43.7481



Animation: frame 27 of 54

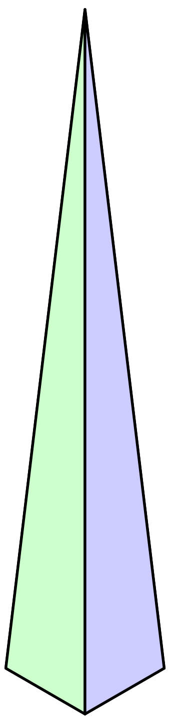
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the ’pyramid’ gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~42.2096



Animation: frame 28 of 54

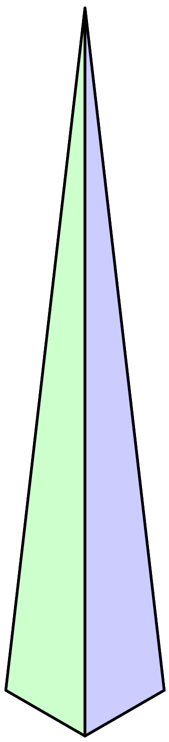
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~40.7749



Animation: frame 29 of 54

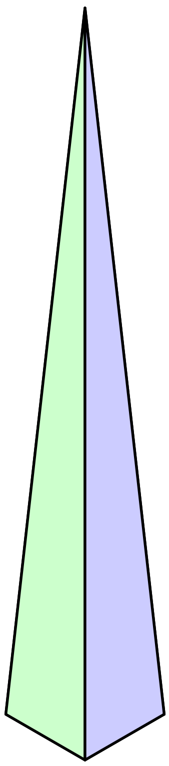
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~39.4339



Animation: frame 30 of 54

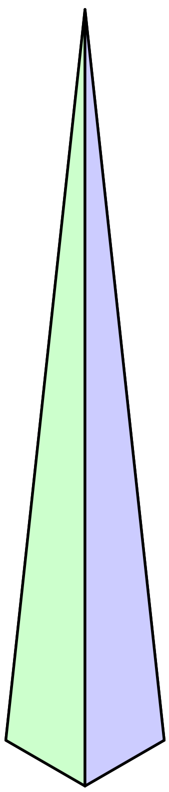
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~38.1778



Animation: frame 31 of 54

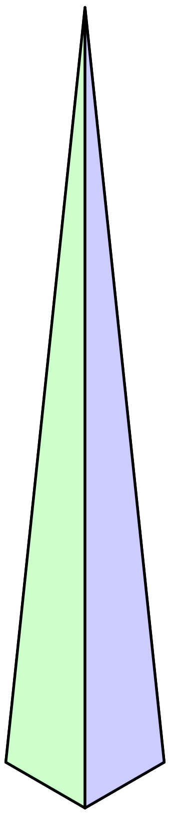
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the ’pyramid’ gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~36.9987



Animation: frame 32 of 54

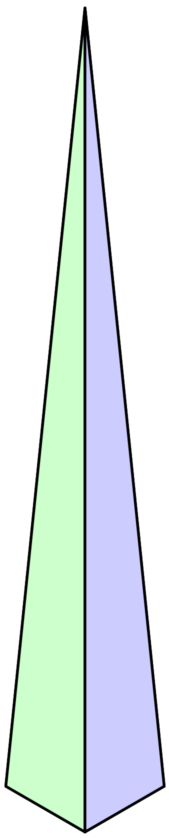
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~35.89



Animation: frame 33 of 54

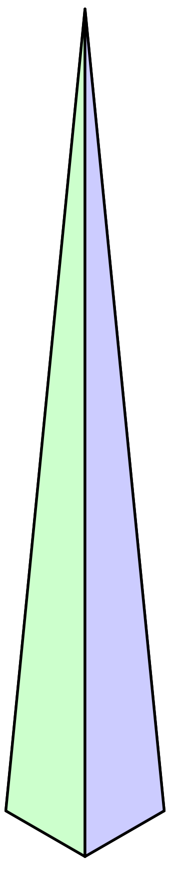
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~34.8453



Animation: frame 34 of 54

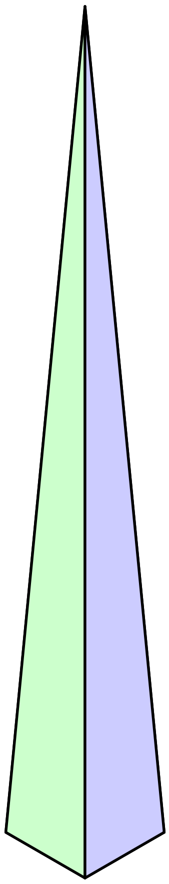
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the ’pyramid’ gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~33.8595



Animation: frame 35 of 54

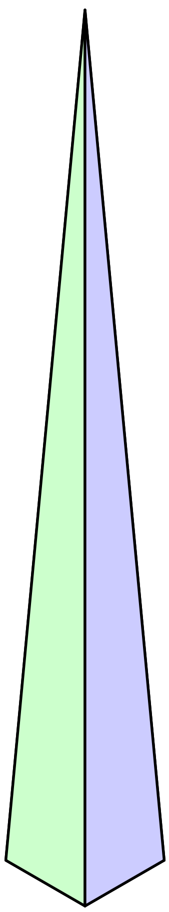
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~32.9277



Animation: frame 36 of 54

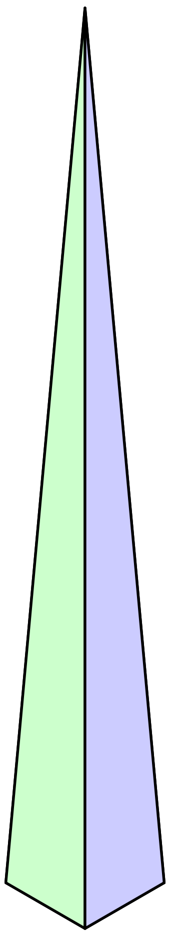
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the ’pyramid’ gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~32.0456



Animation: frame 37 of 54

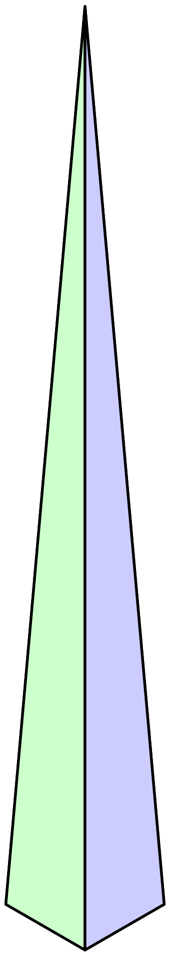
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~31.2094



Animation: frame 38 of 54

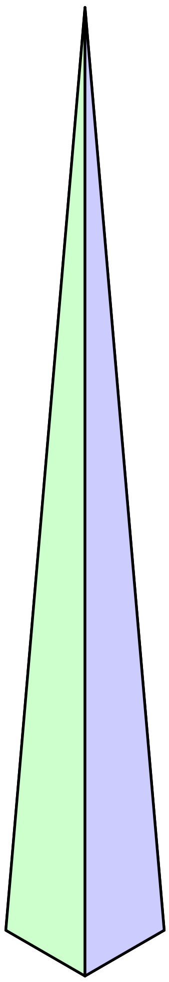
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~30.4155



Animation: frame 39 of 54

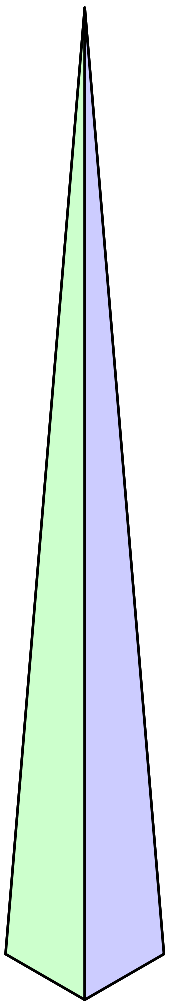
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~29.6608



Animation: frame 40 of 54

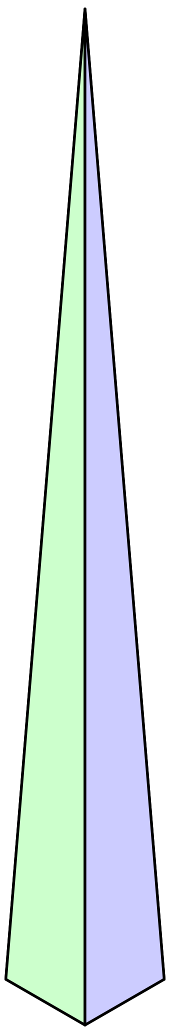
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~28.9426



Animation: frame 41 of 54

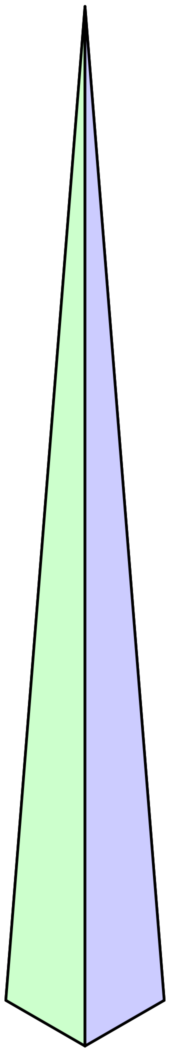
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~28.2582



Animation: frame 42 of 54

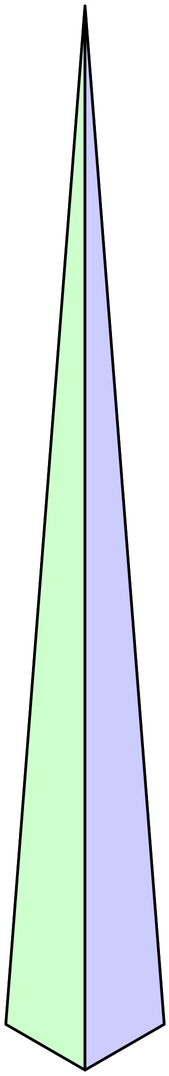
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~27.6053



Animation: frame 43 of 54

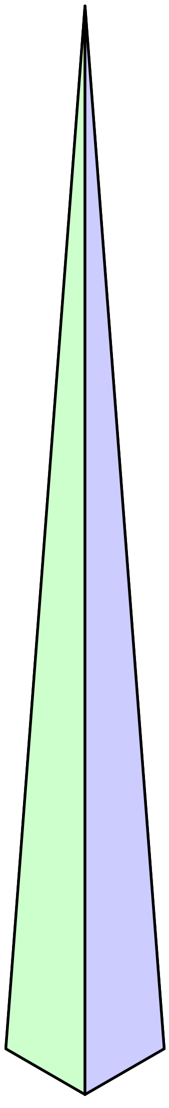
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the ’pyramid’ gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~26.9818



Animation: frame 44 of 54

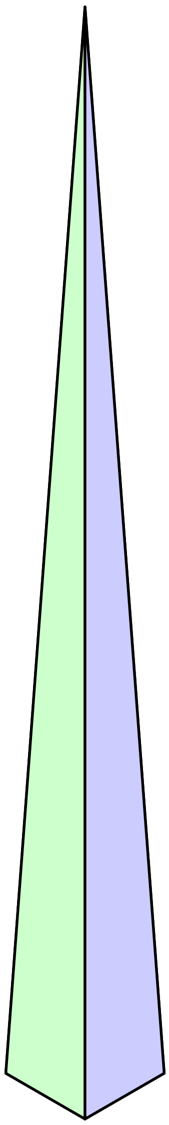
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~26.3858



Animation: frame 45 of 54

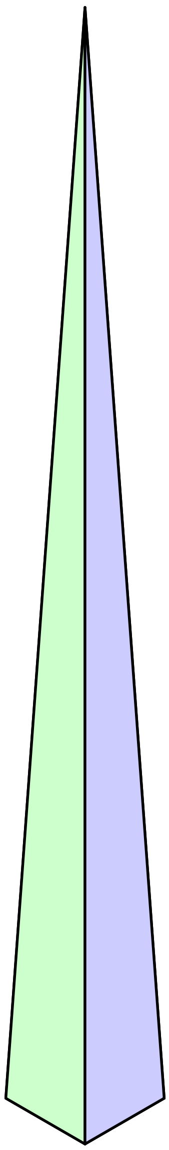
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~25.8154



Animation: frame 46 of 54

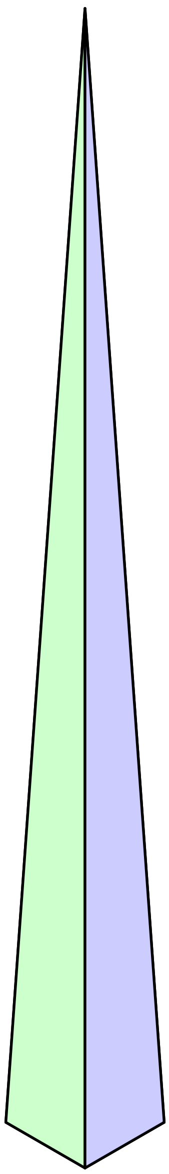
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~25.2691



Animation: frame 47 of 54

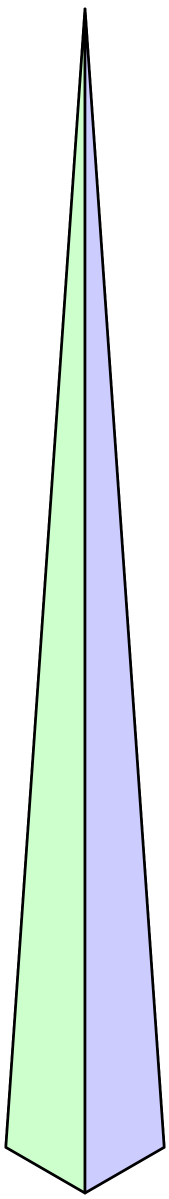
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~24.7455



Animation: frame 48 of 54

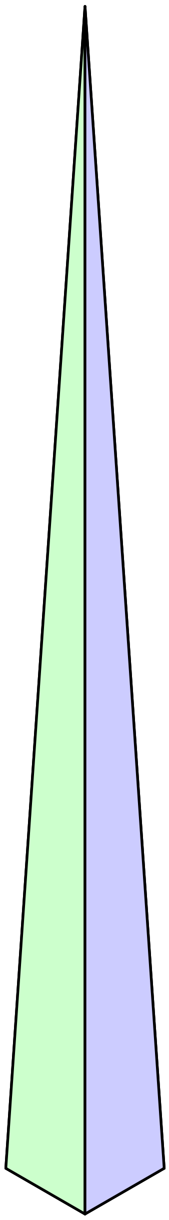
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~24.243



Animation: frame 49 of 54

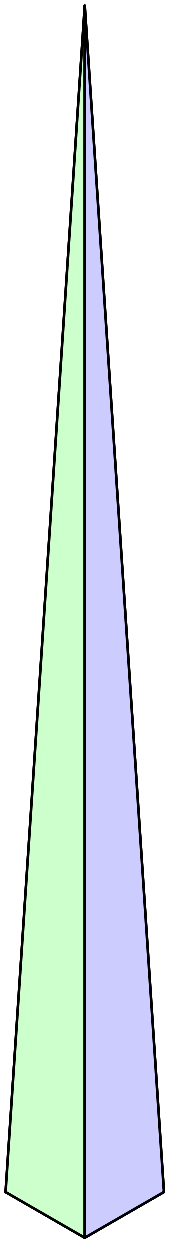
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~23.7605



Animation: frame 50 of 54

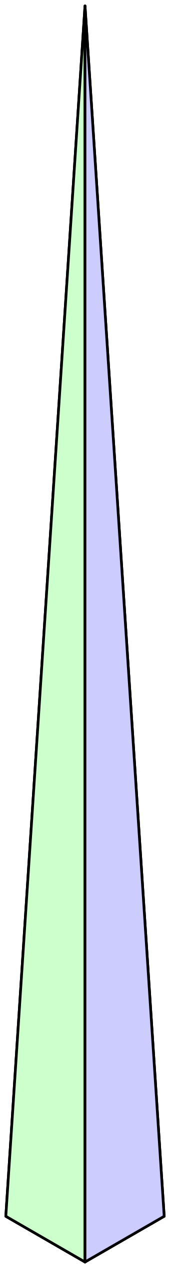
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~23.2967



Animation: frame 51 of 54

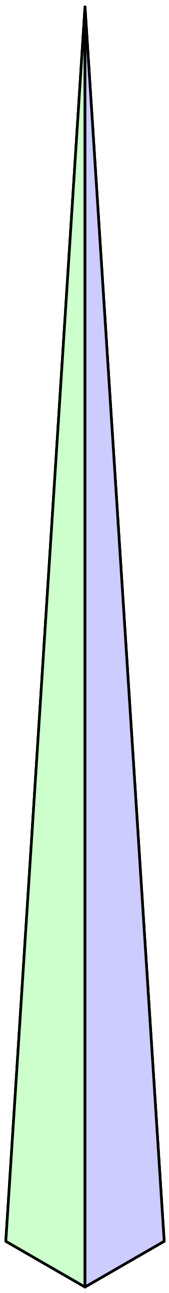
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~22.8507



Animation: frame 52 of 54

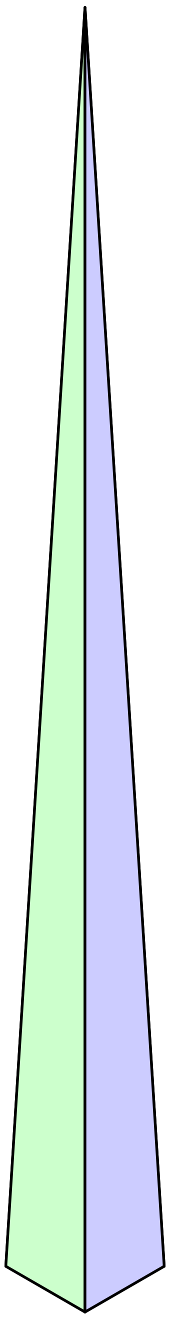
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

Sum of angles around vertex: ~22.4214



Animation: frame 53 of 54

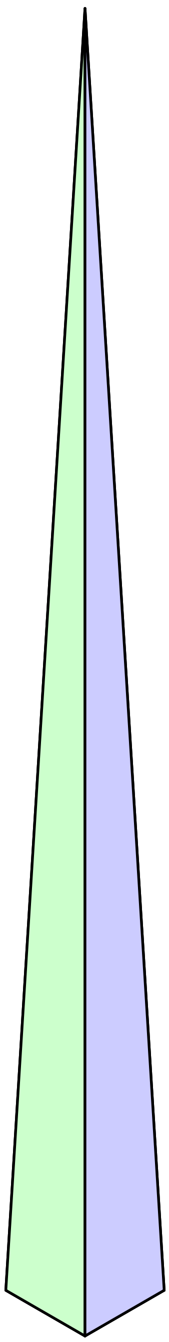
Consequences:

There are only five regular convex polyhedra.

Proof:

First, we know that the sum of the angles around a vertex is less than 360. For example, if this shape lies in a plane, the sum of the angles around the vertex is exactly 360. As the 'pyramid' gets taller, the sum of the angles grows smaller, until it eventually approaches zero. Of course, in a regular convex polyhedron, the faces do not lie in a plane, so the sum is strictly less than 360 degrees.

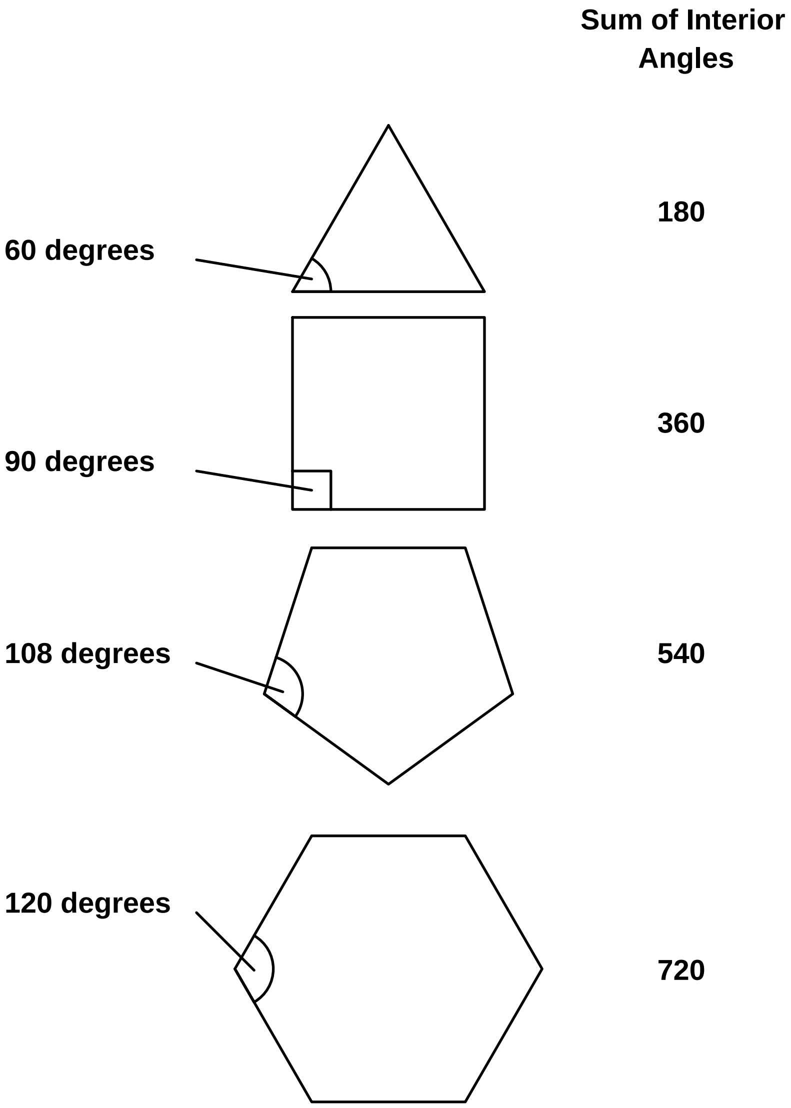
Sum of angles around vertex: ~22.0079



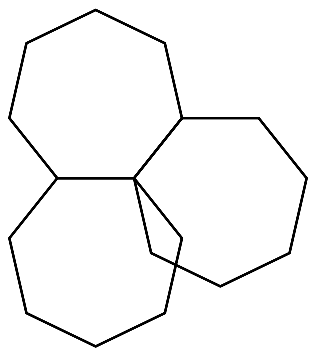
Animation: frame 54 of 54

Second, we know that the sum of the interior angles of a regular apolygon is (V-2)*180 degrees. Each interior angle is then (V-2)*180/V.

For all regular polygons with 6 or more vertices, each interior angle is 120 degrees or more. But we know at least 3 polygons must meet at a vertex, because otherwise the polyhedron would collapse to a plane. If the polygons making up our regular convex polyhedron had 6 or more vertices per side, it would violate our assertion that the sum of the angles around a vertex is less than 360 degrees. Therefore, there must be between 3 and 5 (inclusive) vertices.



Attempting to attach 3 heptagons in the plane. Clearly they don’t fit.



Algebra Warning! But I swear, it's worthwhile.

Let assume we have a regular convex polyhedron {p, q}, where p is the number of edges per face, and q is the number of edges (faces) that meet at each vertex. We have already shown that p is between 3 and 5, and as per our previous discussion, q must be greater than or equal to 3, otherwise the polyhedron would collapse to a plane. Since each edge connects two faces (the polyhedron is closed), $pF=2E$. Since each edge also connects two vertices, $qV=2E$. Substituting these into Euler's Formula $F - E + V = 2$ we get $2E/p - E + 2E/q = 2$, and rearranging and dividing by 2E we get $1/p + 1/q = 1/2 + 1/E$.

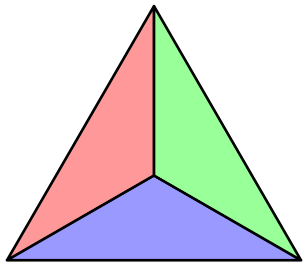
p and q cannot both be greater than 3. To see why, let $p = q = 4$, the least offensive case. Then $1/4 + 1/4 = 1/2 + 1/E$, which simplifies down to $0 = 1/E$.

Then let $p = 3$. What values of q are still allowed? $1/3 + 1/q = 1/2 + 1/E$, which simplifies to $1/q - 1/6 = 1/E$. The left hand side must always be greater than 0, and q greater than or equal to 3, so only the values 3, 4 or 5 are allowed for q.

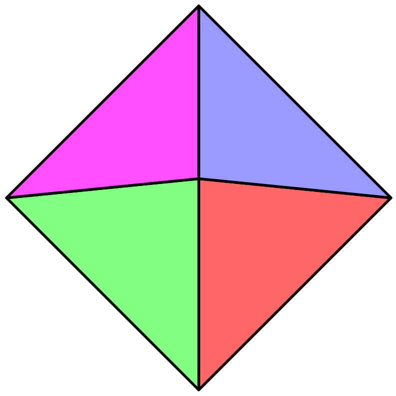
Formula	F	E	V	Name
{3,3}	4	6	4	Tetrahedron
{3,4}	8	12	6	Octahedron
{3,5}	20	30	12	Icosahedron
{4,3}	6	12	8	Cube
{5,3}	12	30	20	Dodecahedron

Animations on next (final) page!

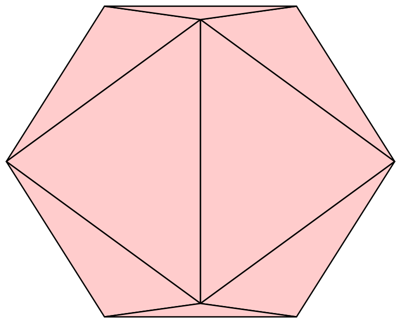
Tetrahedron:



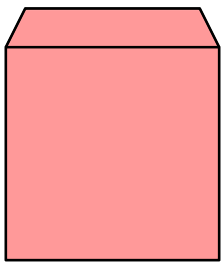
Octahedron:



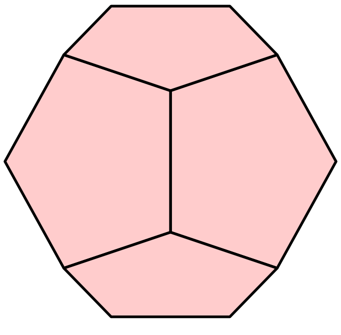
Icosahedron:



Cube:

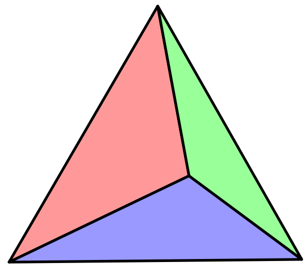


Dodecahedron:

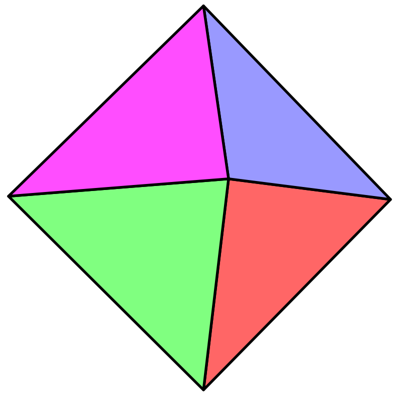


Animation: 0 of 120

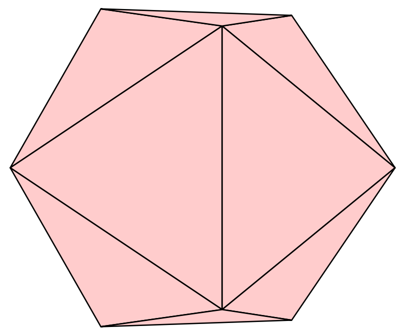
Tetrahedron:



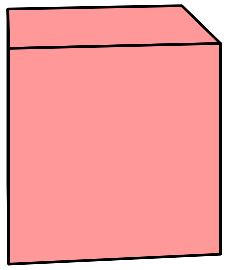
Octahedron:



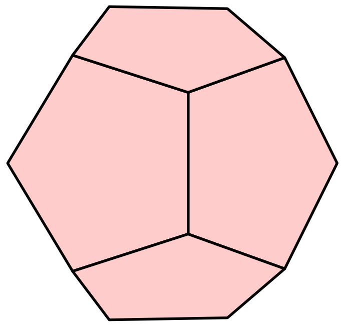
Icosahedron:



Cube:

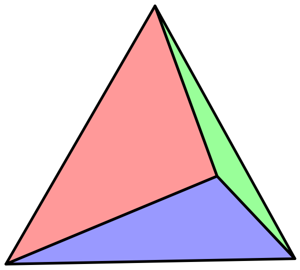


Dodecahedron:



Animation: 1 of 120

Tetrahedron:



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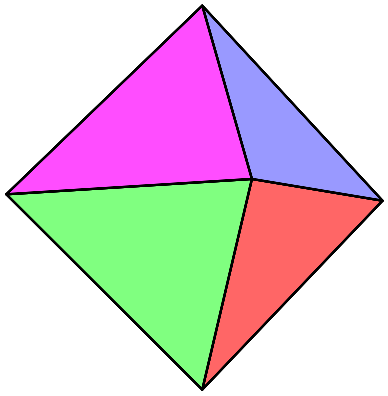

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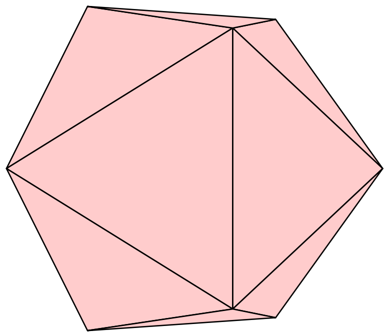

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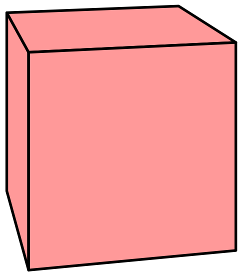
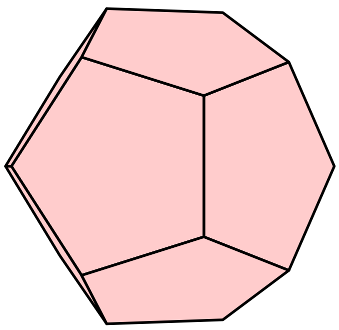
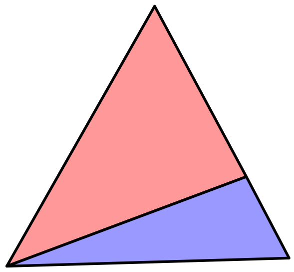


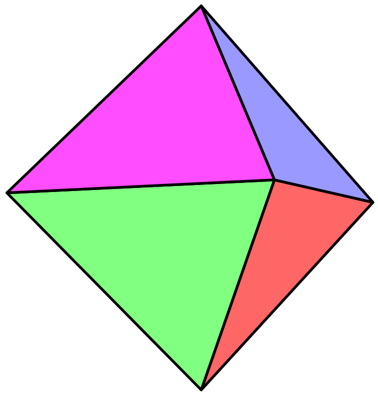
Dodecahedron:



Tetrahedron:



Octahedron:



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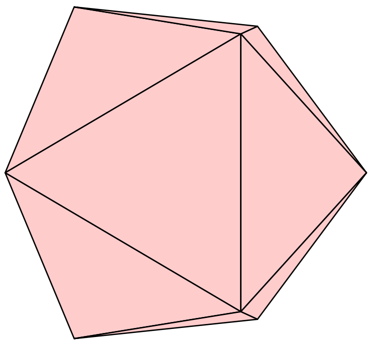
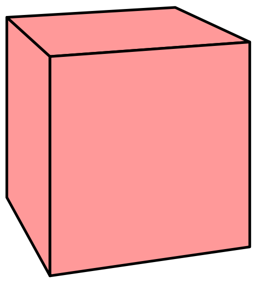


Cube:



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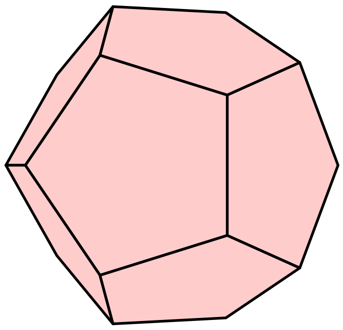

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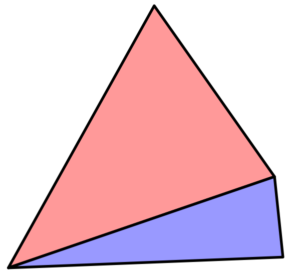
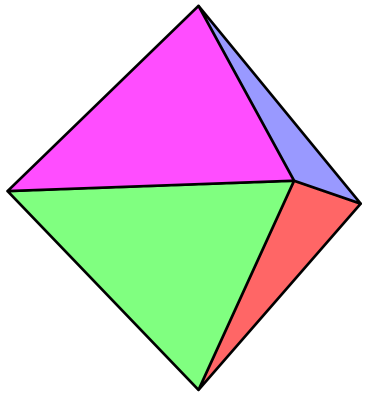


Octahedron:



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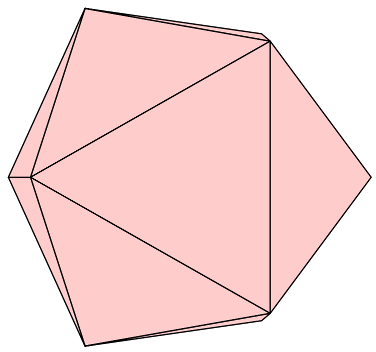

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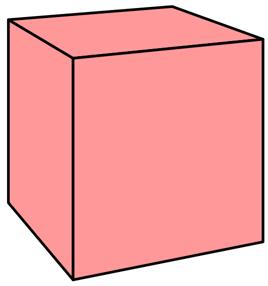

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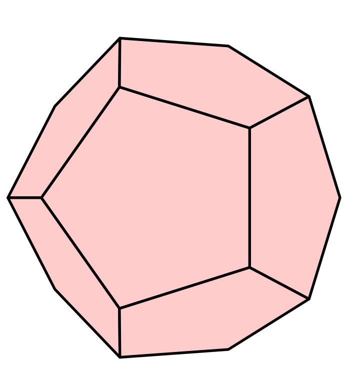

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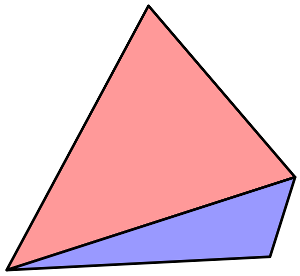

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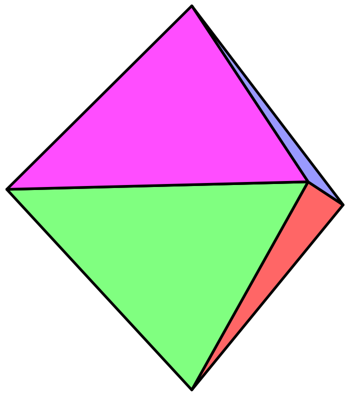

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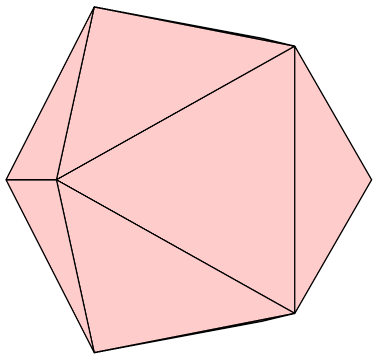

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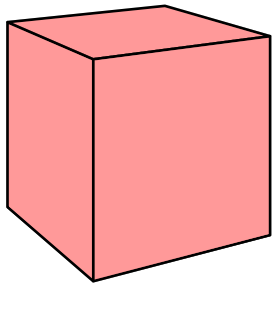

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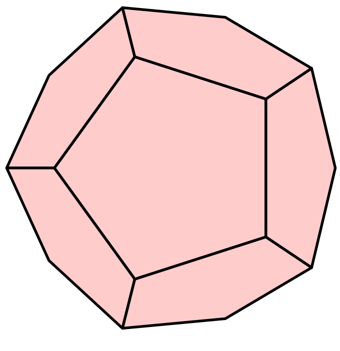
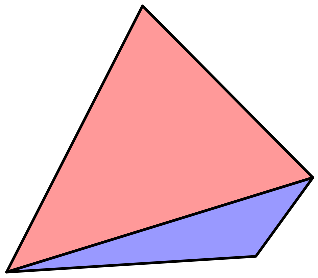


Animation: 5 of 120

Tetrahedron:



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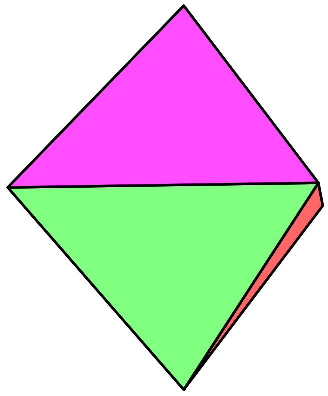

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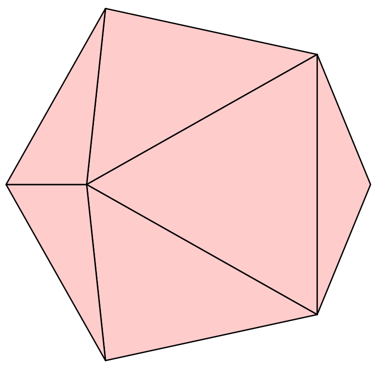

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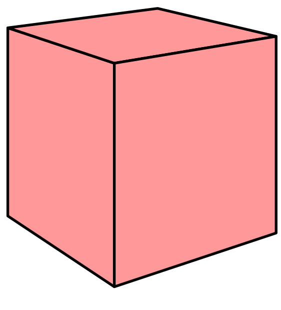

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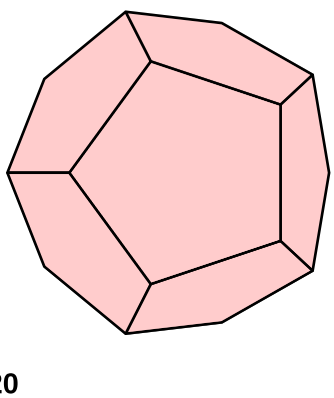
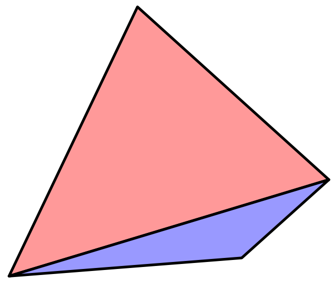


Animation: 6 of 120

Tetrahedron:



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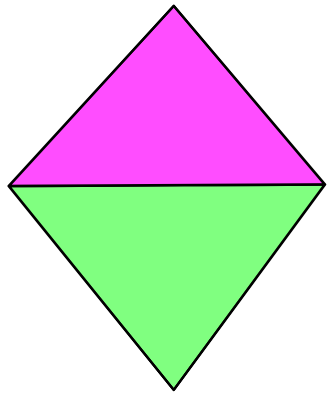

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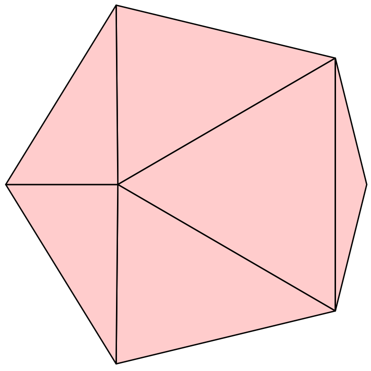

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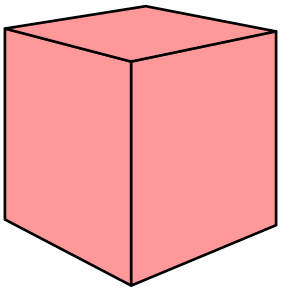

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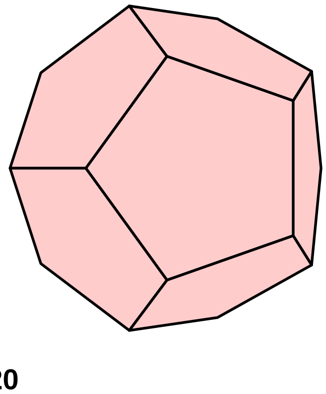
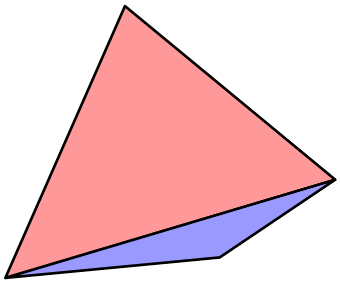


Animation: 7 of 120

Tetrahedron:



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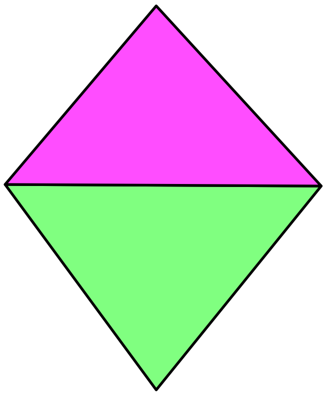

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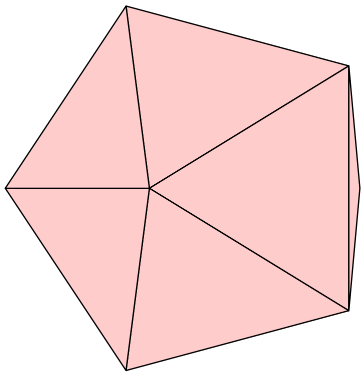
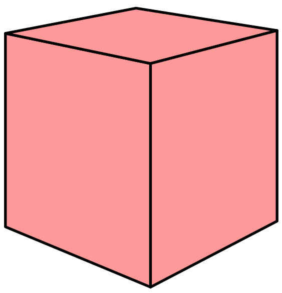
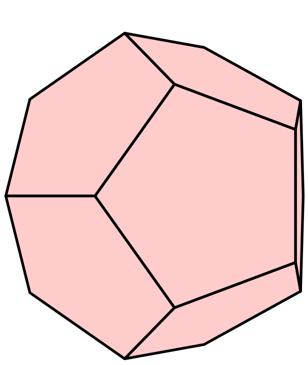


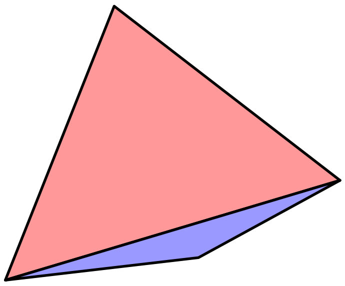
Cube:



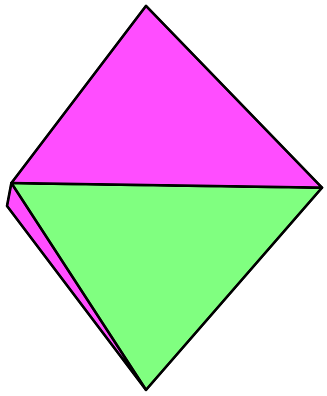
Dodecahedron:



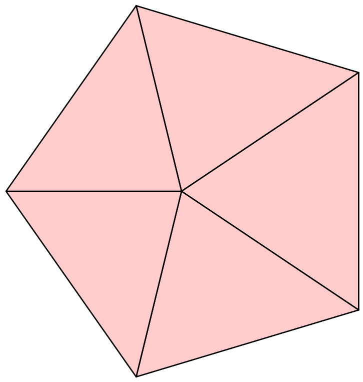
Tetrahedron:



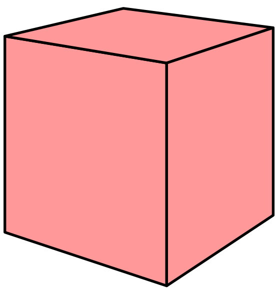
Octahedron:



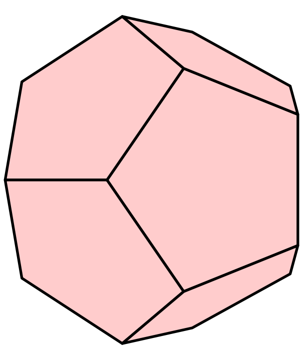
Icosahedron:



Cube:

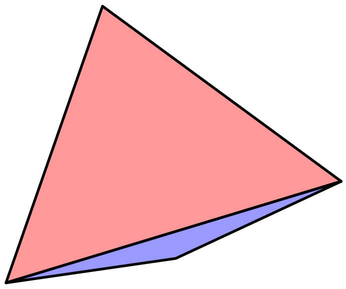


Dodecahedron:

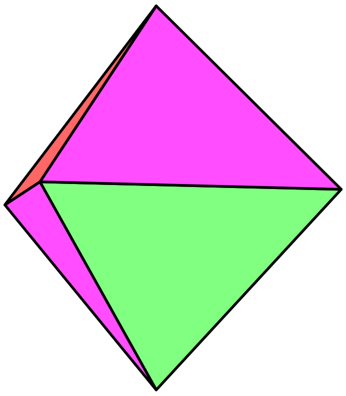


Animation: 9 of 120

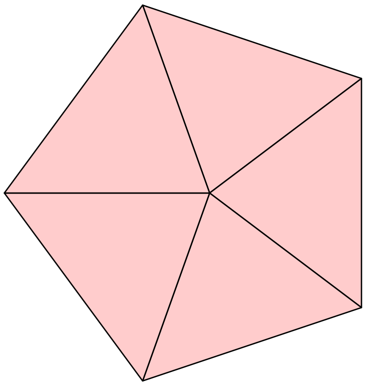
Tetrahedron:



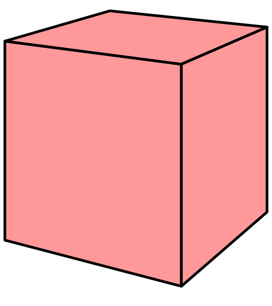
Octahedron:



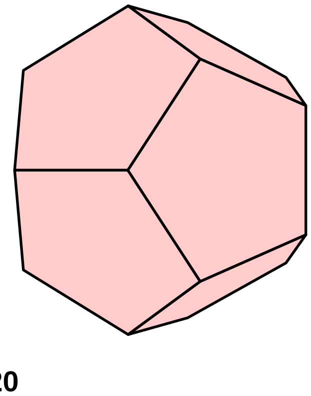
Icosahedron:



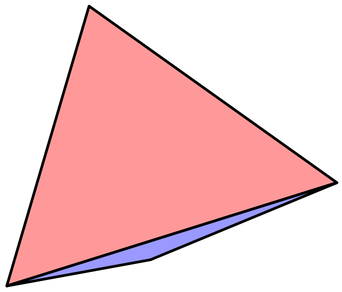
Cube:



Dodecahedron:



Tetrahedron:



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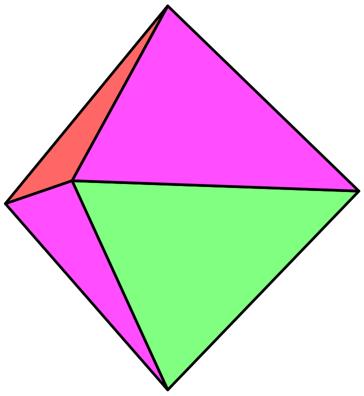

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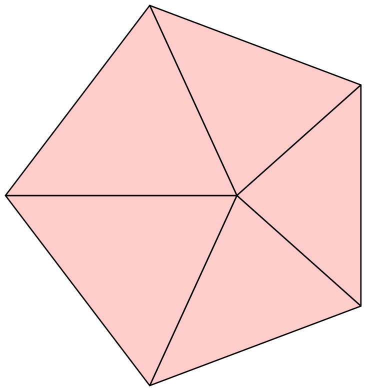

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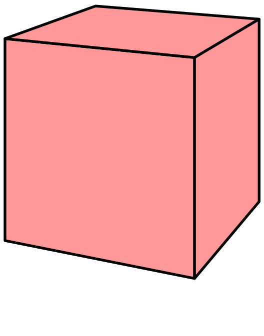

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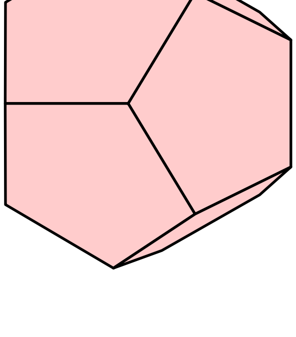

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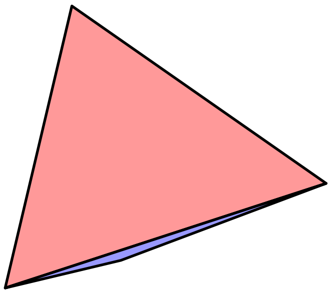

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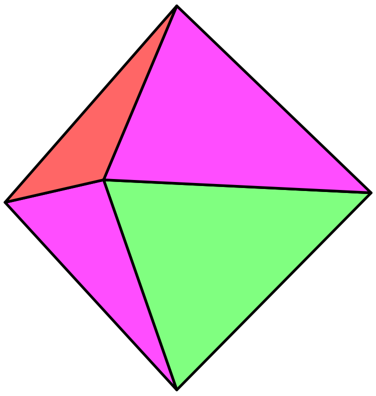

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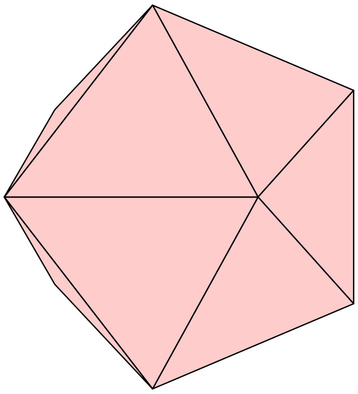

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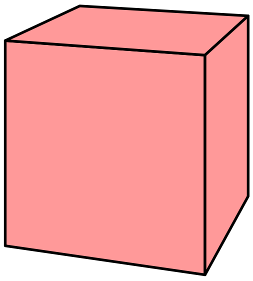

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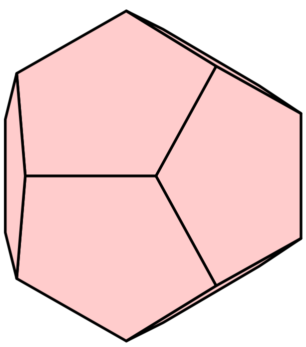

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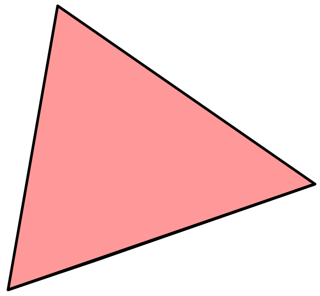

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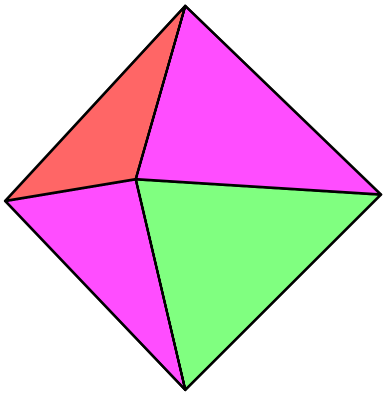

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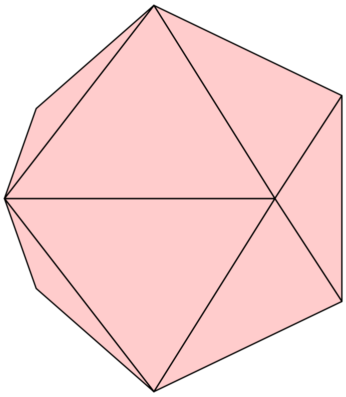

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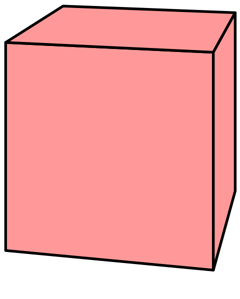

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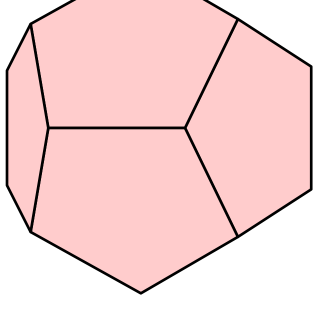

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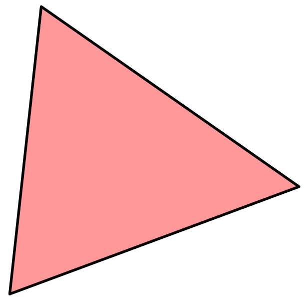

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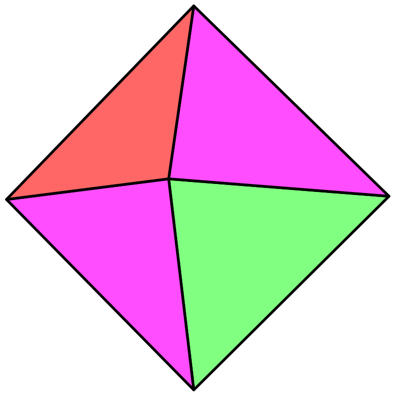

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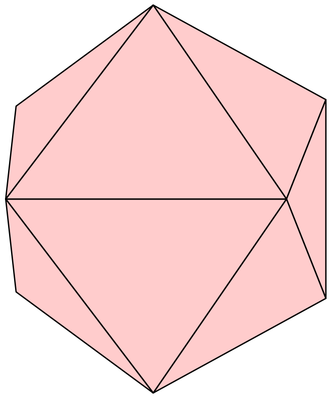

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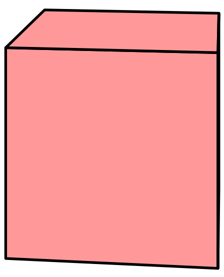

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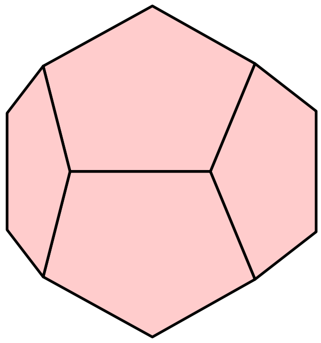

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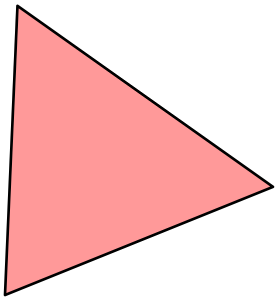

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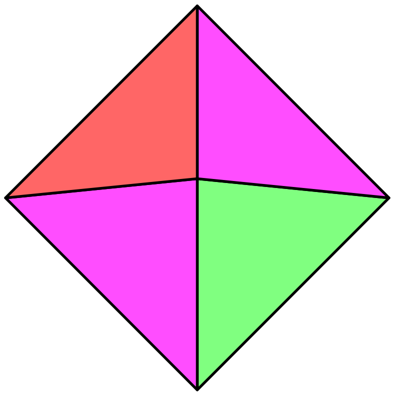

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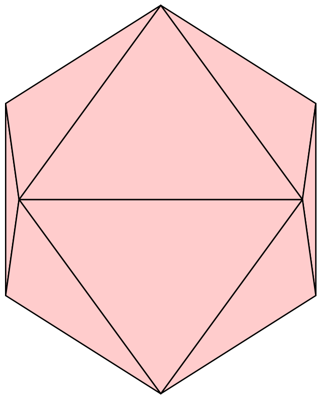

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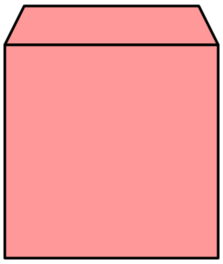

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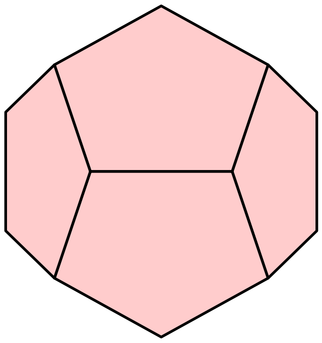

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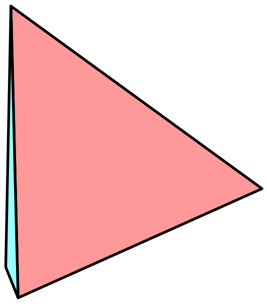

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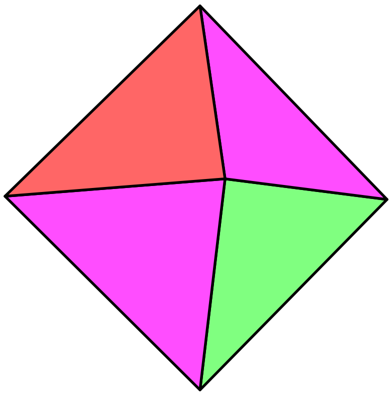

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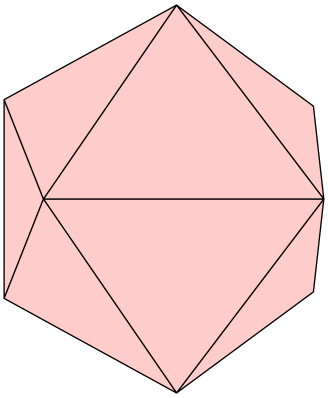

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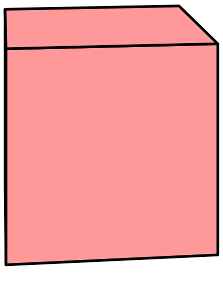

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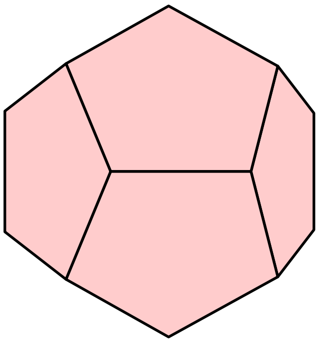

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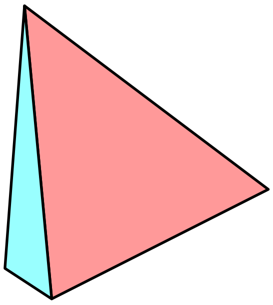

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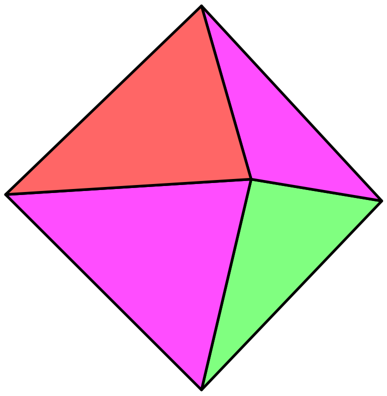

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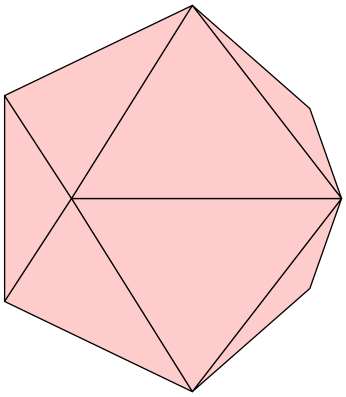

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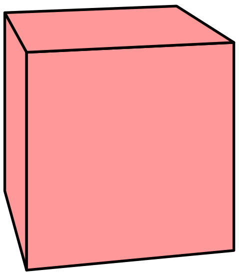

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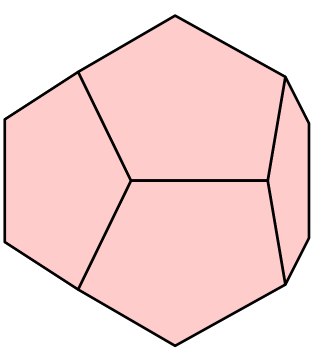

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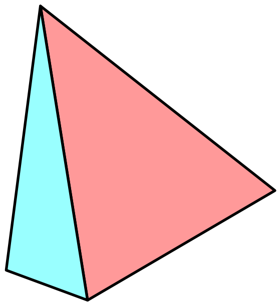

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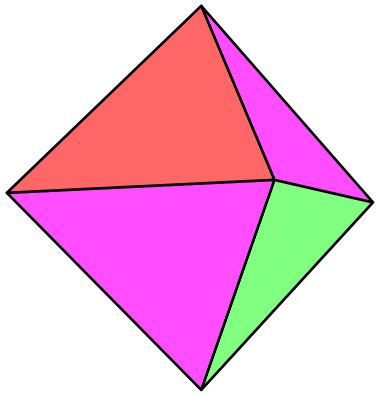

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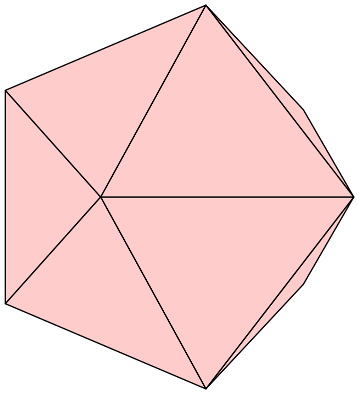

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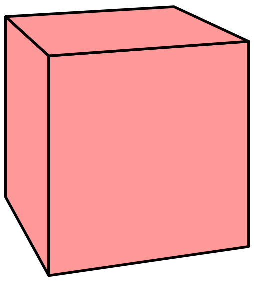

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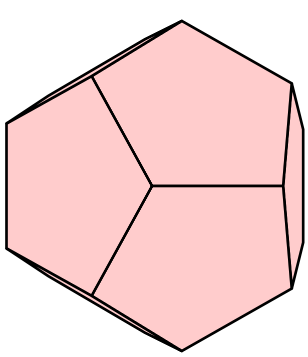

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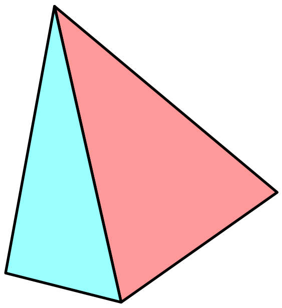

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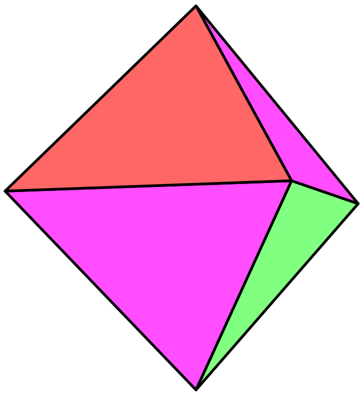

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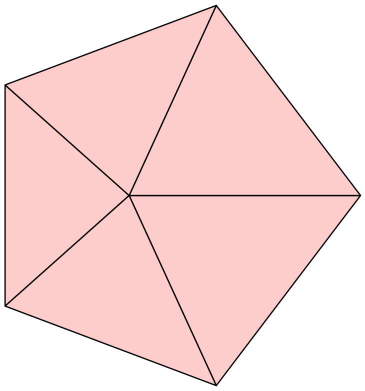

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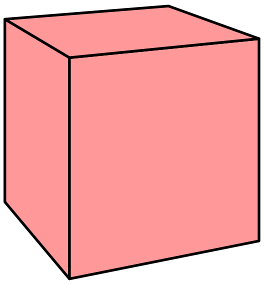

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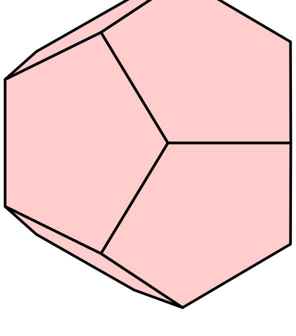

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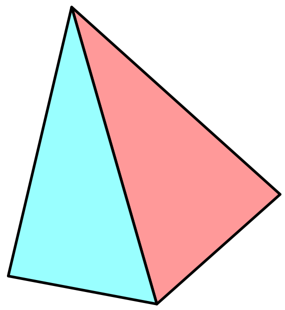

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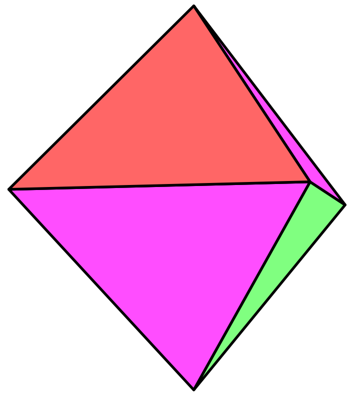

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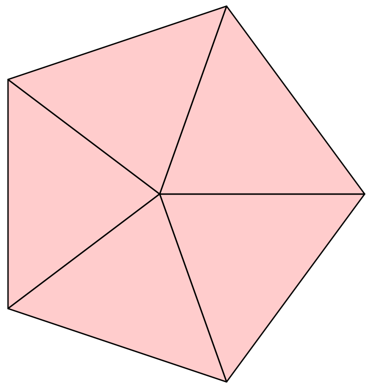

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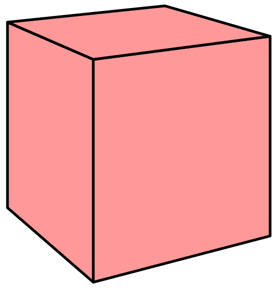

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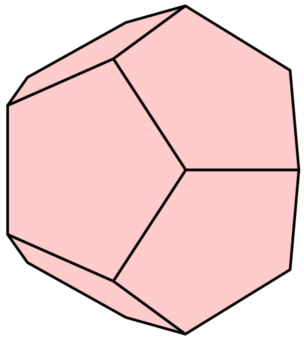

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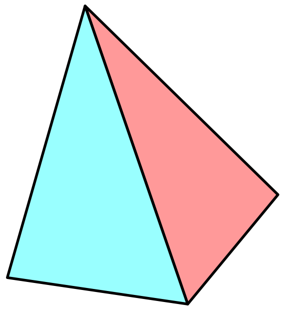

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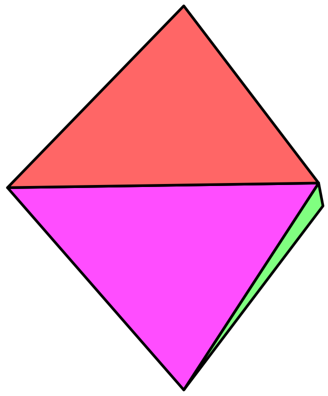

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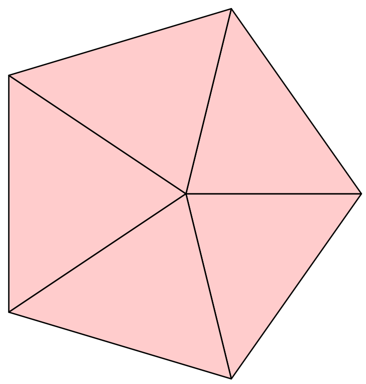

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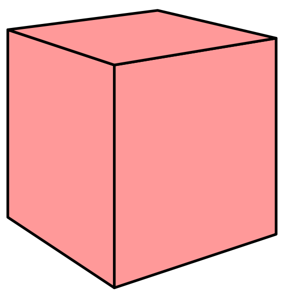

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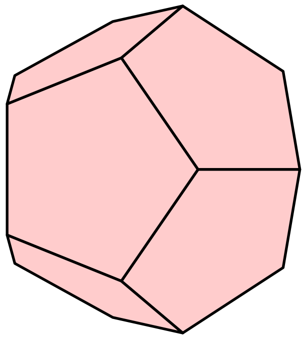

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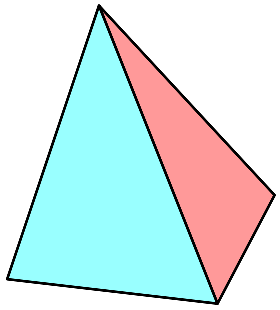

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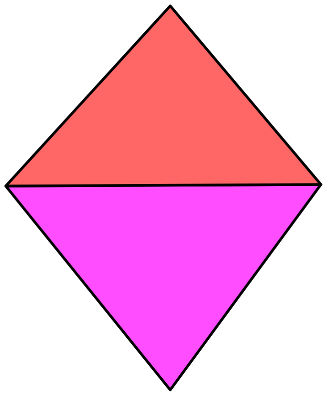

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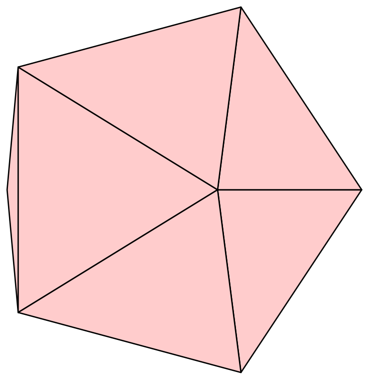

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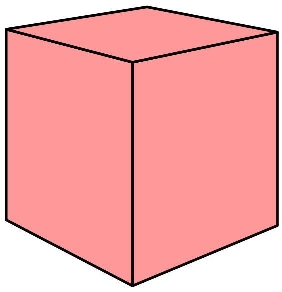

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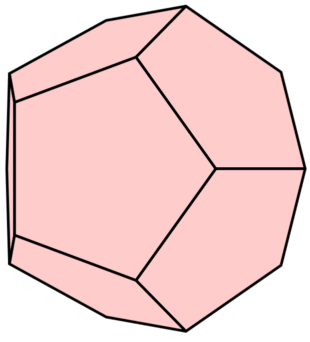

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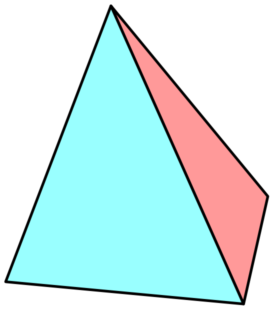

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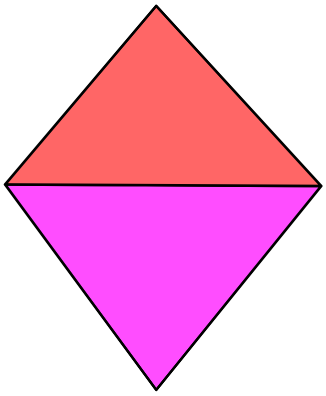

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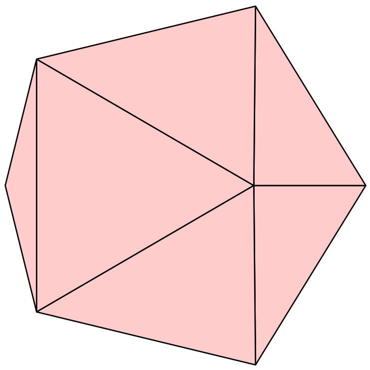

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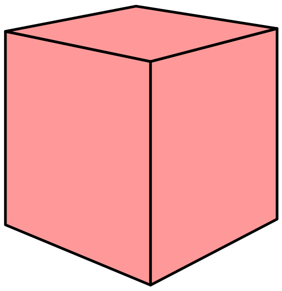

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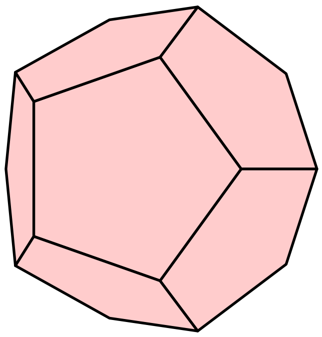

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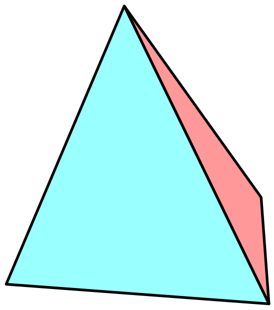

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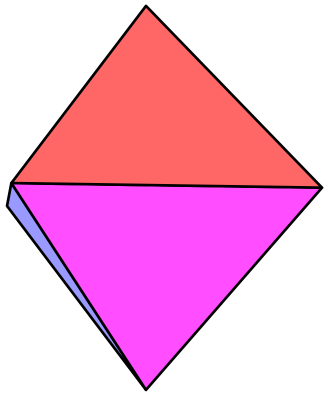

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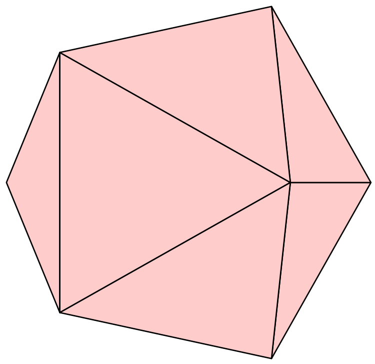

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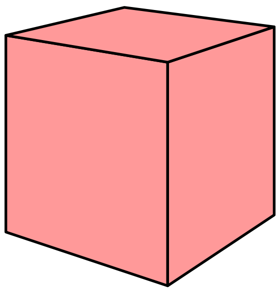

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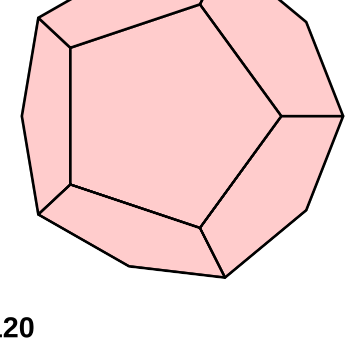

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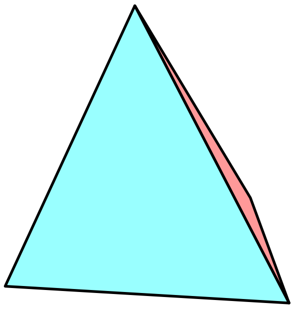

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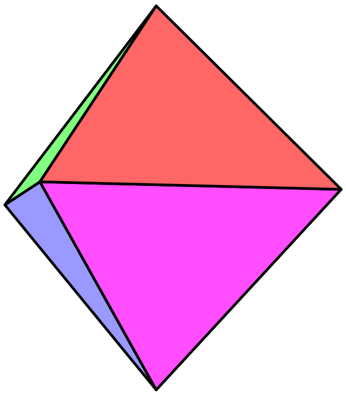

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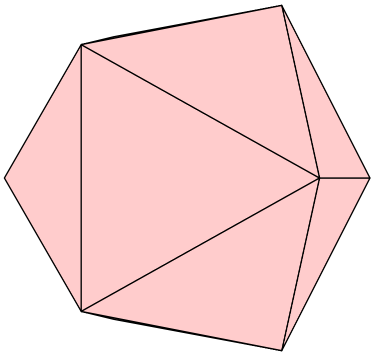
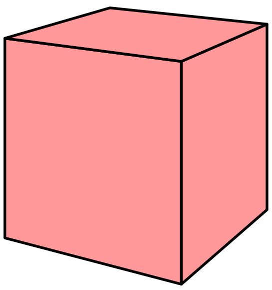


Cube:



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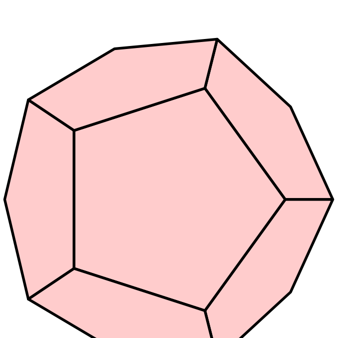

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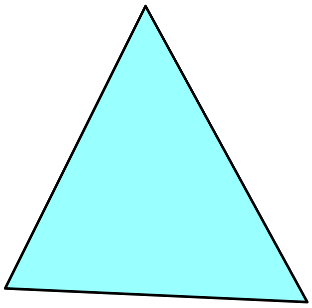

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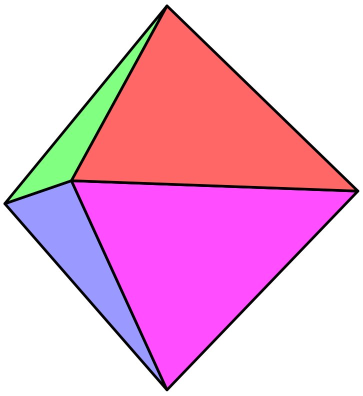

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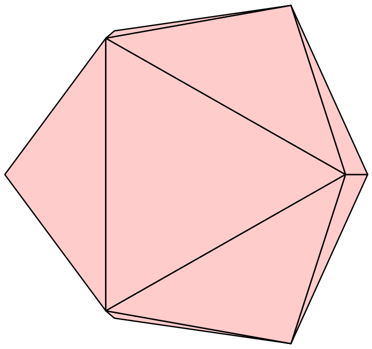

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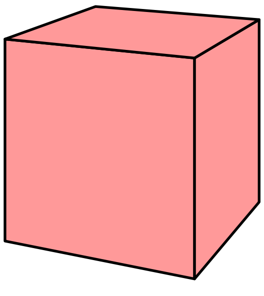

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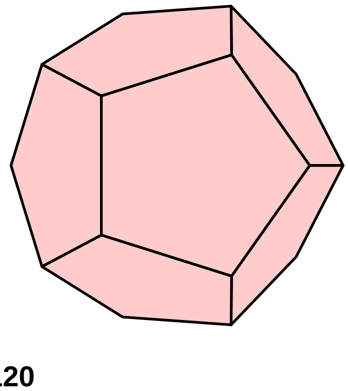

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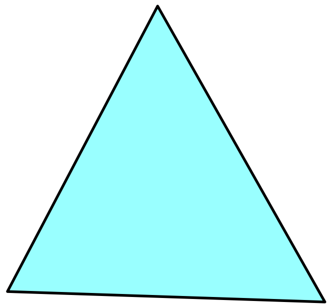

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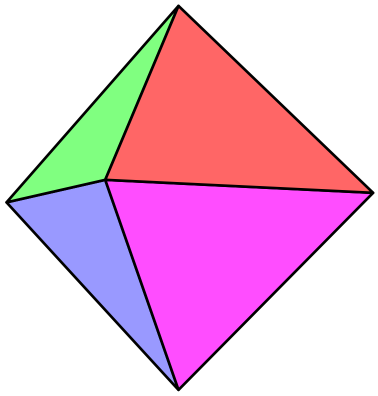

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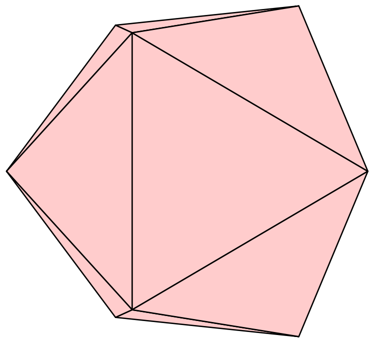

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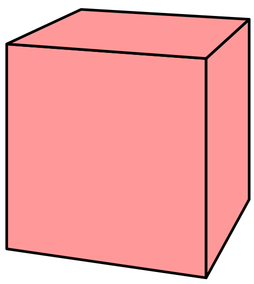

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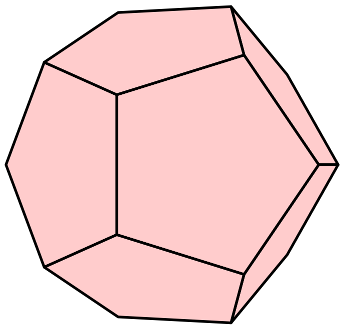

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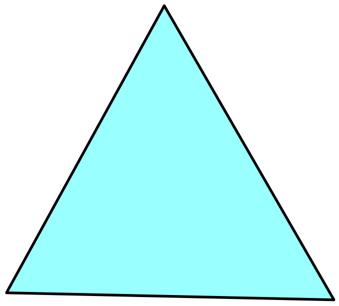

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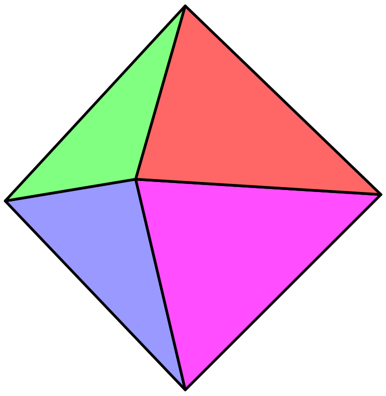

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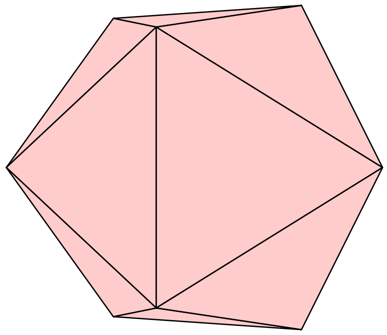

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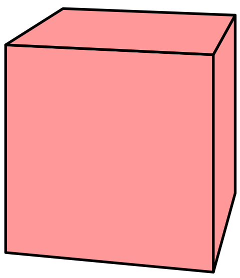

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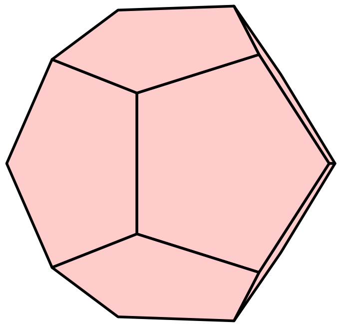

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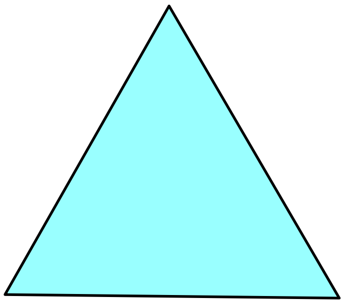
Tetrahedron:



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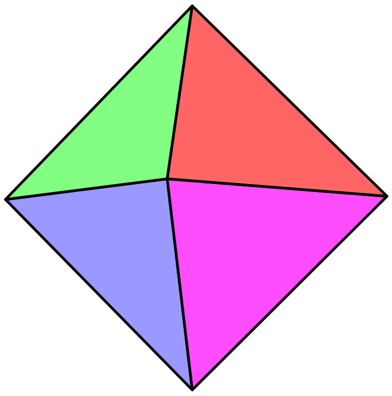

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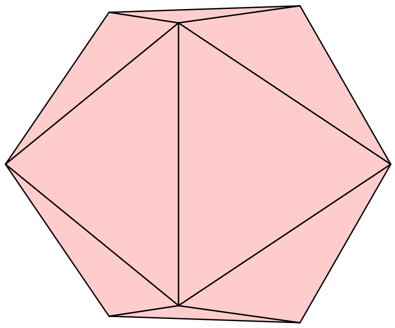

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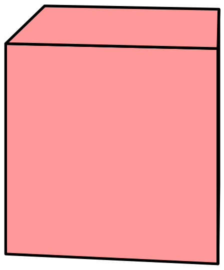

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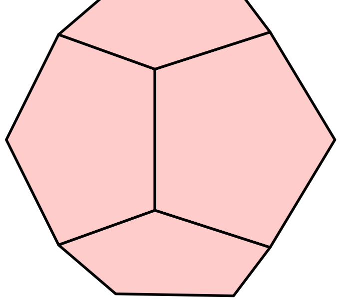

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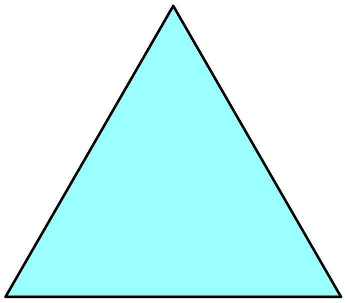

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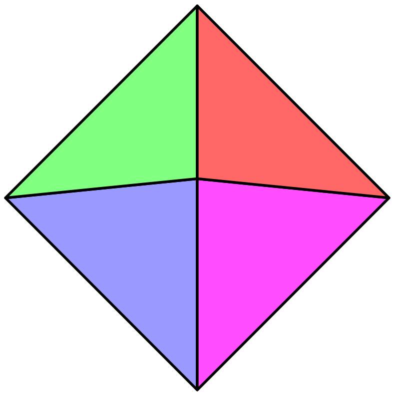

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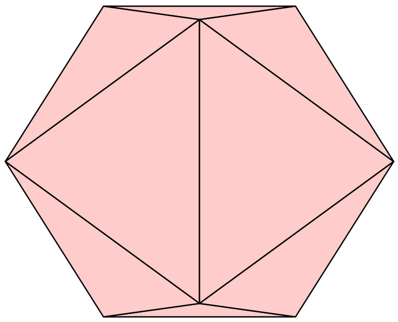

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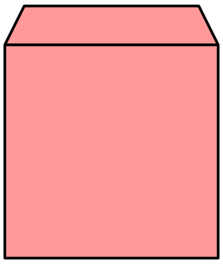

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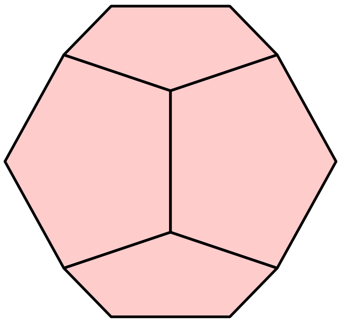

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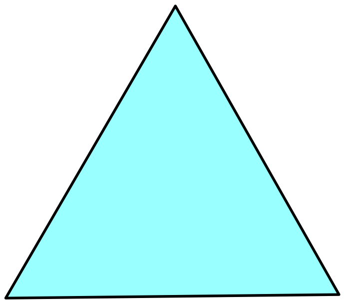

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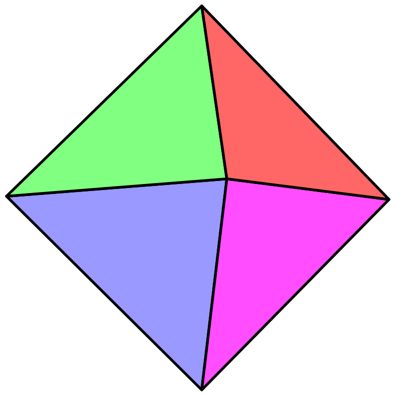

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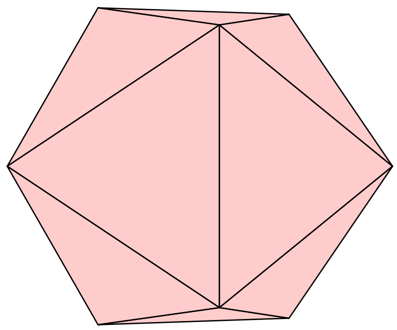

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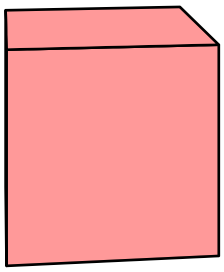

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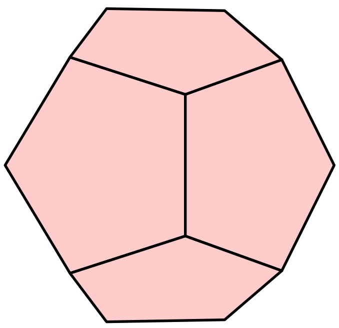

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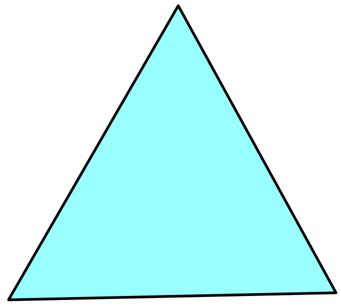

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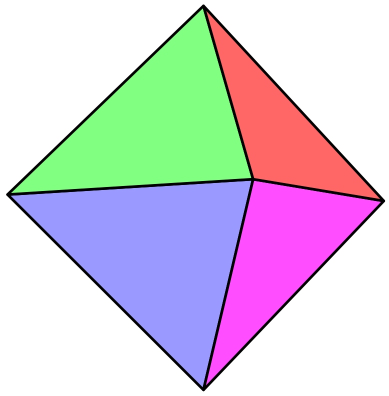

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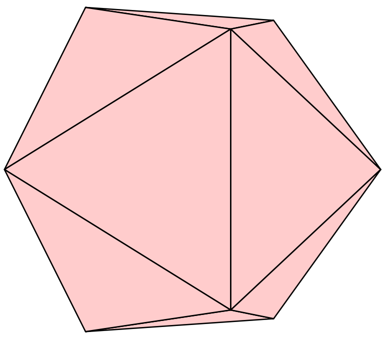

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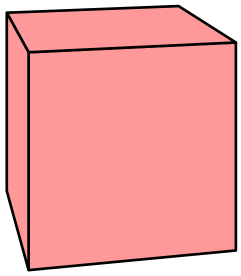

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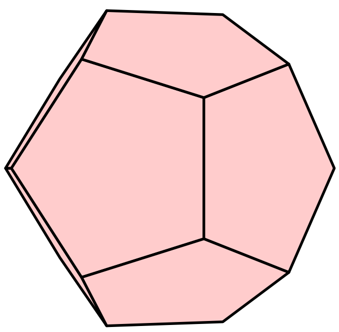

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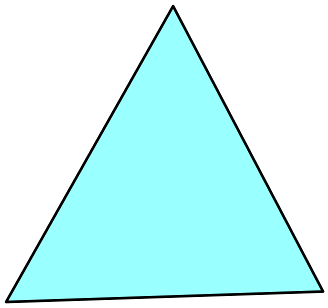
Tetrahedron:



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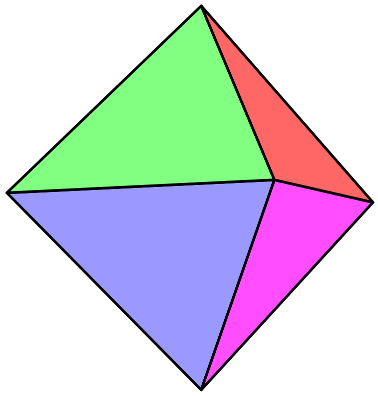

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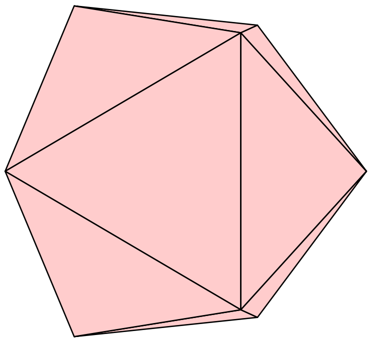

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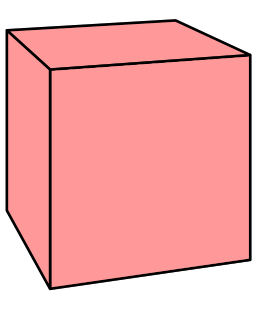

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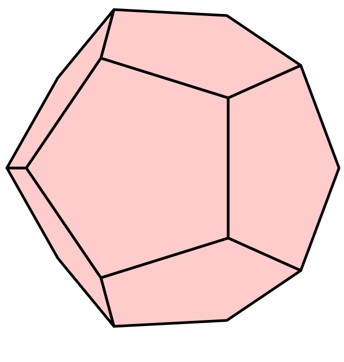

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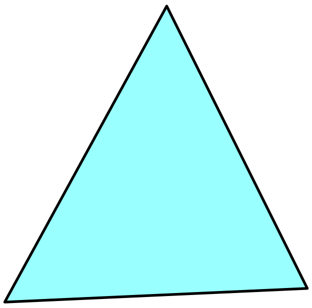
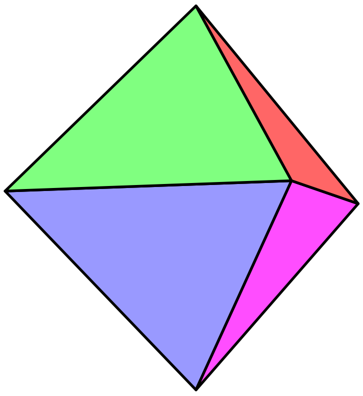
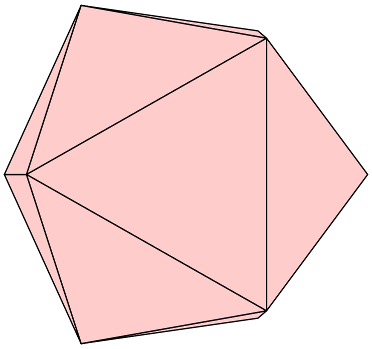
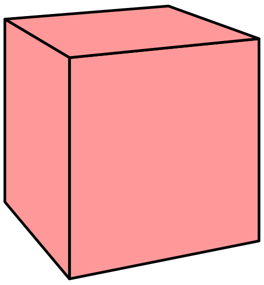
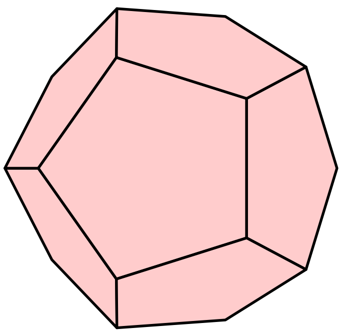
Tetrahedron: 

Octahedron: 

Icosahedron: 

Cube: 

Dodecahedron: 

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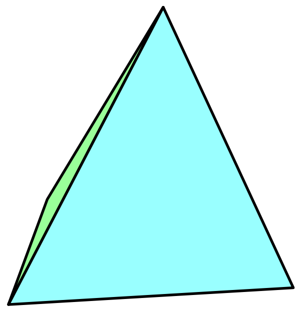

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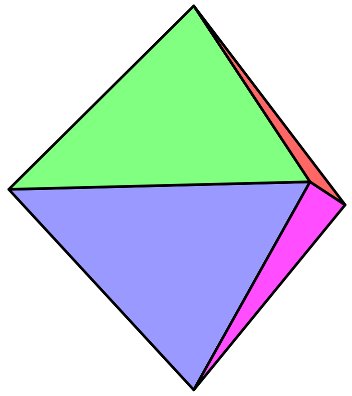

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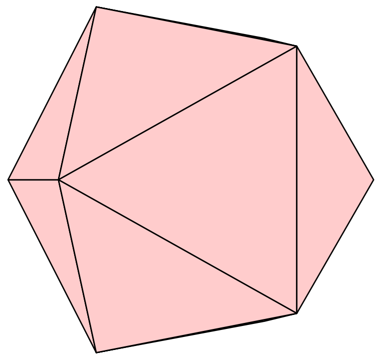

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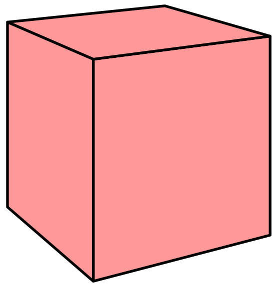

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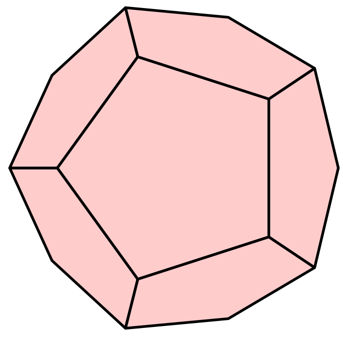

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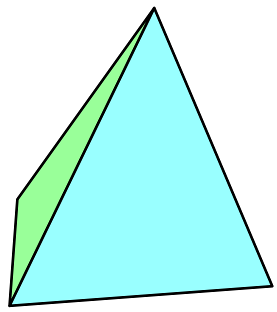

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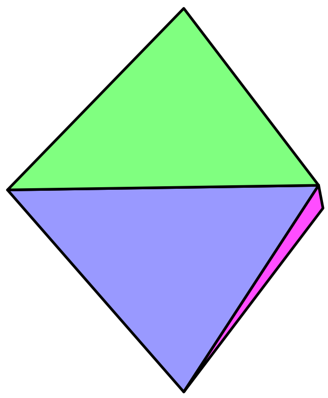

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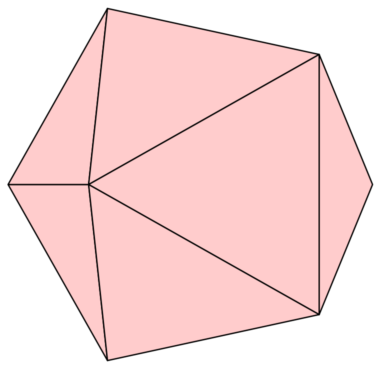

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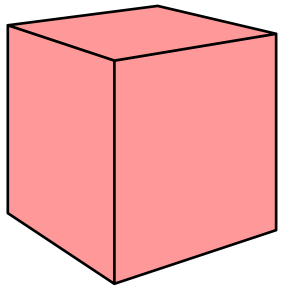

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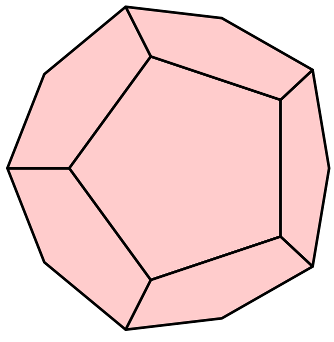

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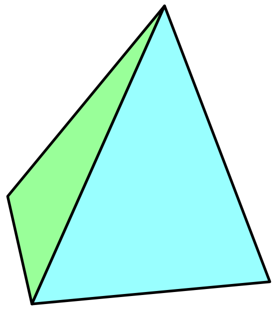

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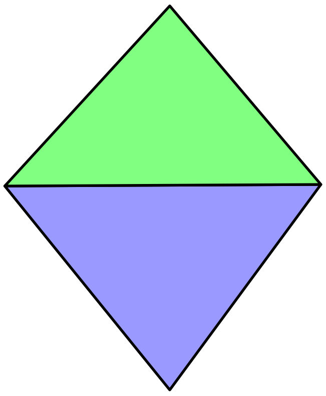

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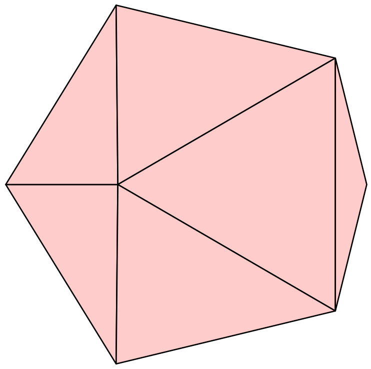

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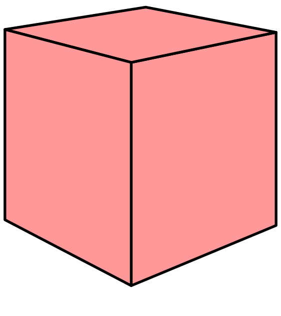

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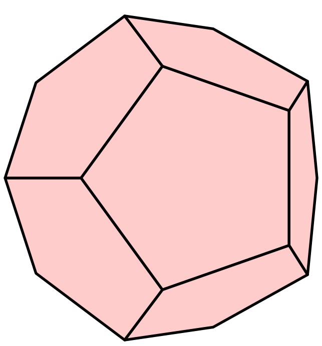

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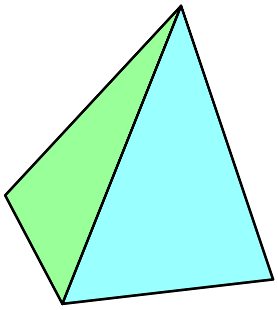

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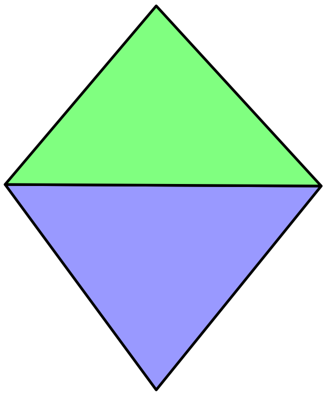

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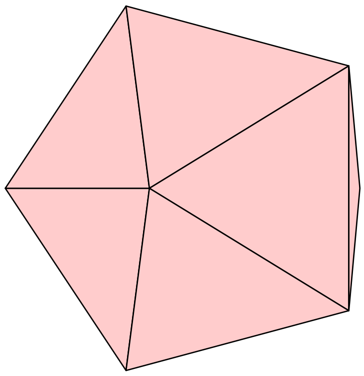

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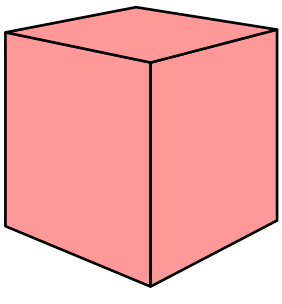

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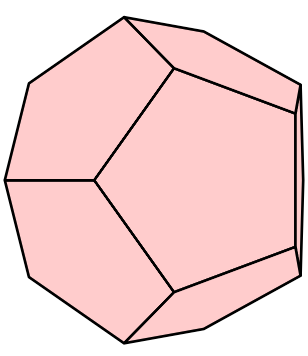

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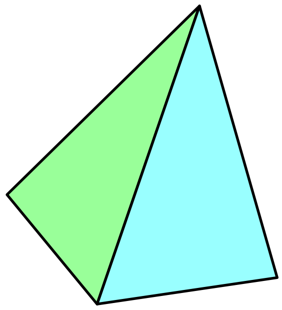

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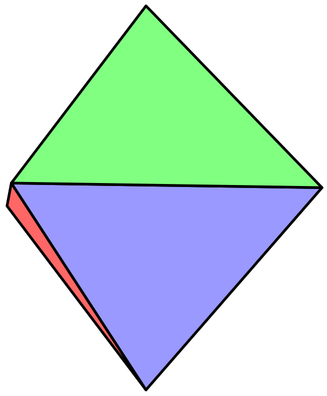

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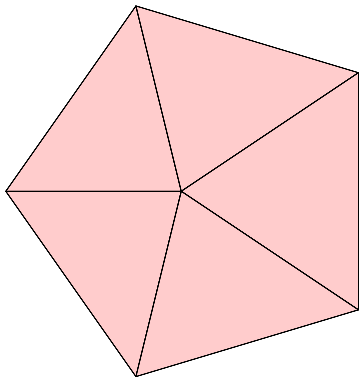

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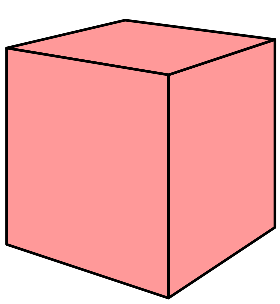

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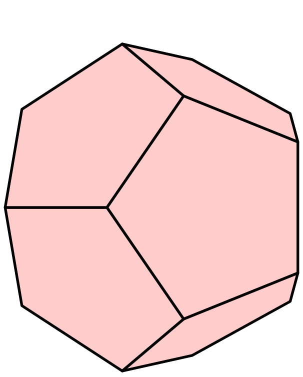

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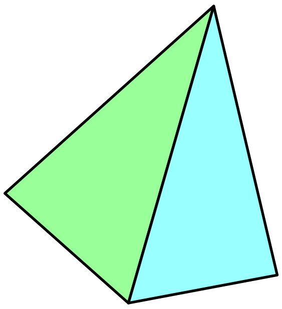

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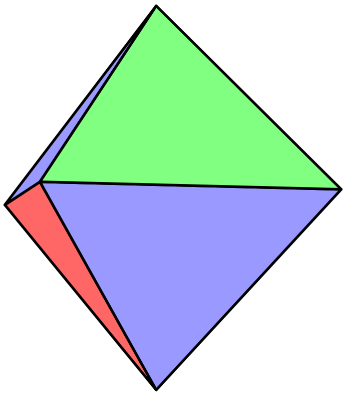

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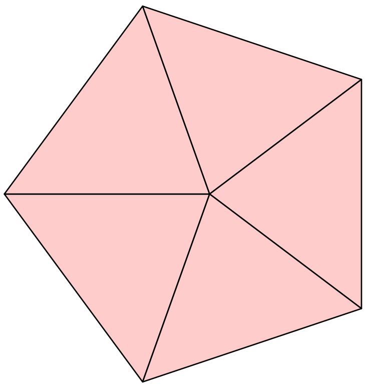

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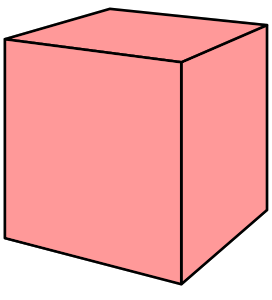

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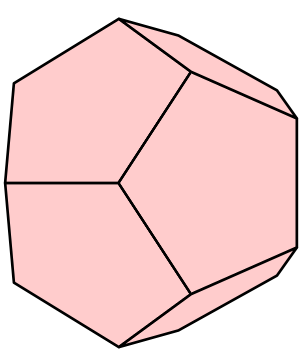

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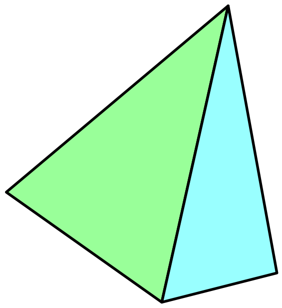

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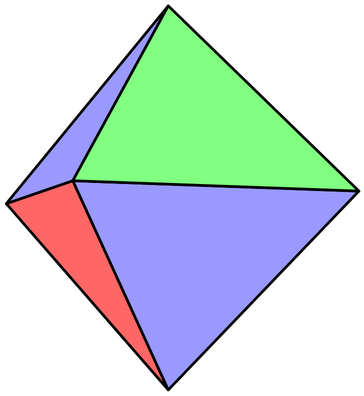

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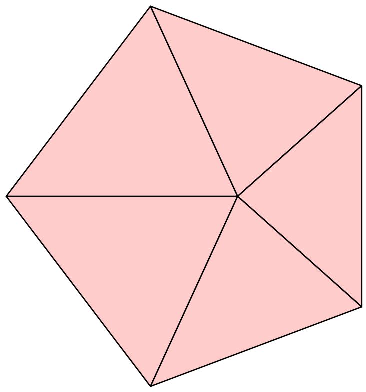

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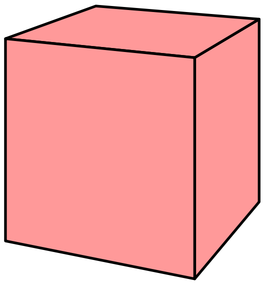

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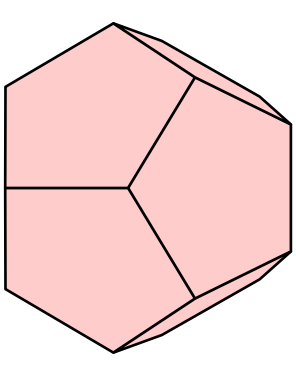

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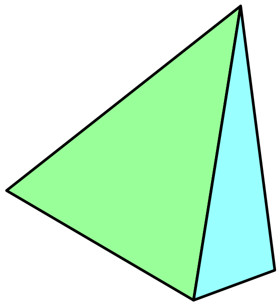

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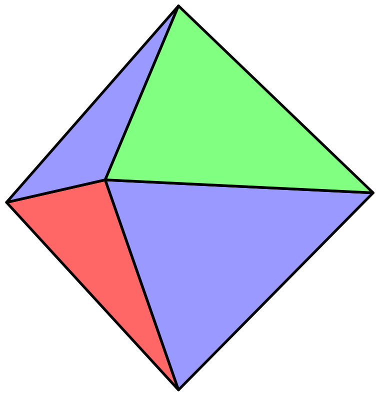

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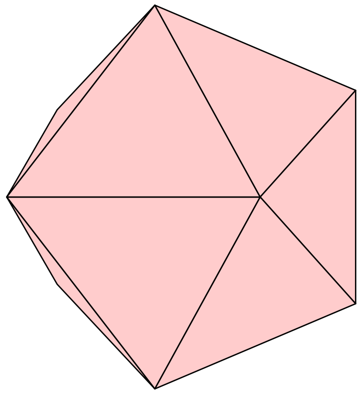

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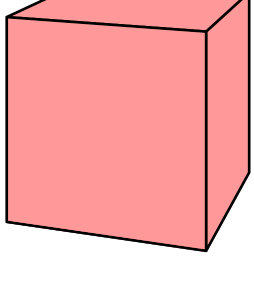

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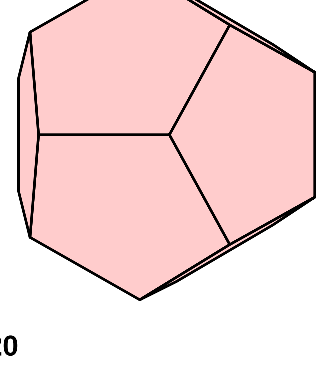

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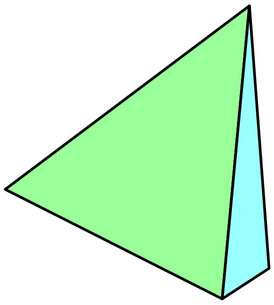

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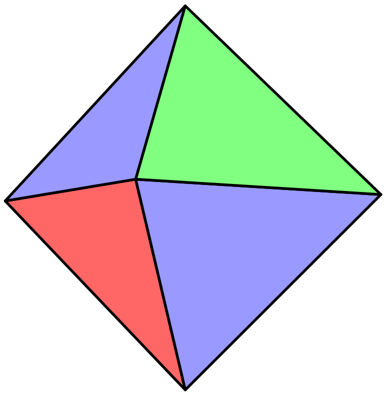

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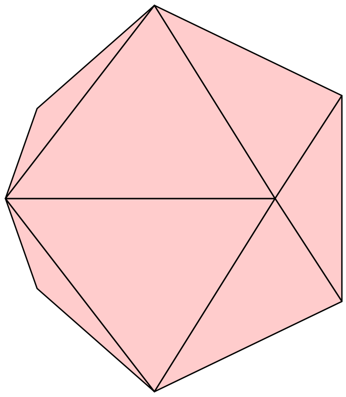

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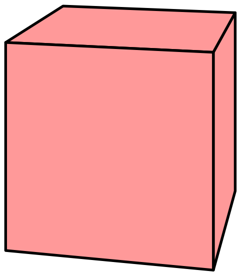

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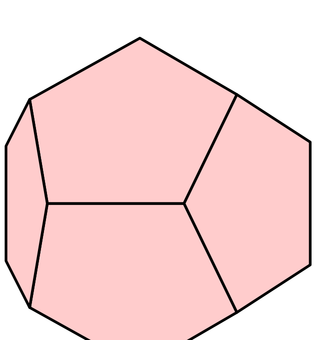

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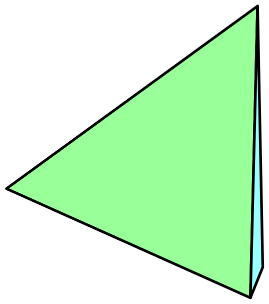

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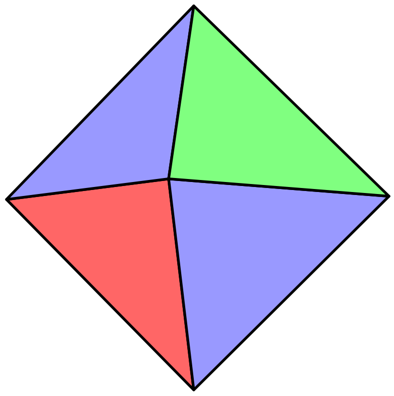

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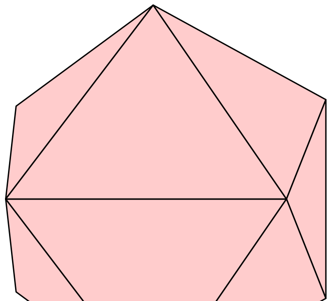

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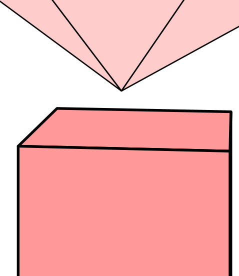

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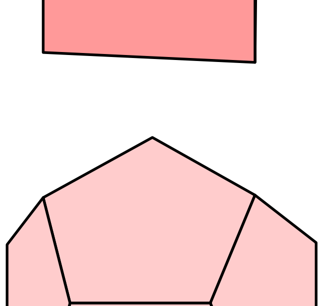

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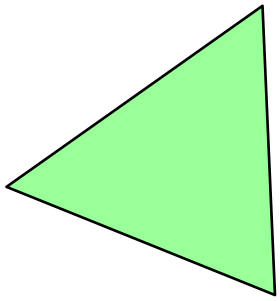

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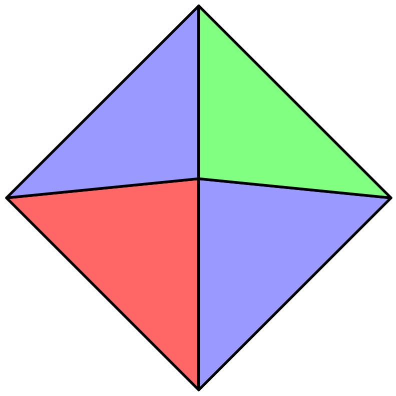

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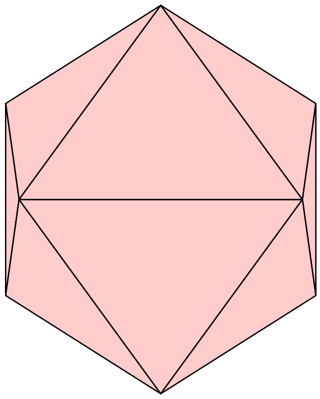

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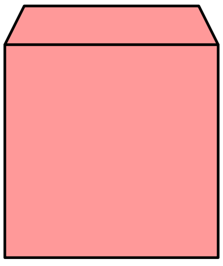

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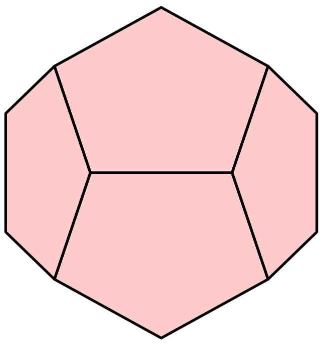

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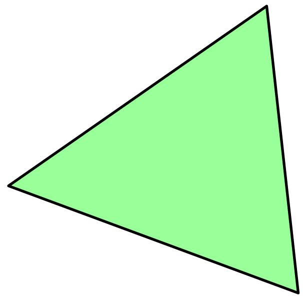

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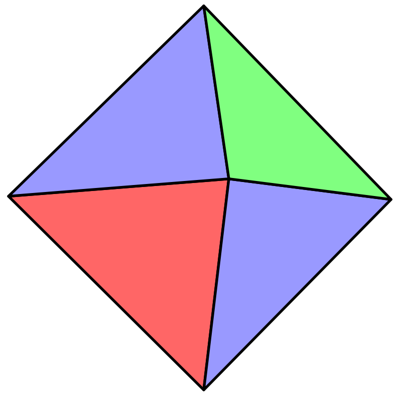

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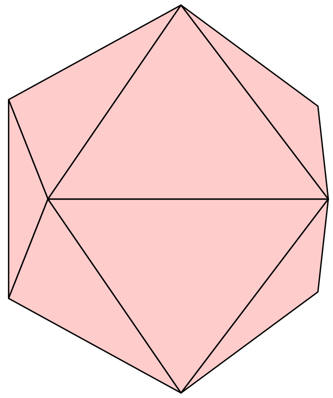

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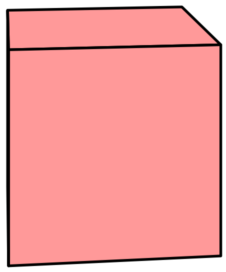

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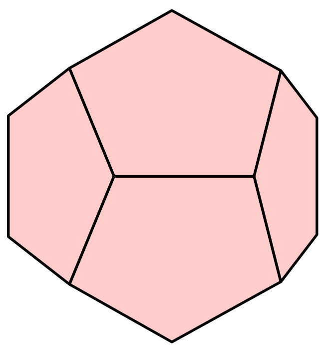

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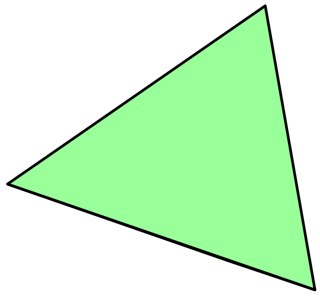
Tetrahedron:



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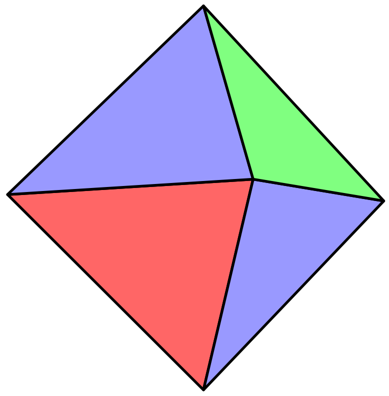

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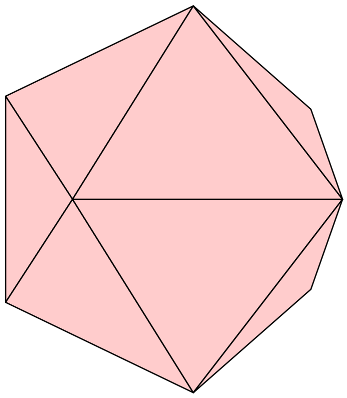

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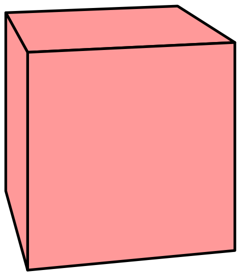

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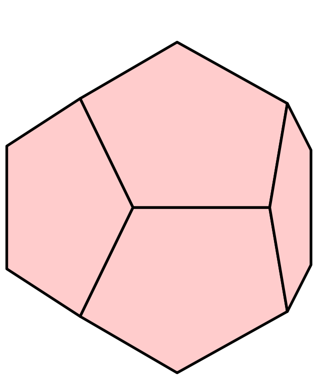

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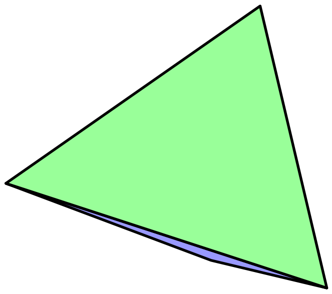

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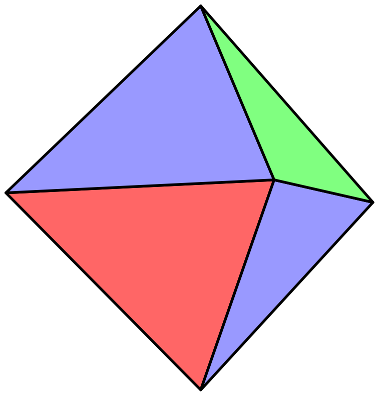

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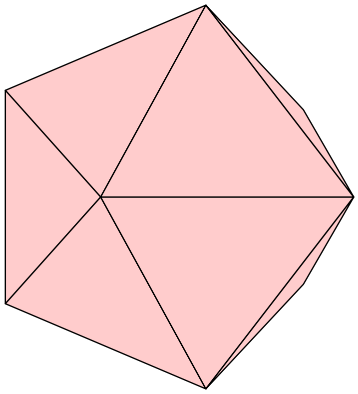

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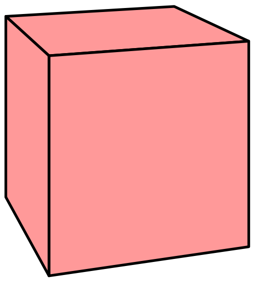

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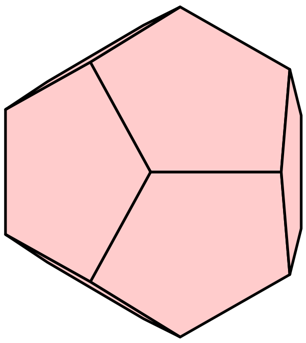

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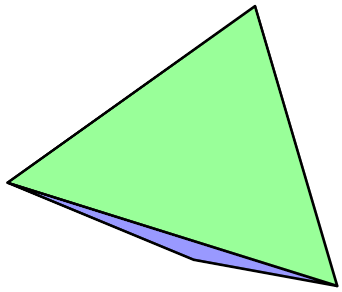

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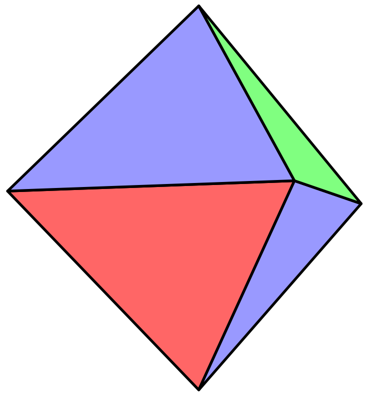

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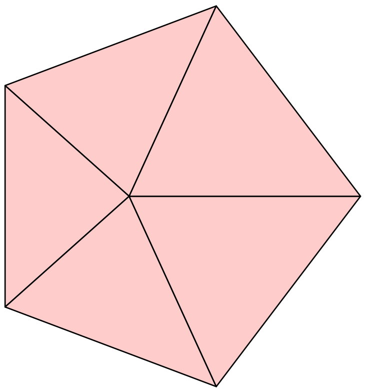

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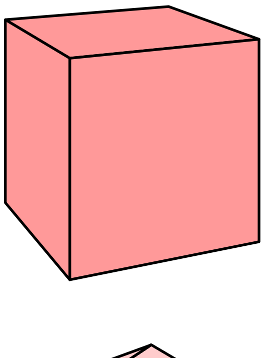

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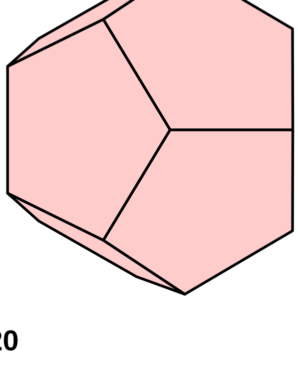

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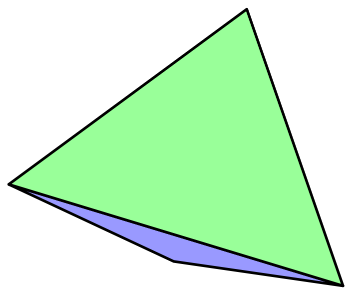

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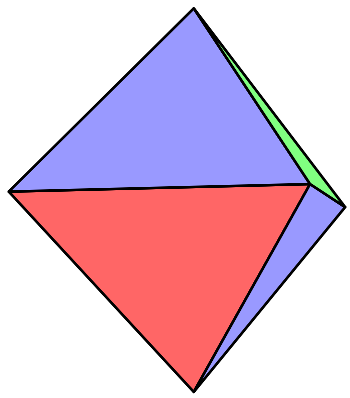

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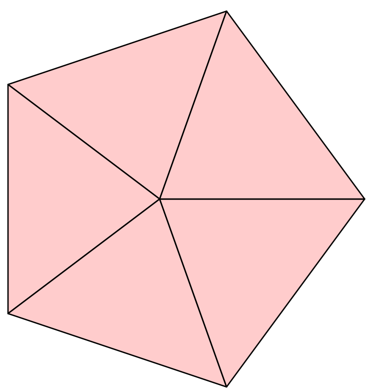

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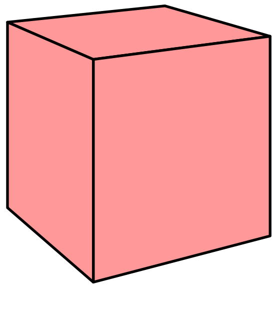

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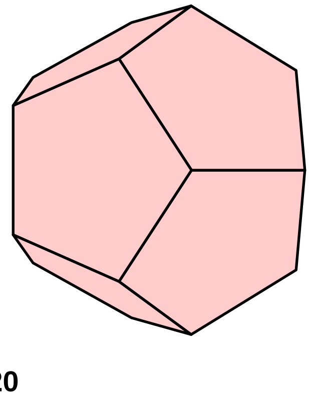

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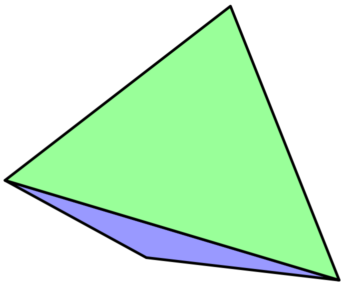
Tetrahedron:



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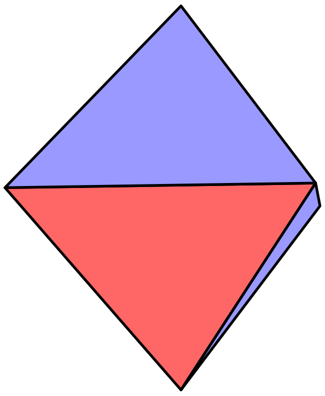

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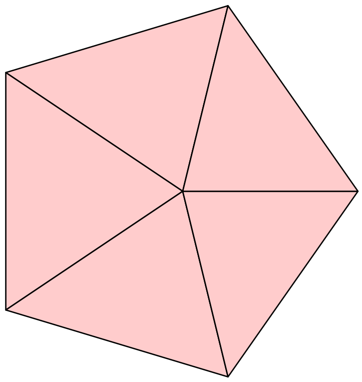

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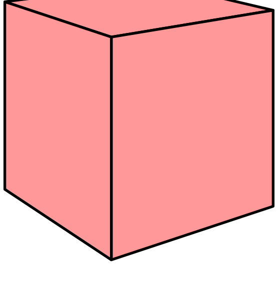

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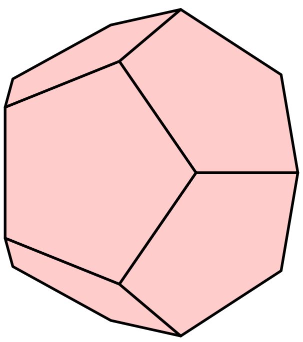

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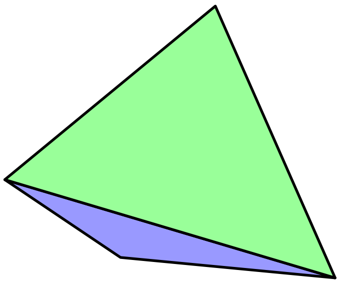

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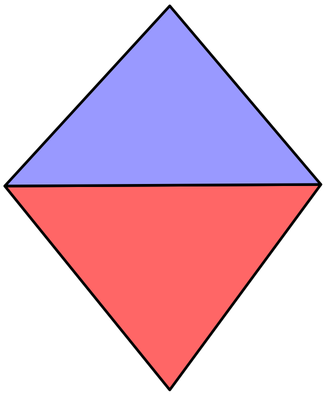

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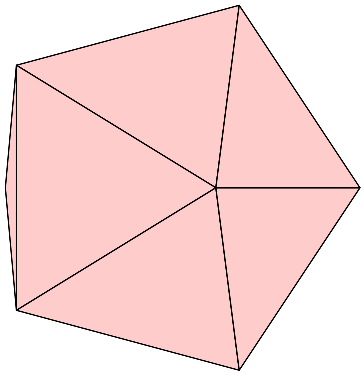

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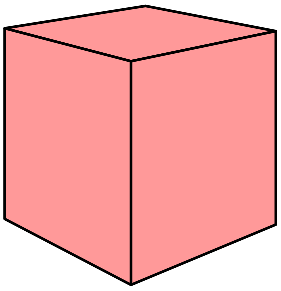

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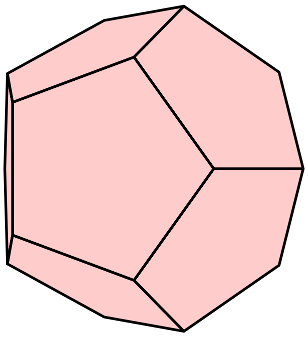

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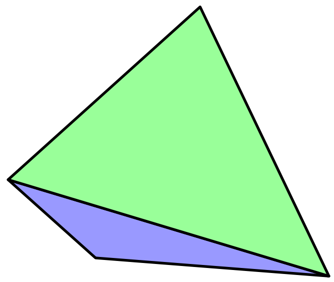

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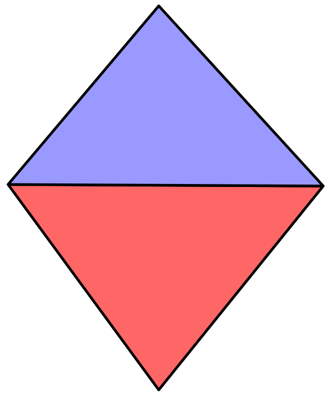

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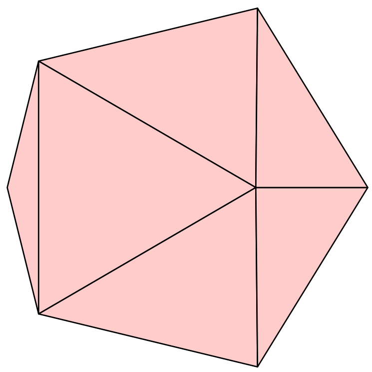

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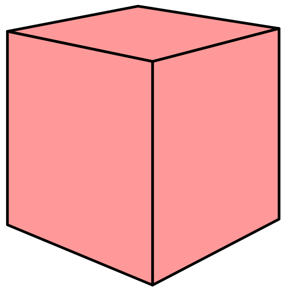

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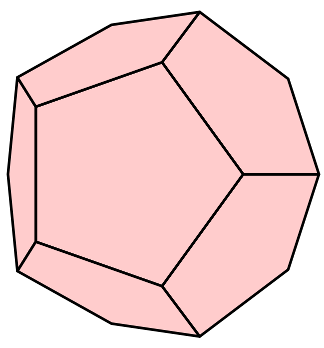

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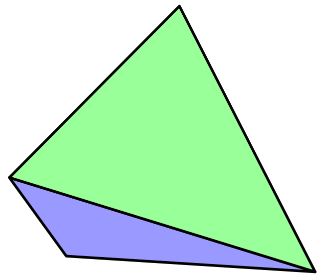
Tetrahedron:



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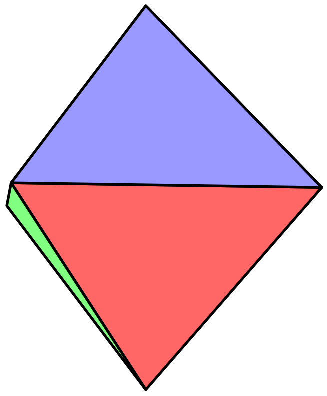

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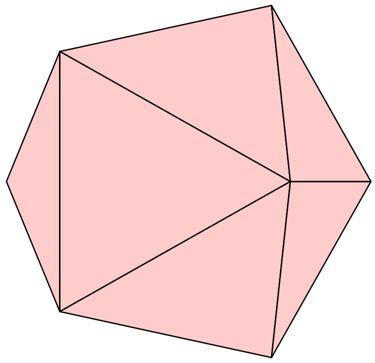

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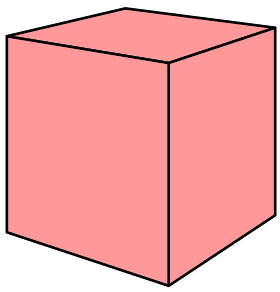

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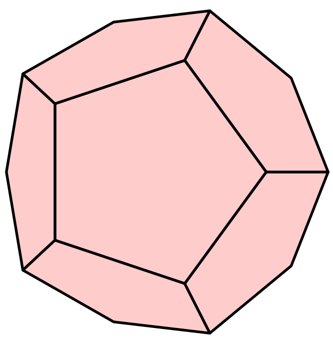

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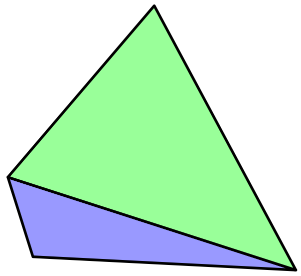

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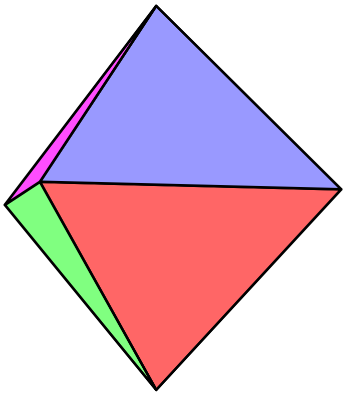

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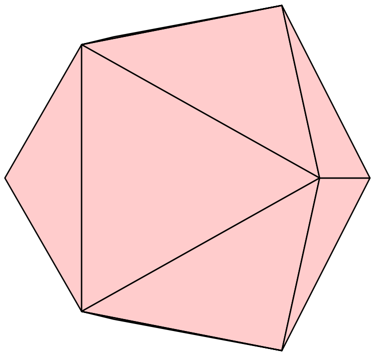

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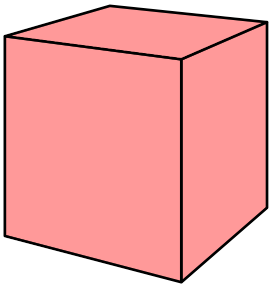

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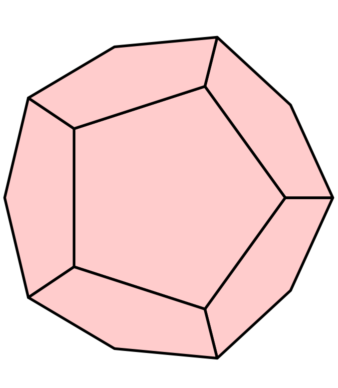

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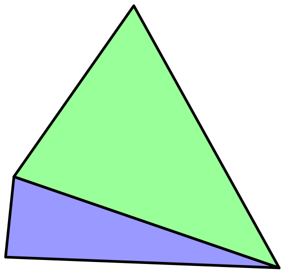

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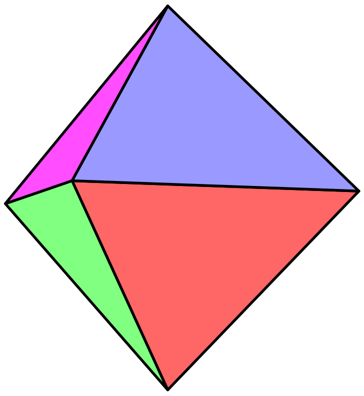

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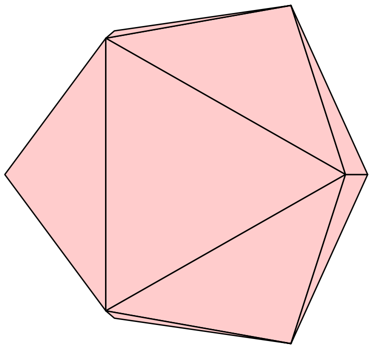

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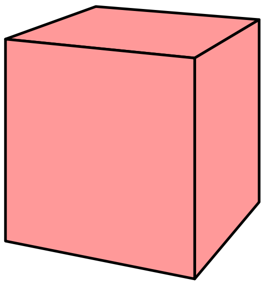

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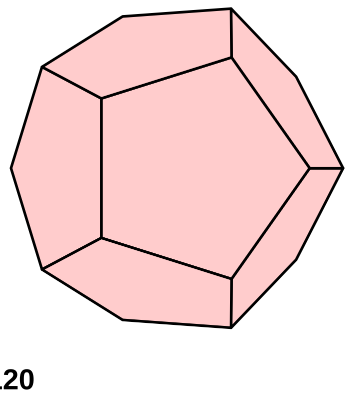

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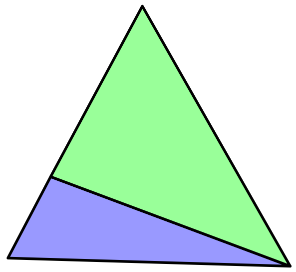

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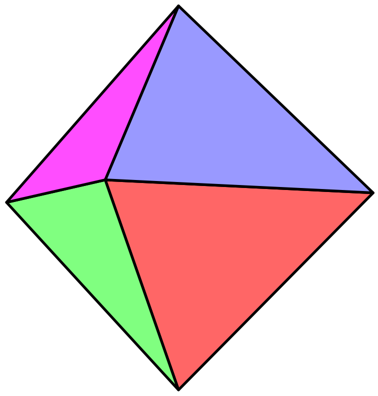

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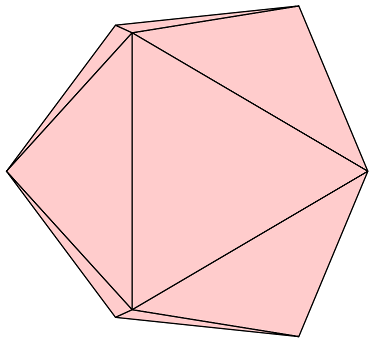

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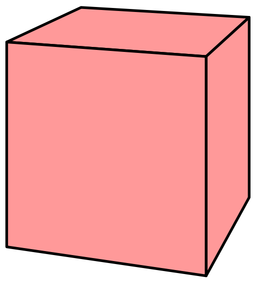

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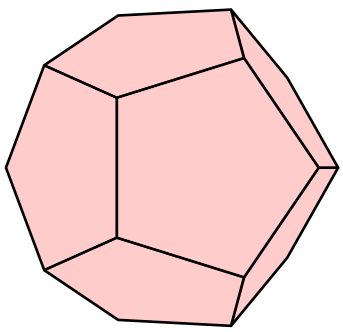

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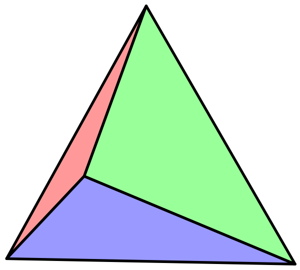
Tetrahedron:



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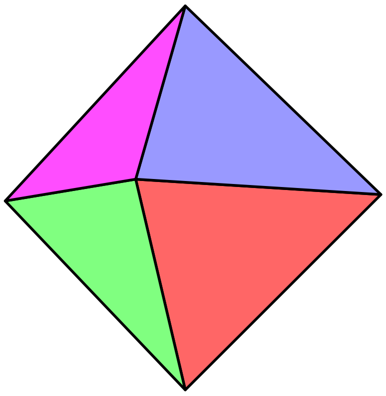

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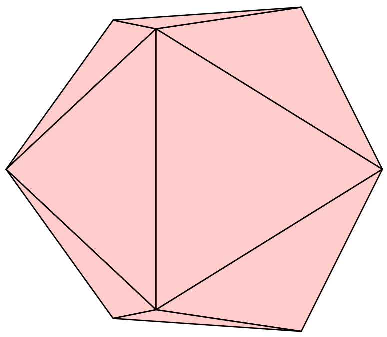

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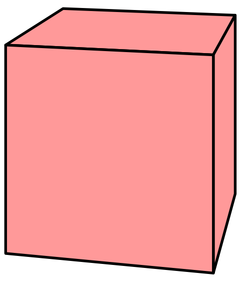

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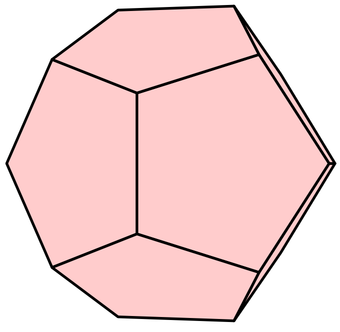

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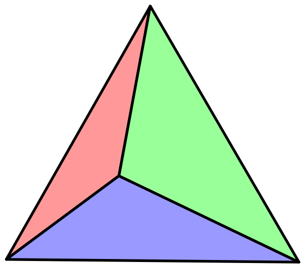
Tetrahedron:



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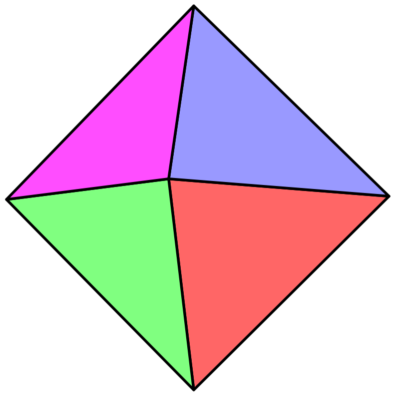

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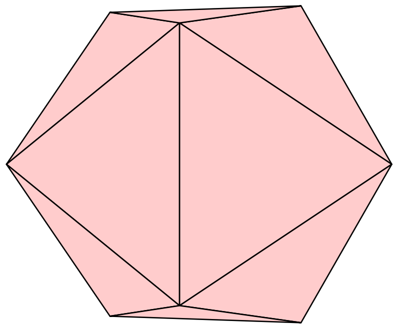

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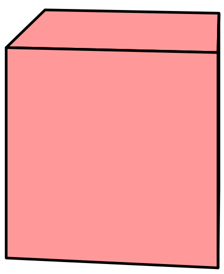

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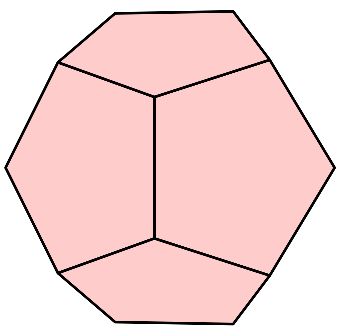

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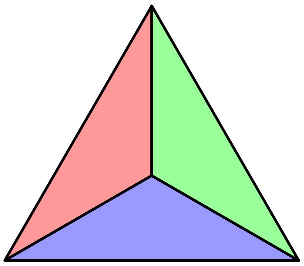
Tetrahedron:



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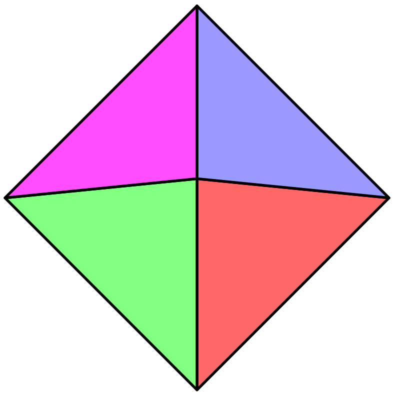

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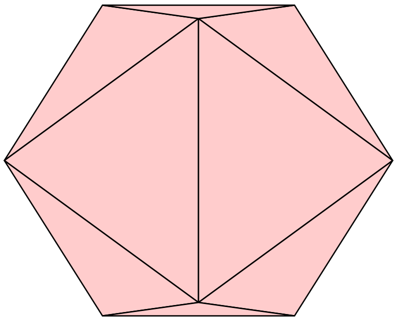

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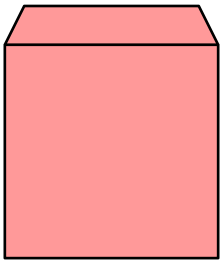

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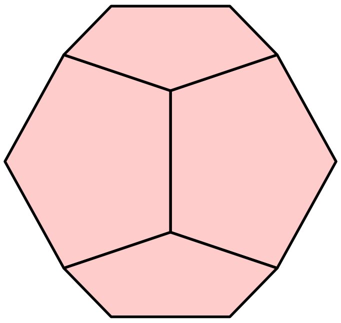

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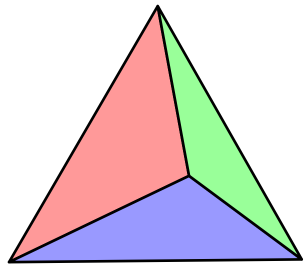

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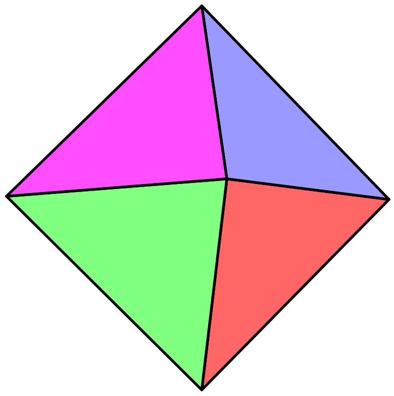

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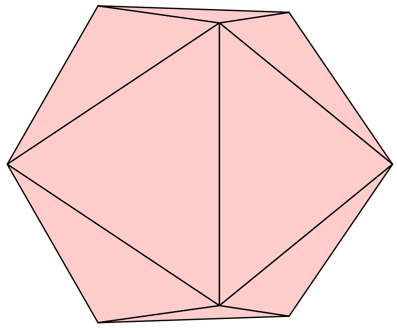

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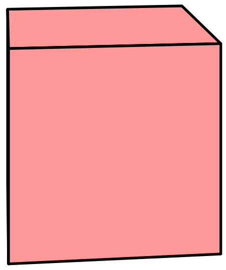

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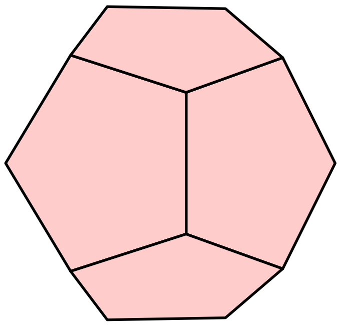

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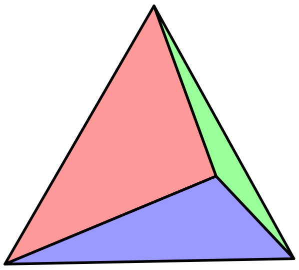

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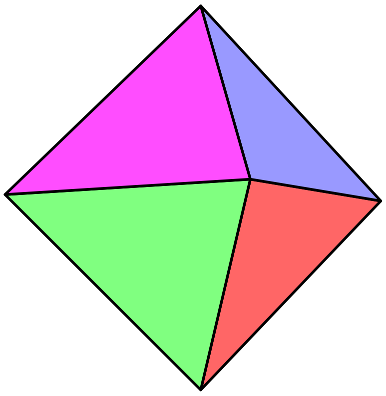

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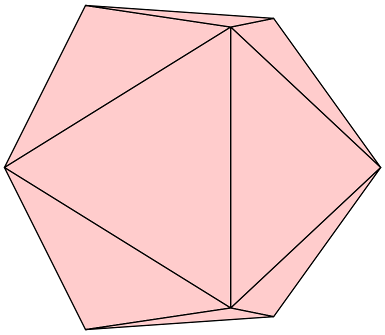

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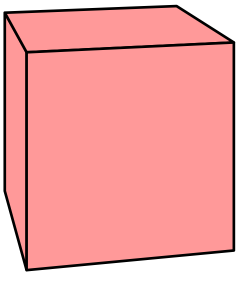

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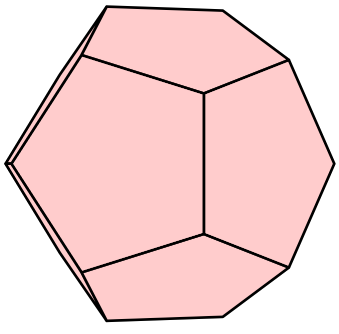

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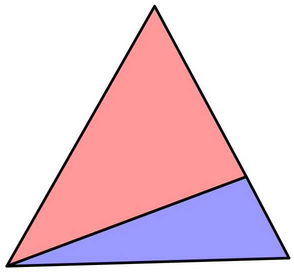
Tetrahedron:



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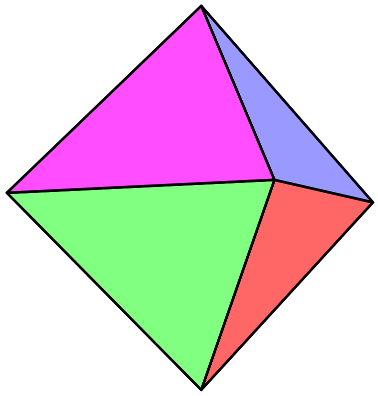

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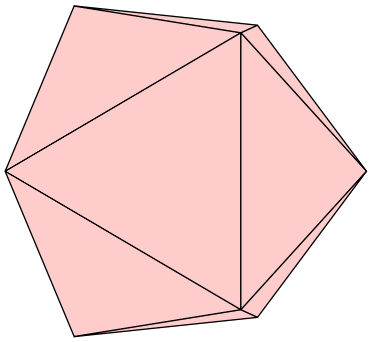

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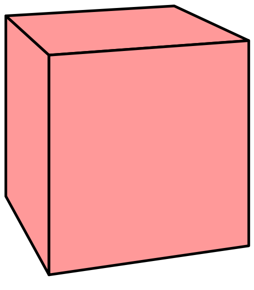

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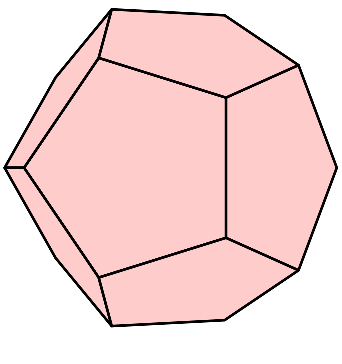

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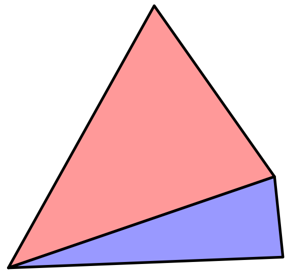
Tetrahedron:



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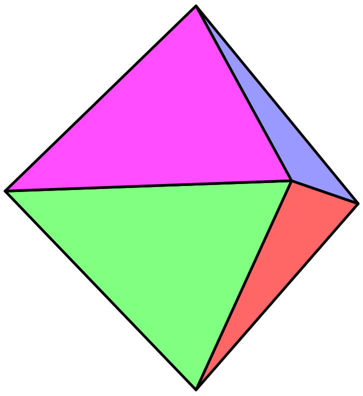

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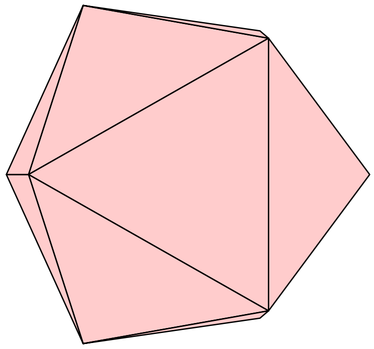

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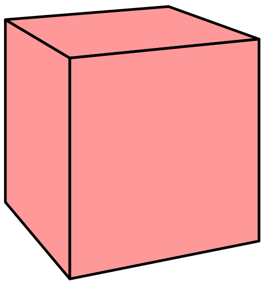

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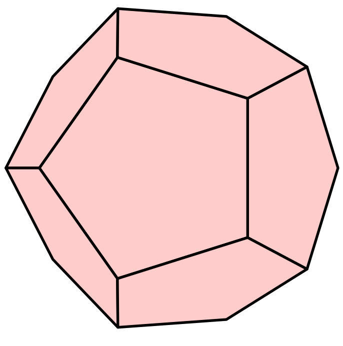

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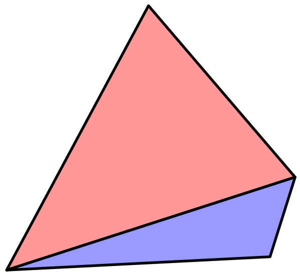

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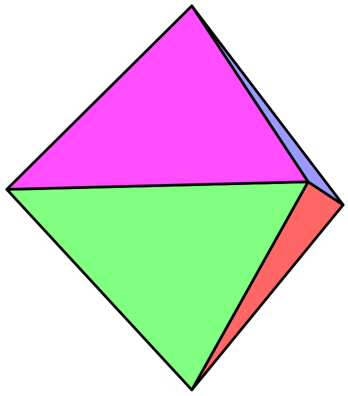

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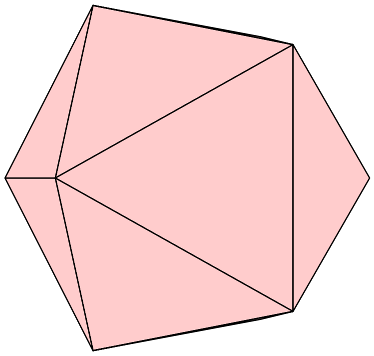

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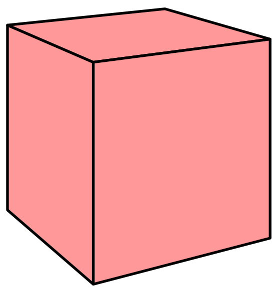

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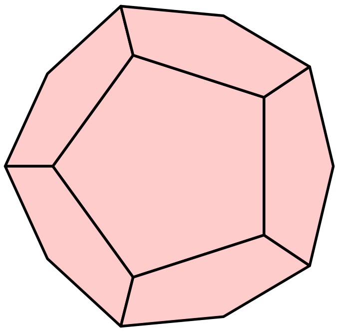

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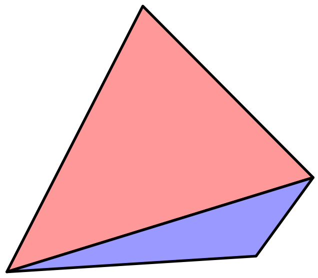
Tetrahedron:



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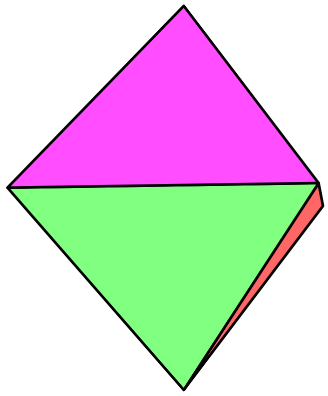

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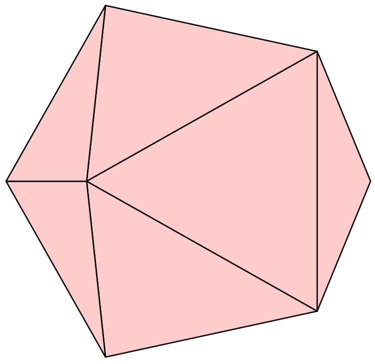

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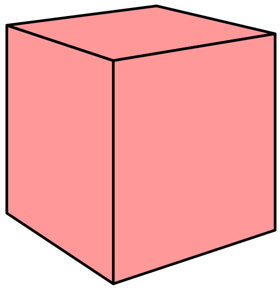

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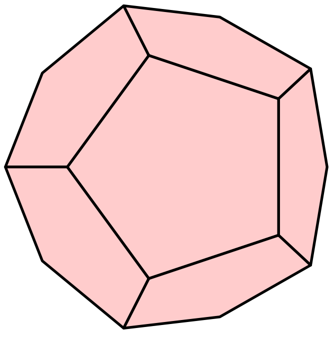

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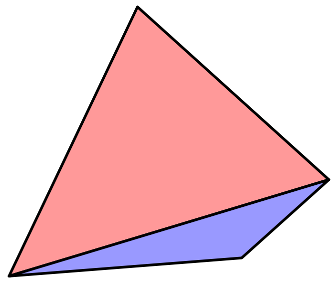

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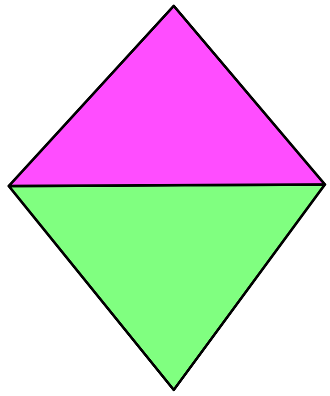

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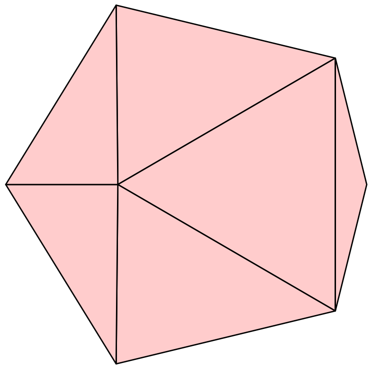

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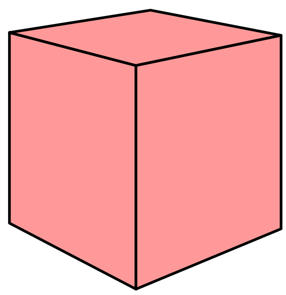

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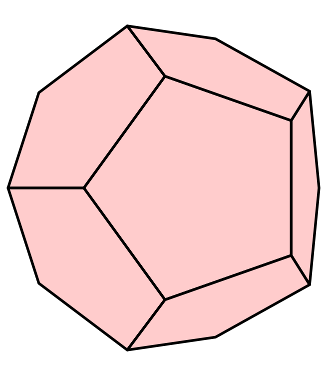

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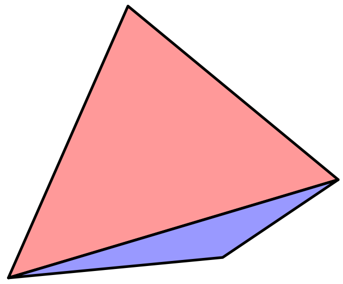
Tetrahedron:



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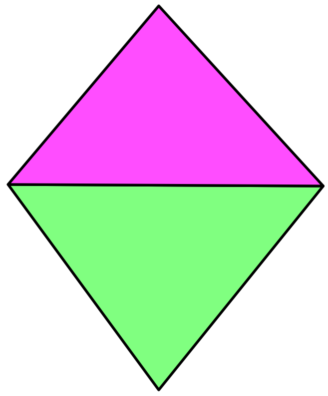

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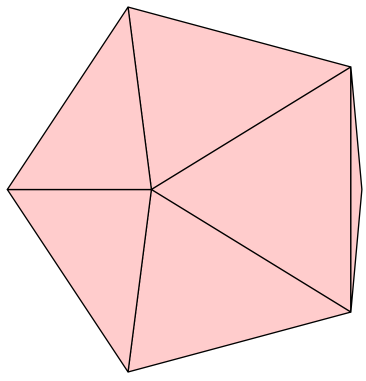

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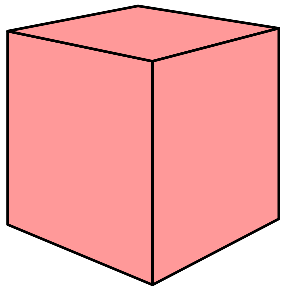

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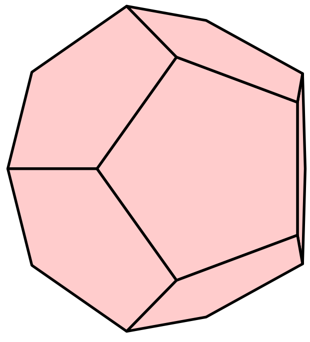

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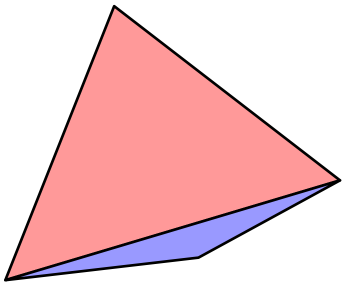
Tetrahedron:



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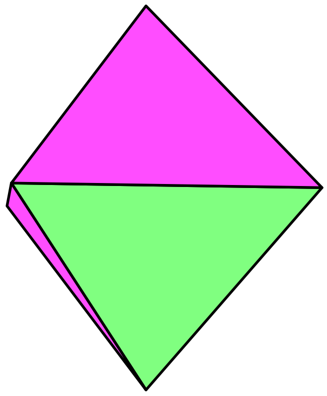
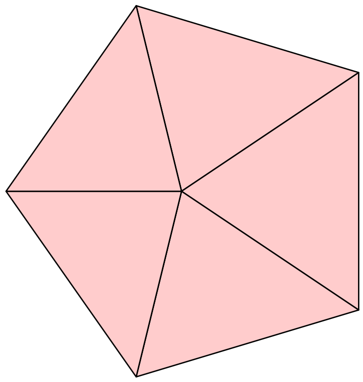
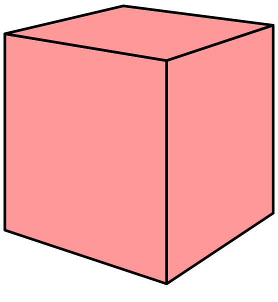


Icosahedron:



Cube:



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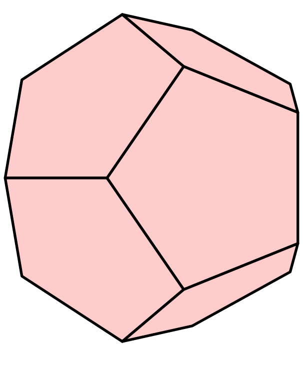

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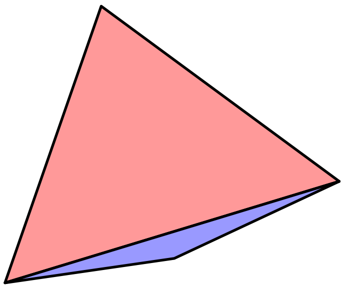
Tetrahedron:



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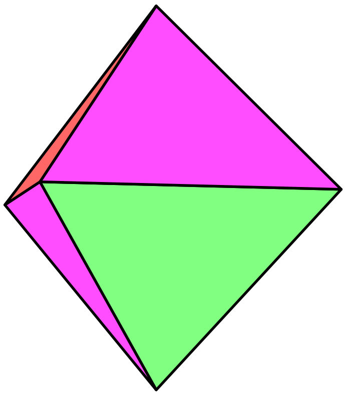

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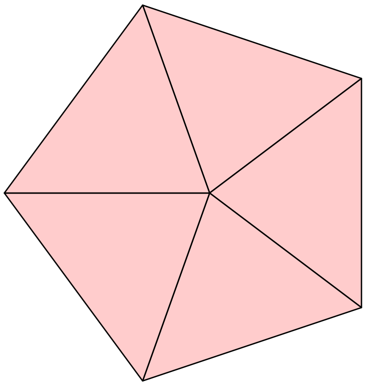

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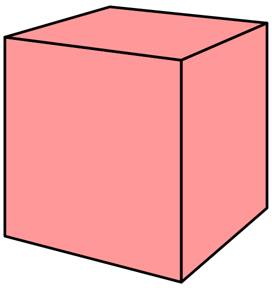

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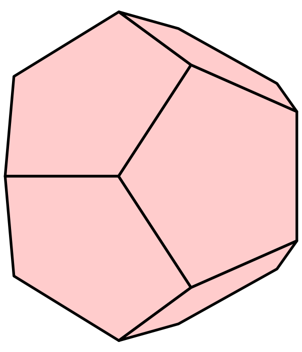

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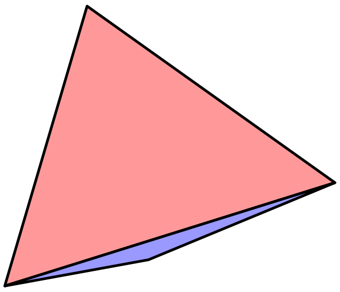
Tetrahedron:



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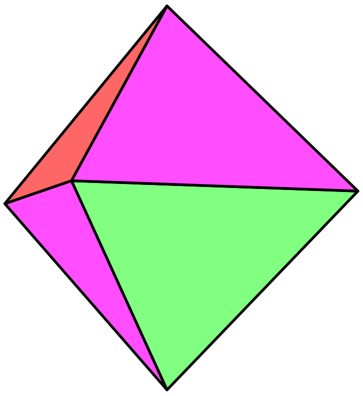

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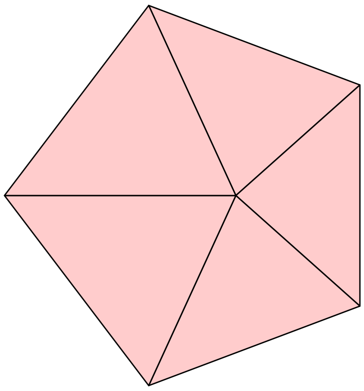

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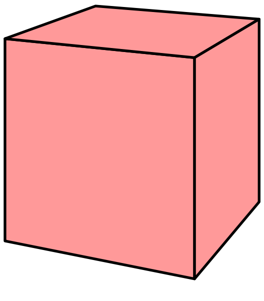

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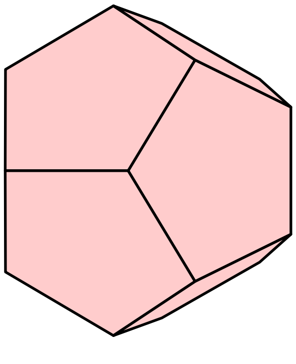

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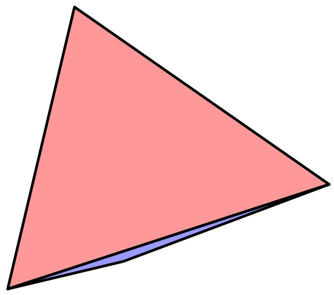

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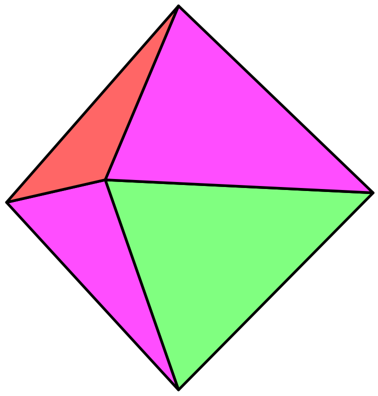

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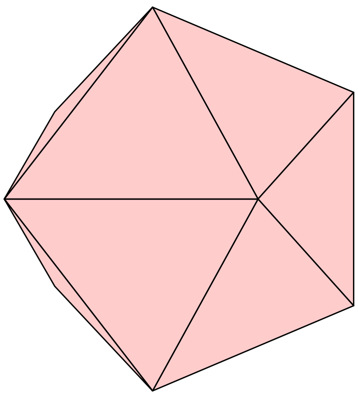

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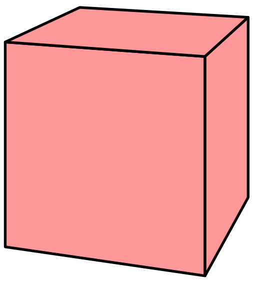

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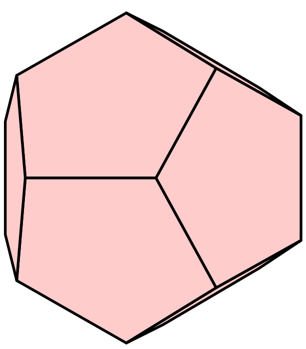

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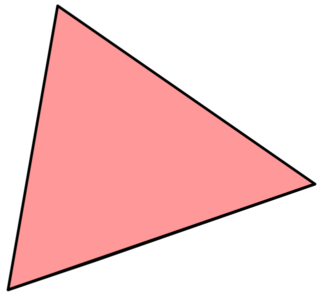

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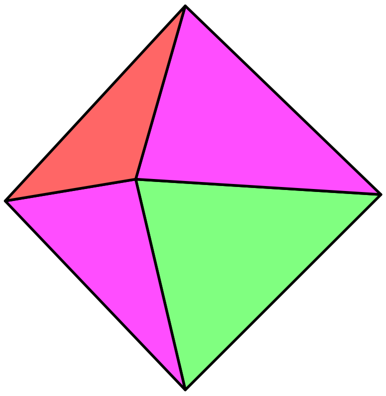

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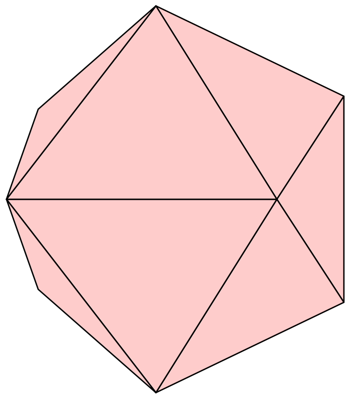

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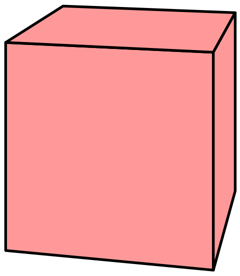

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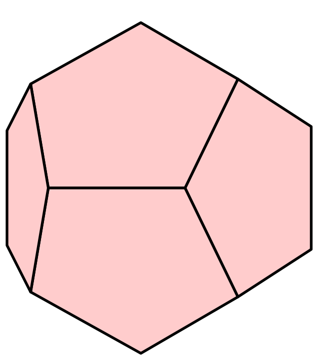

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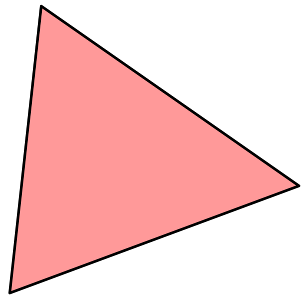

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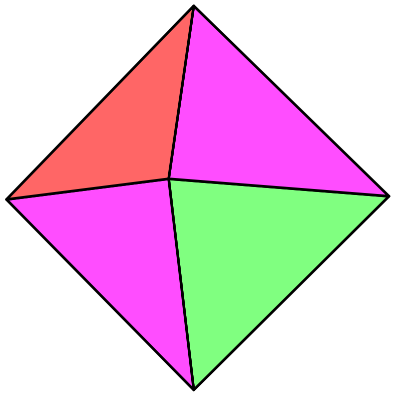

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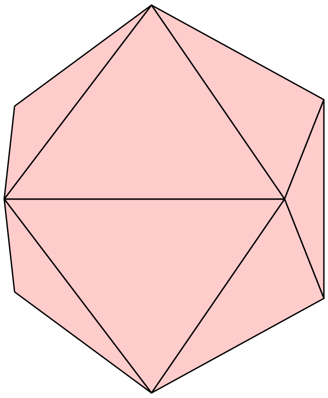

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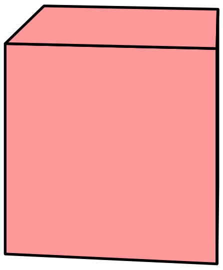

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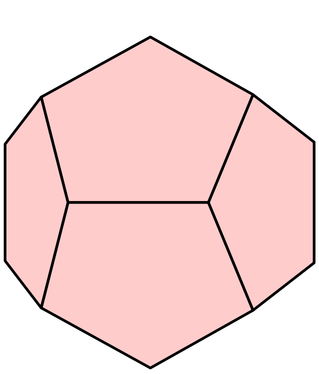

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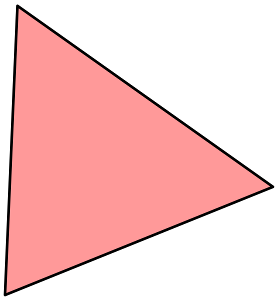
Tetrahedron:



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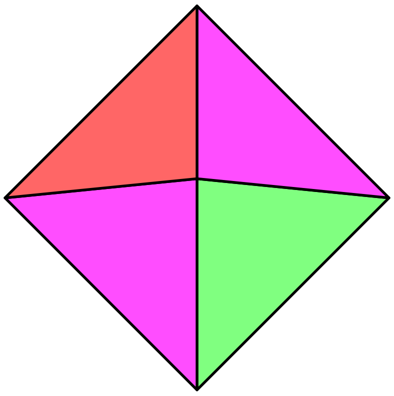

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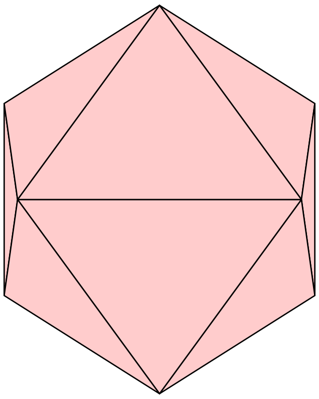

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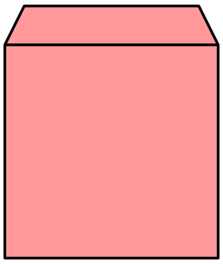

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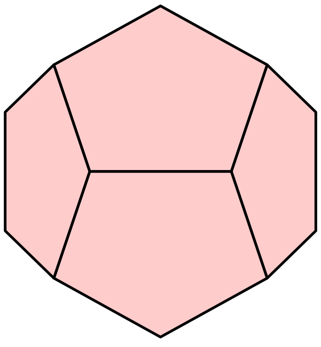

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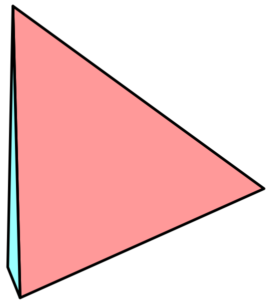

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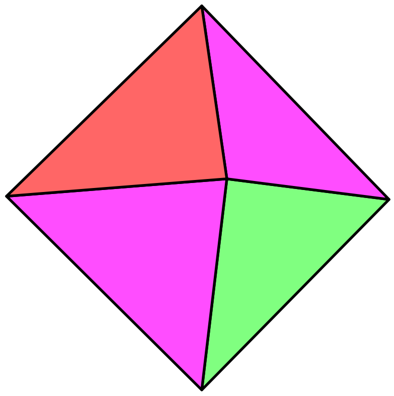

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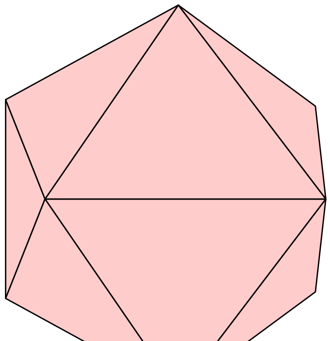

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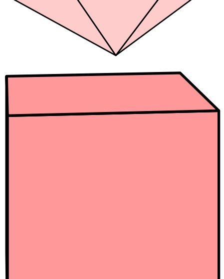

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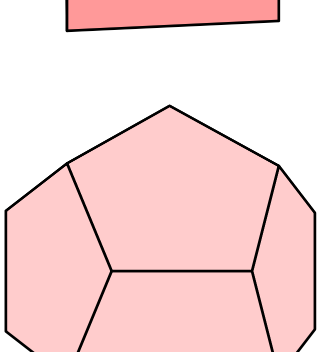

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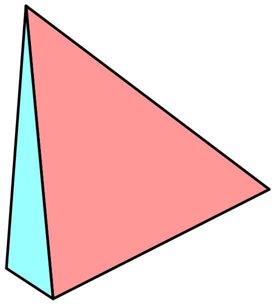

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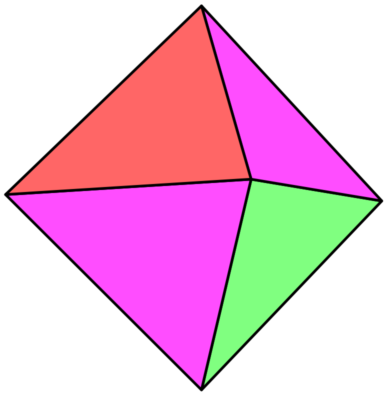

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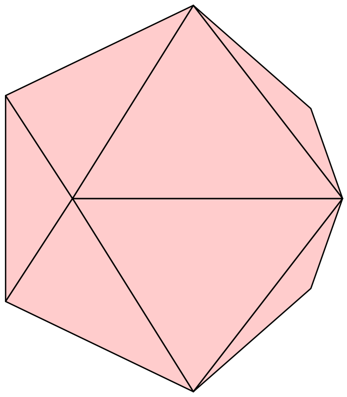

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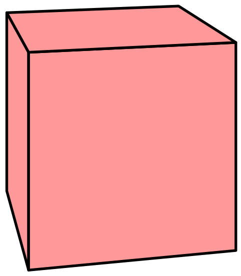

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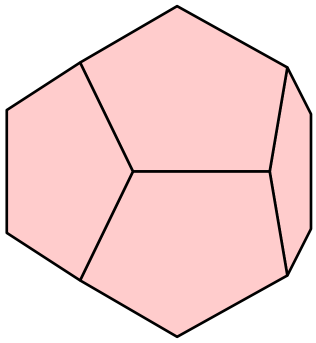

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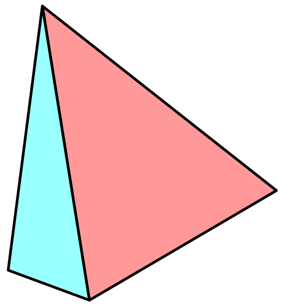

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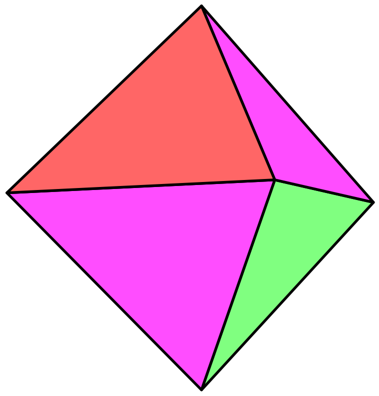

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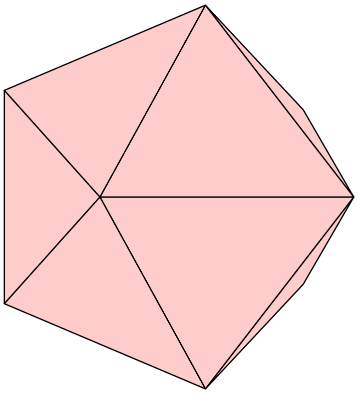

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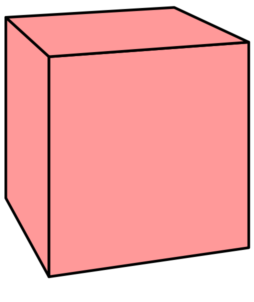

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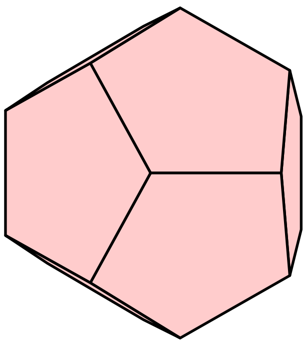

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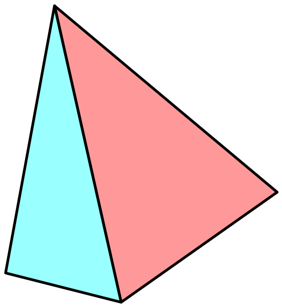

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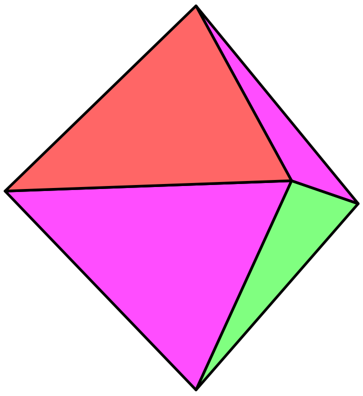

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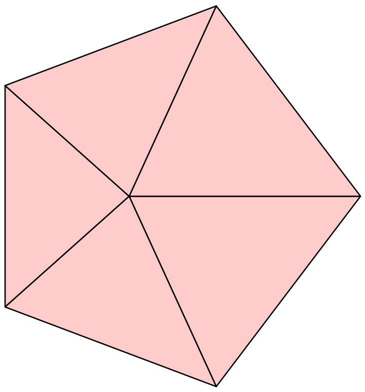

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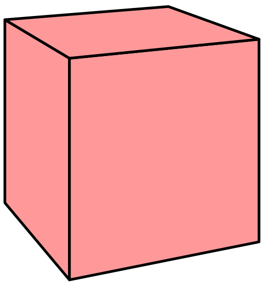

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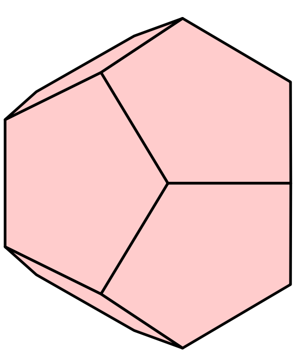

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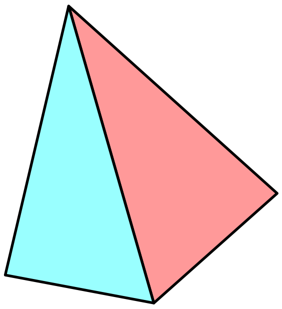
Tetrahedron:



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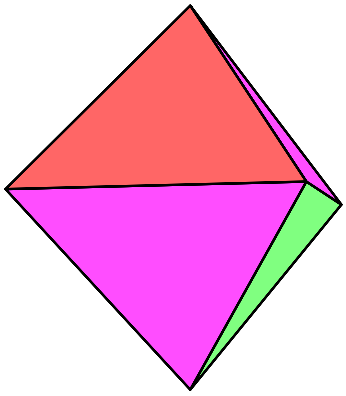

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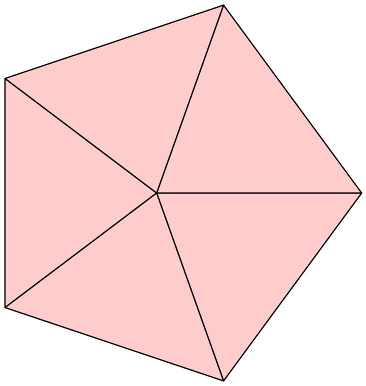

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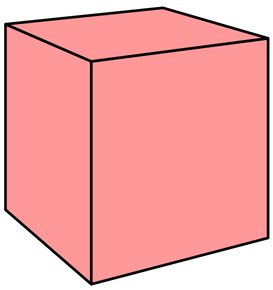

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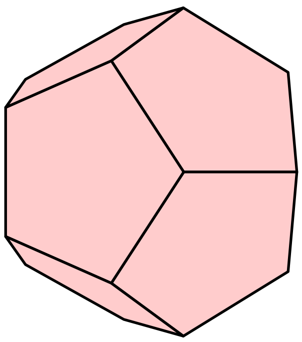

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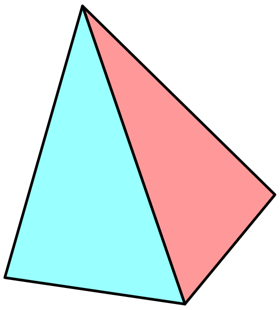

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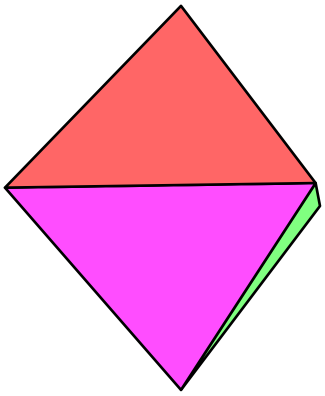

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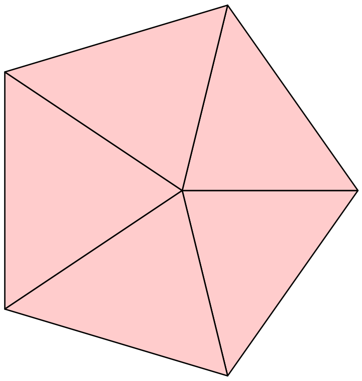

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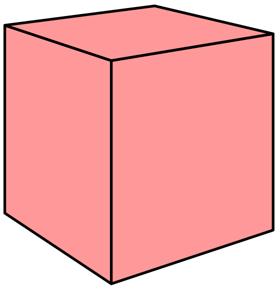

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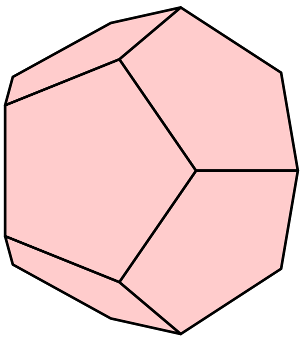

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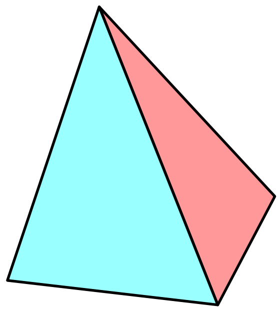

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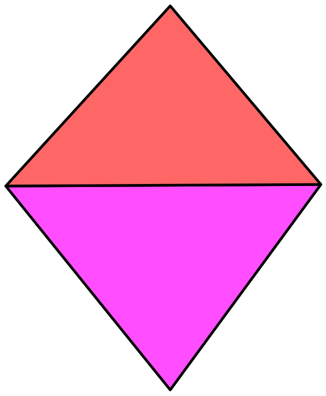

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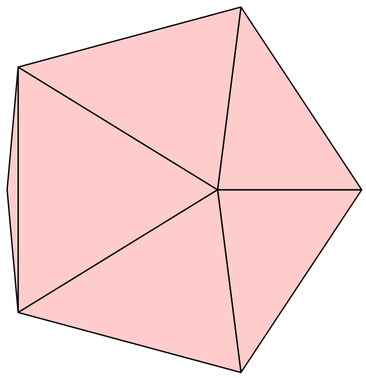

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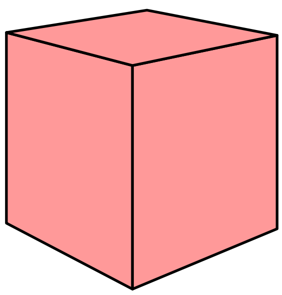

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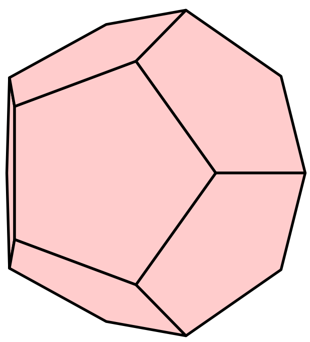

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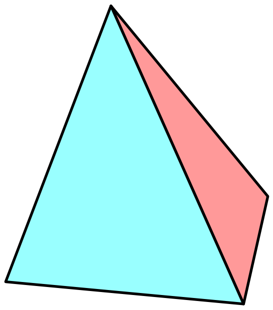
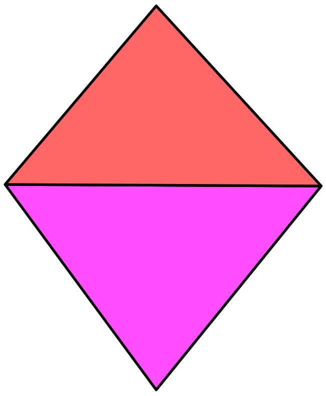
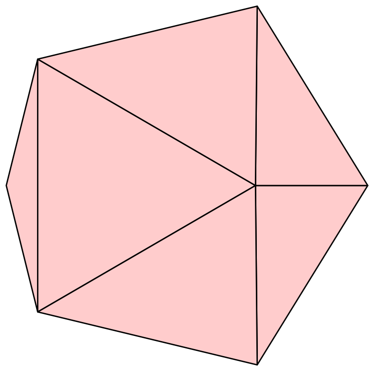


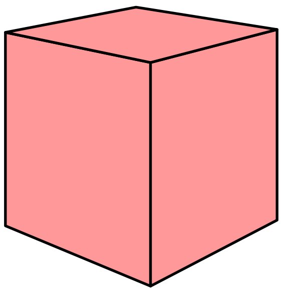
Octahedron:



Icosahedron:



Cube:



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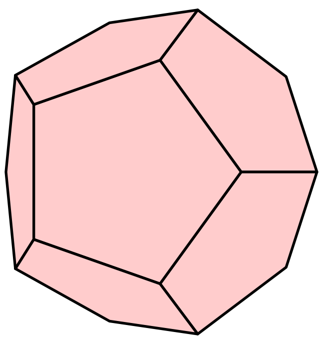

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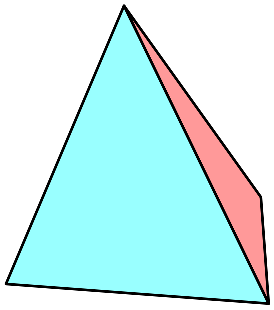

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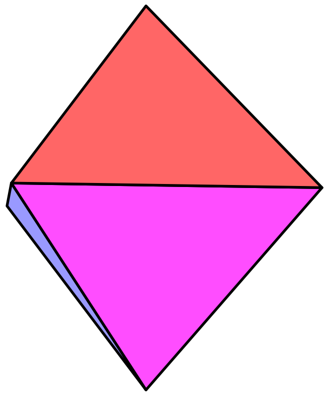

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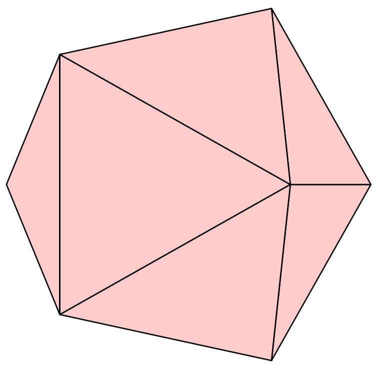

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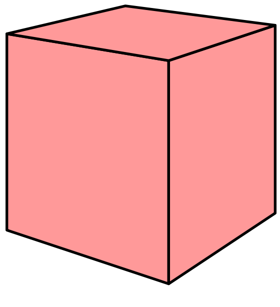

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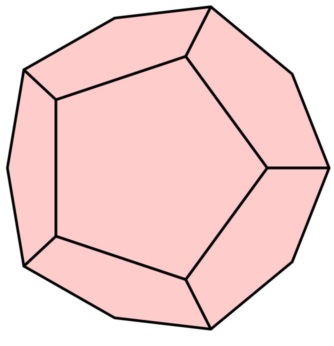

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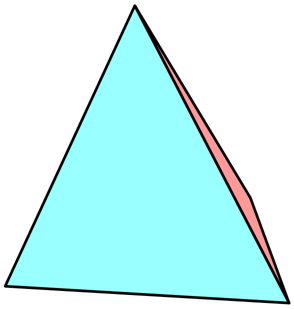
Tetrahedron:



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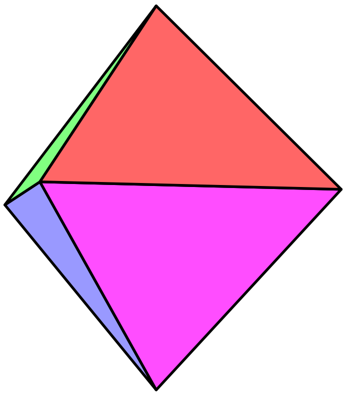

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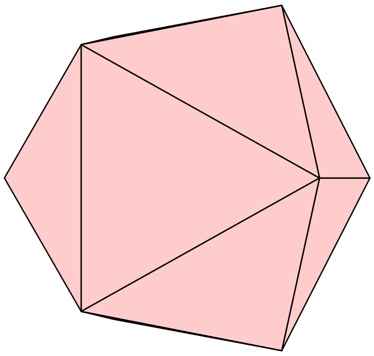

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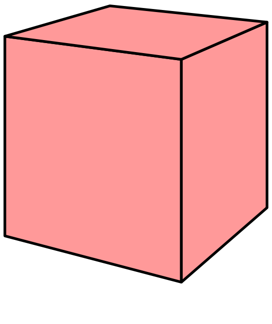

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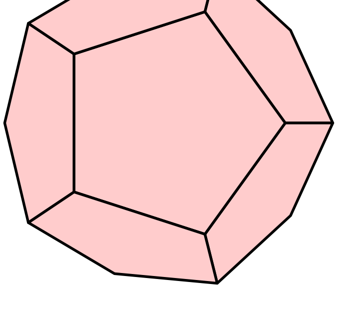

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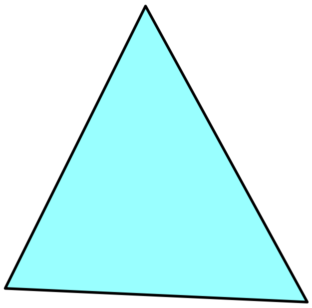

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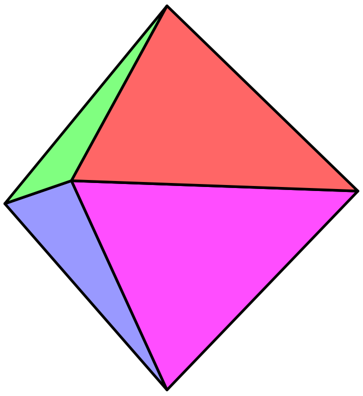

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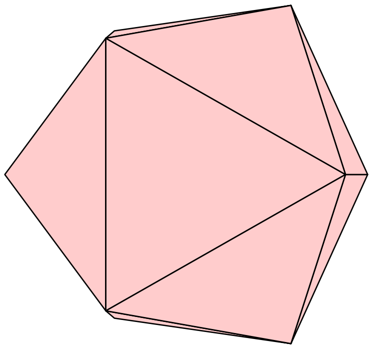

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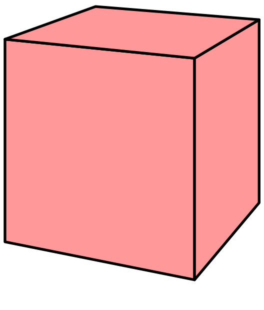

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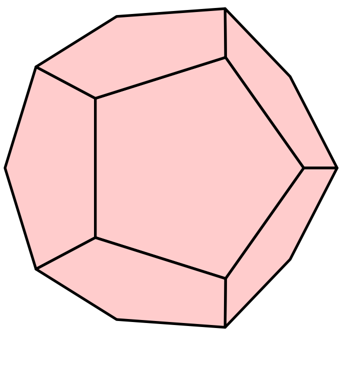

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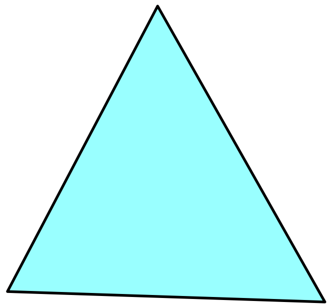

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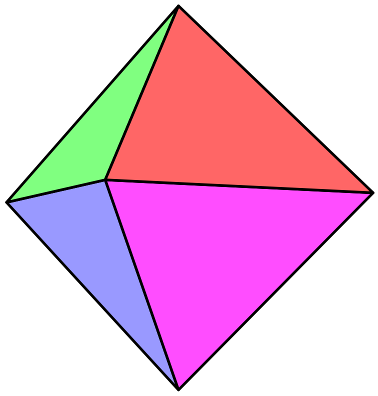

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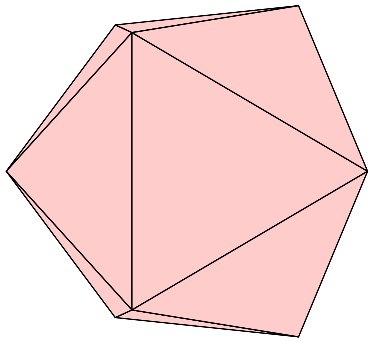

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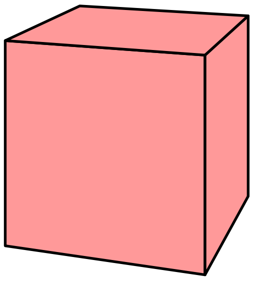

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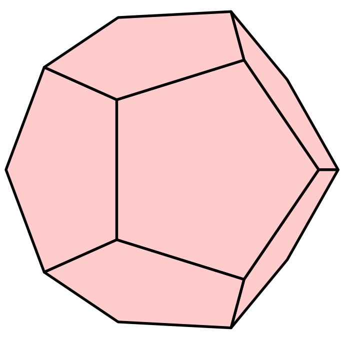

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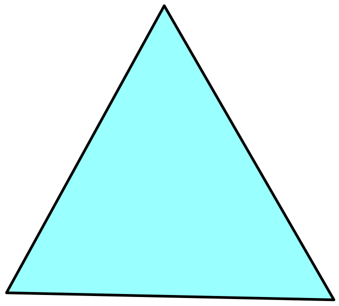
Tetrahedron:



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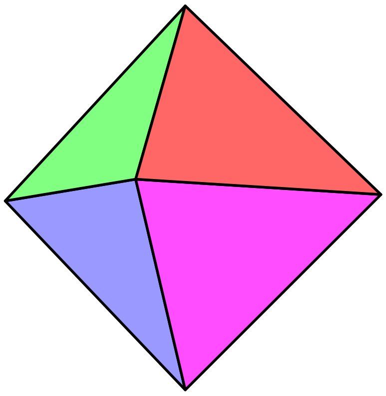

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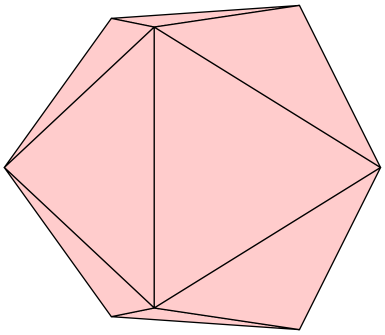

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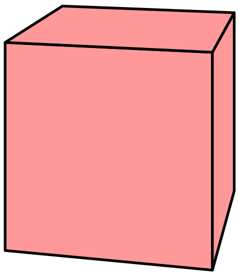

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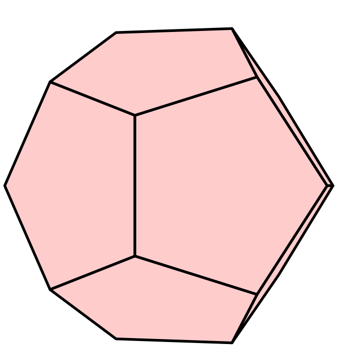

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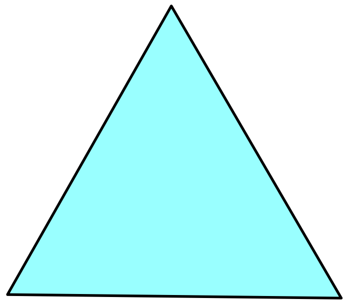
Tetrahedron:



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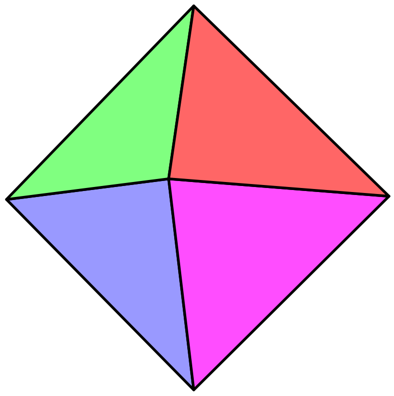

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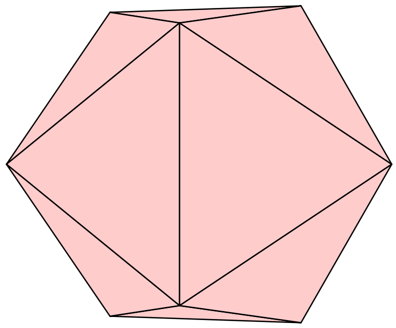

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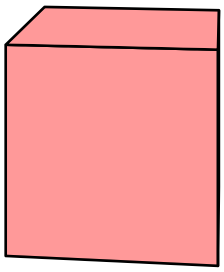

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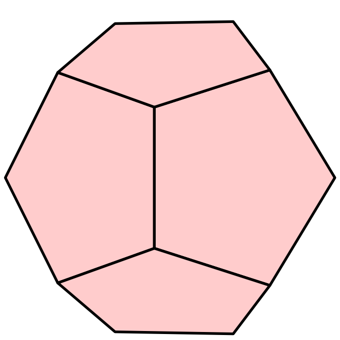

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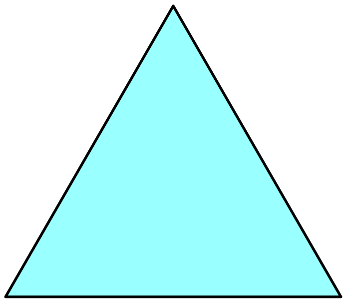

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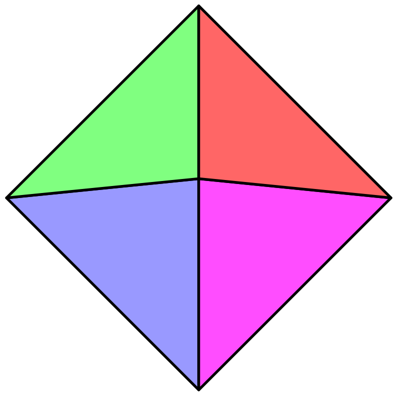

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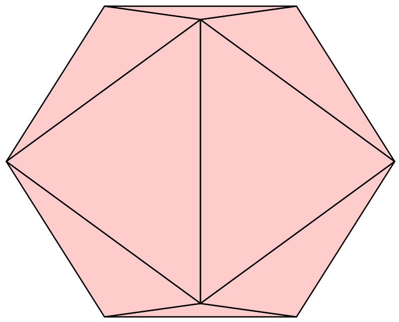

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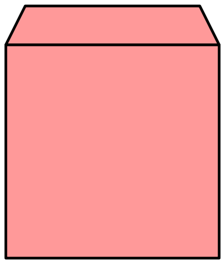

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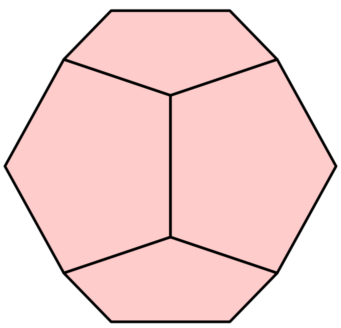

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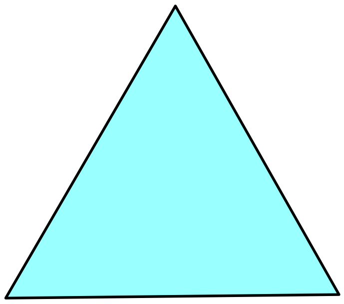

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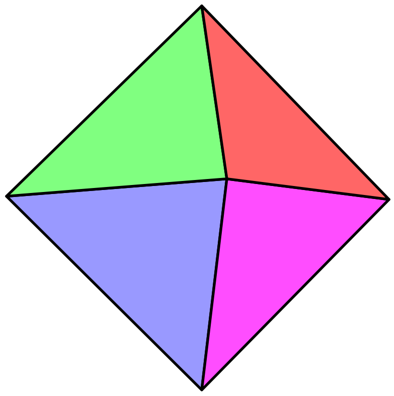

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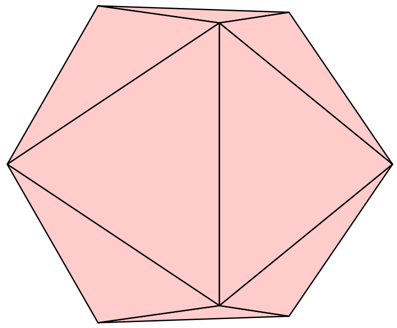

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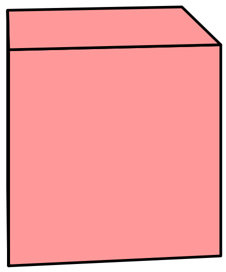

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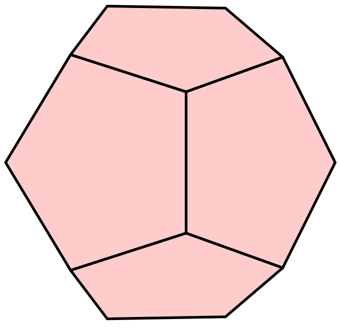

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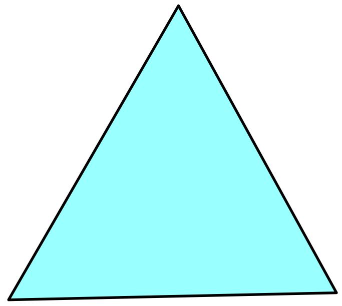

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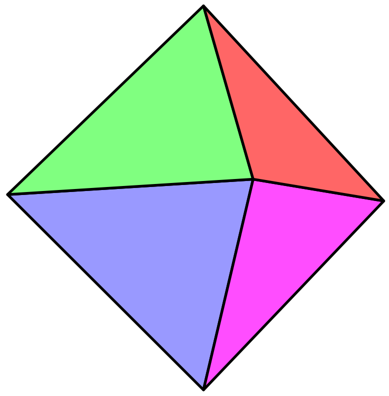

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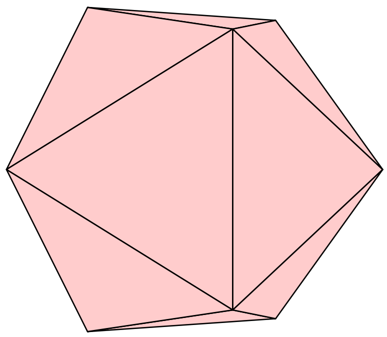

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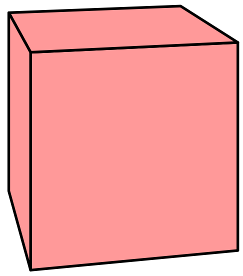

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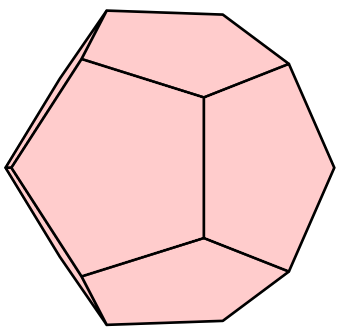

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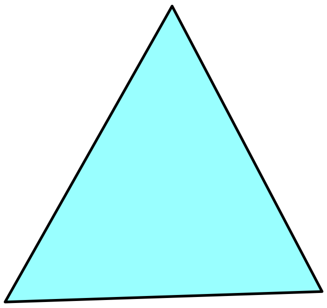
Tetrahedron:



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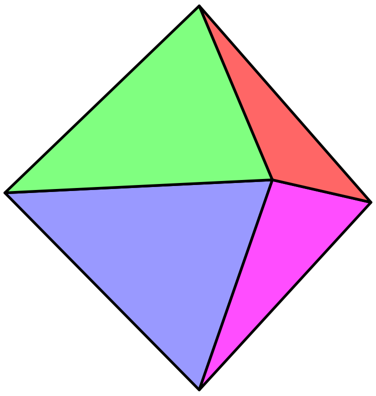

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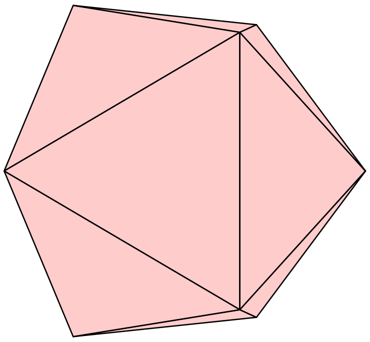

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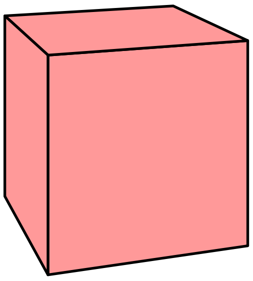

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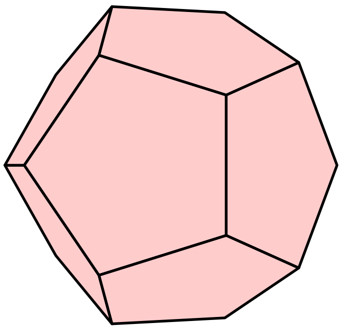

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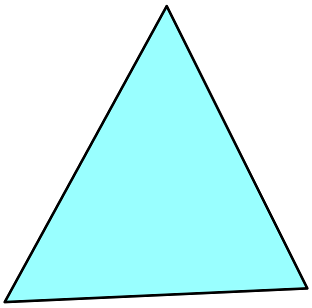
Tetrahedron:



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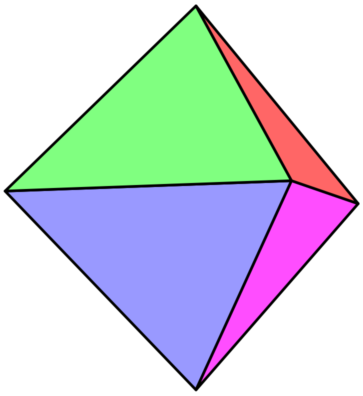

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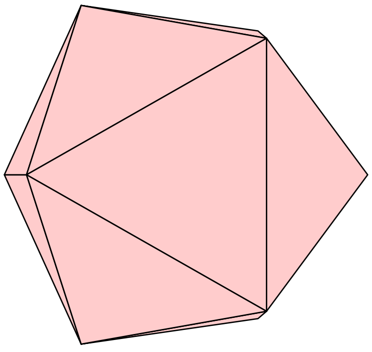

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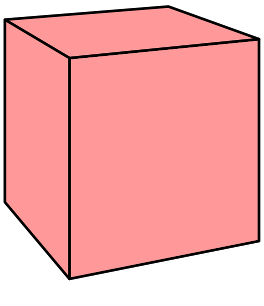

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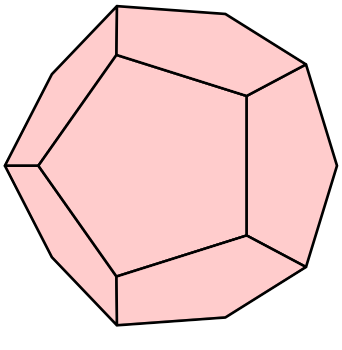

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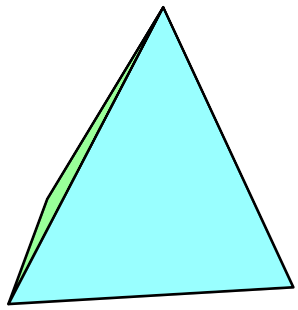

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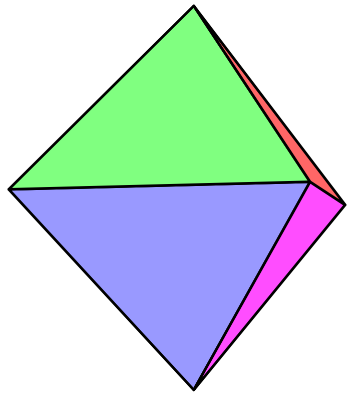

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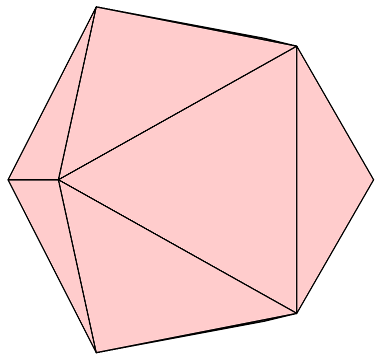

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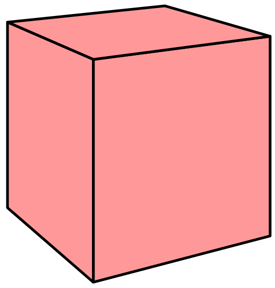

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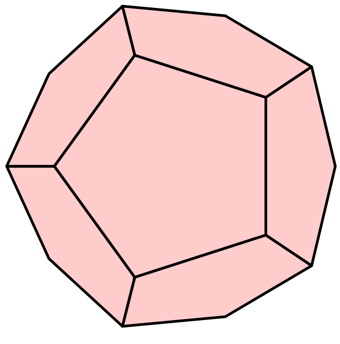

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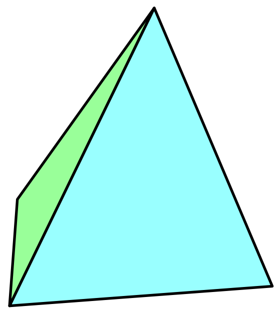

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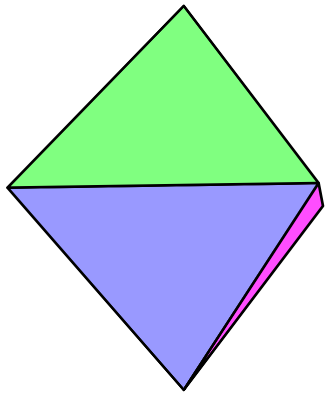

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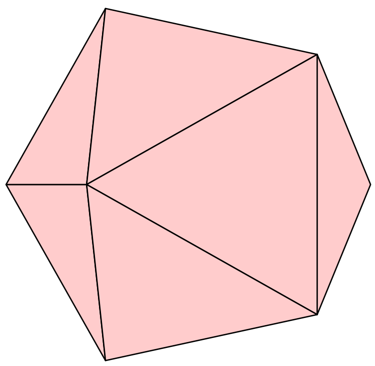

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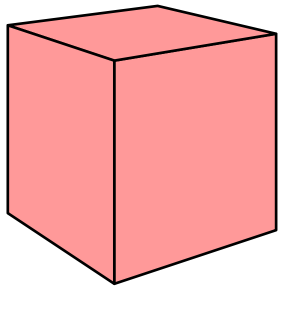

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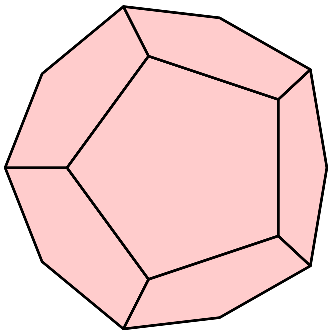

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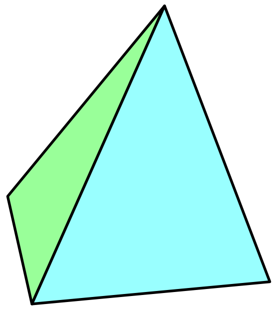

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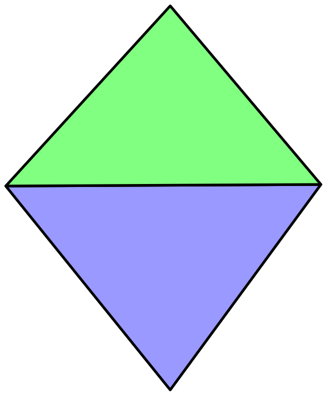

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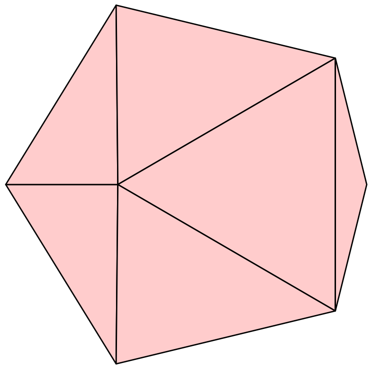

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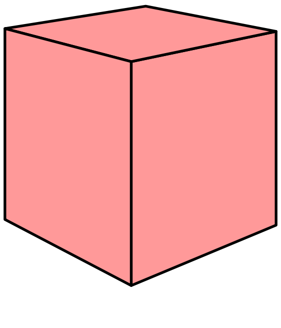

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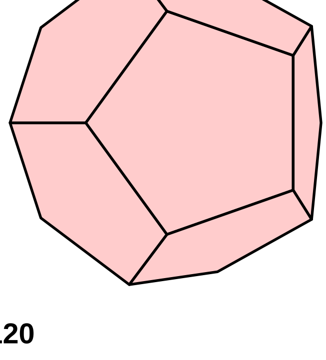

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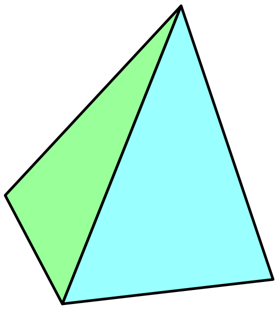

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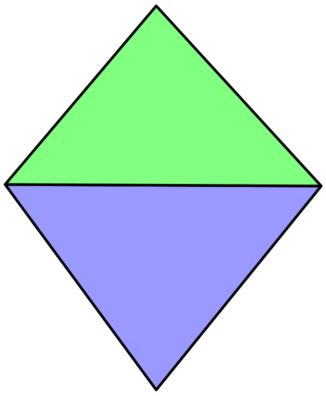

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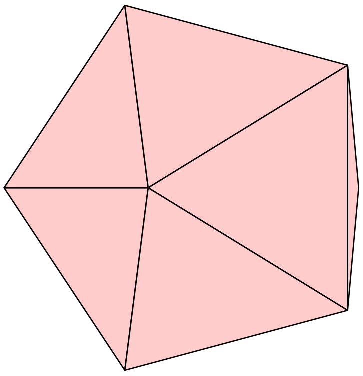

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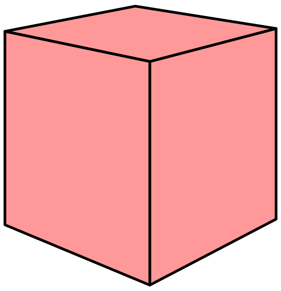

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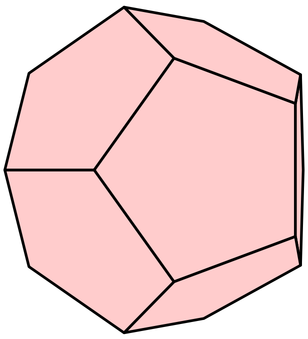

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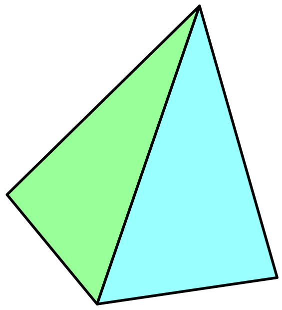

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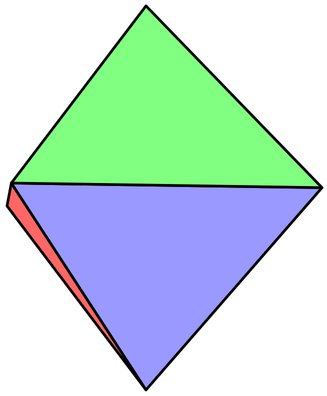

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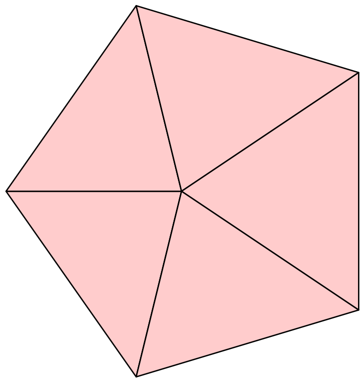

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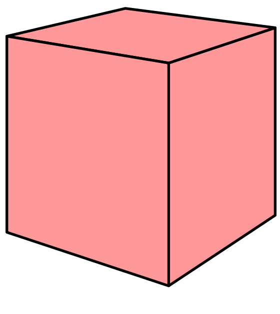

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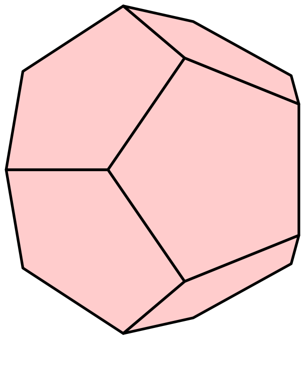

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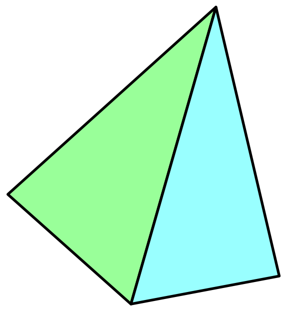

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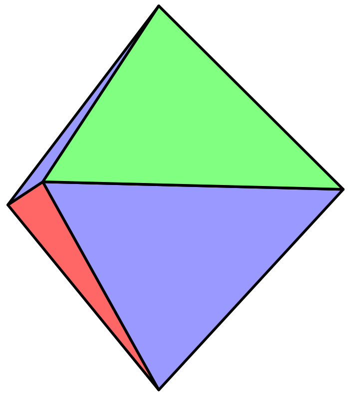

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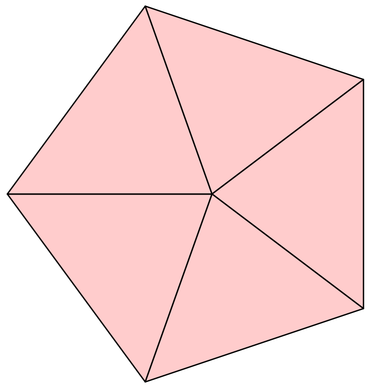

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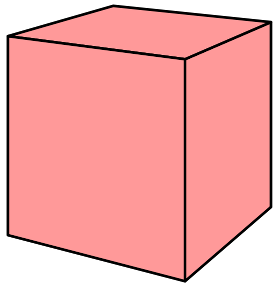

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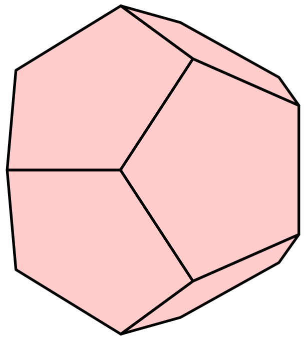

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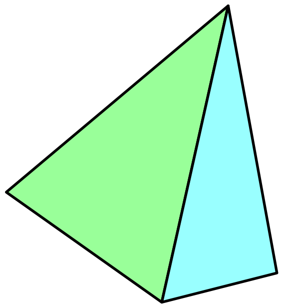

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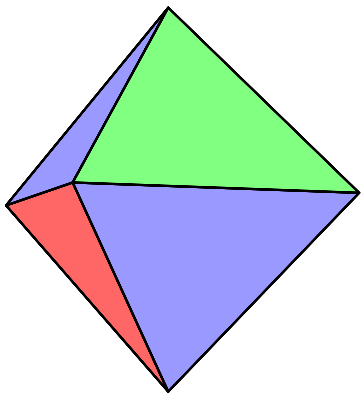

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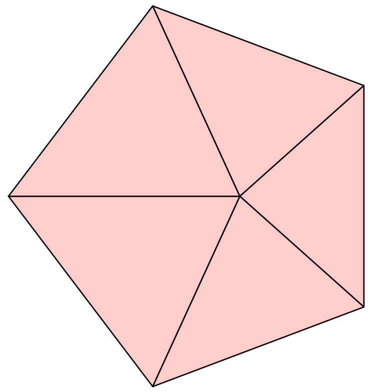

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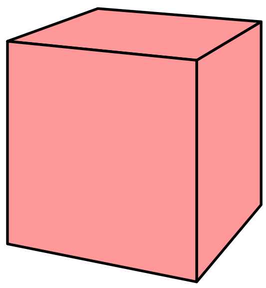

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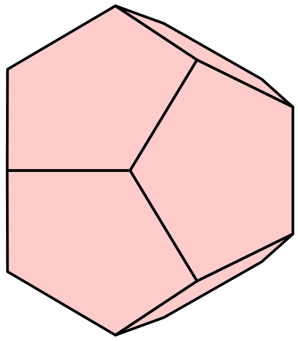

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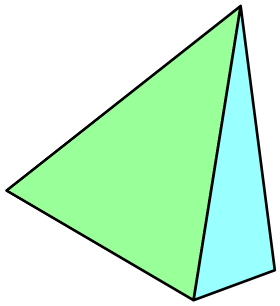

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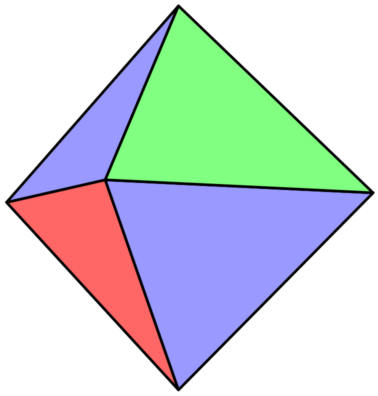

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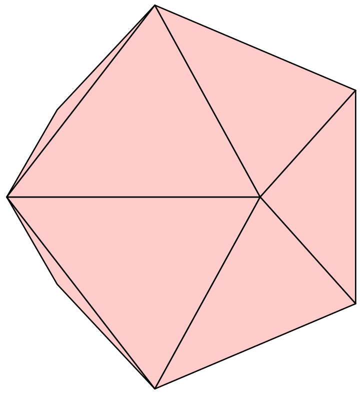

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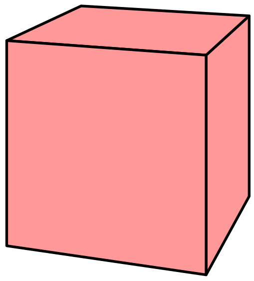

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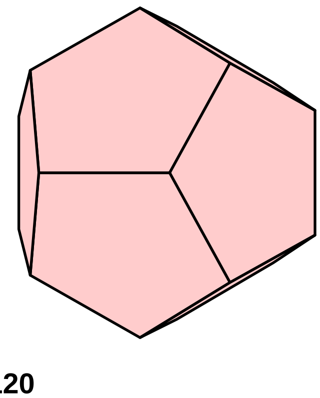

Animation: 102 of 120

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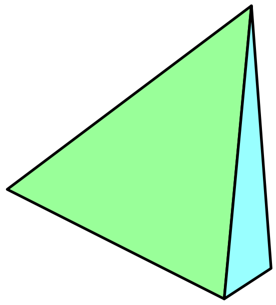

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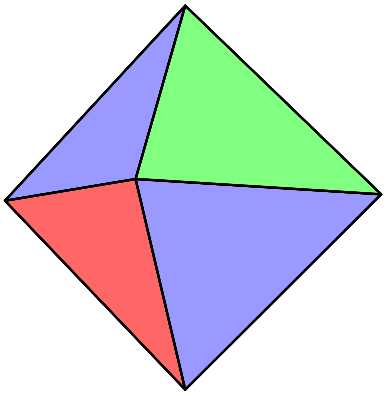

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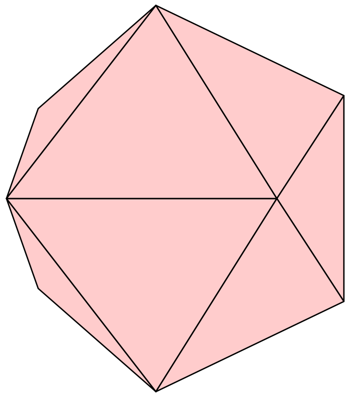

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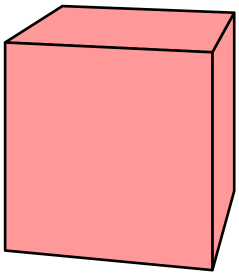

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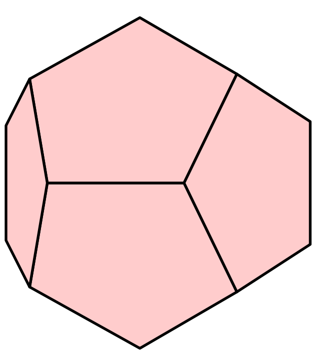

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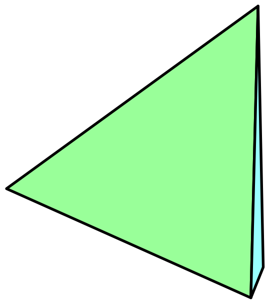

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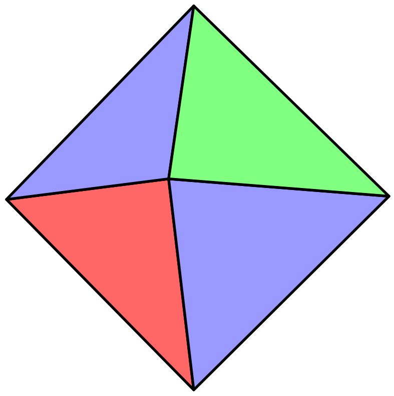

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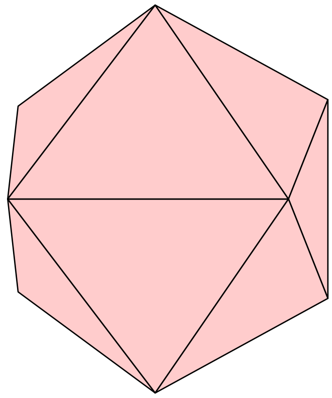

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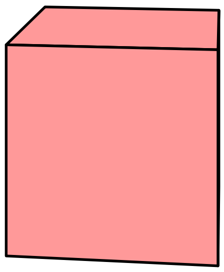

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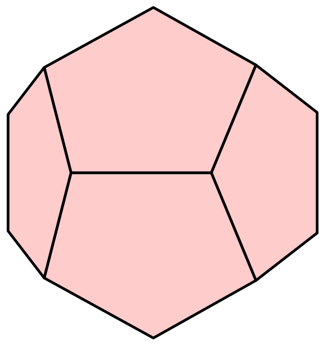

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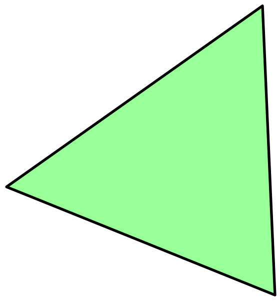

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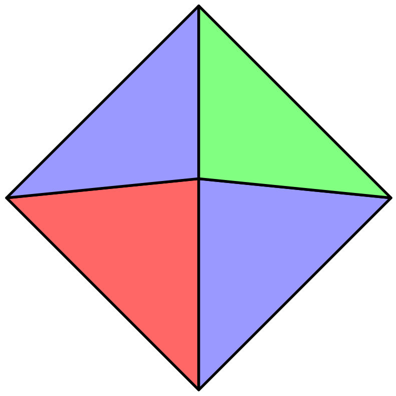

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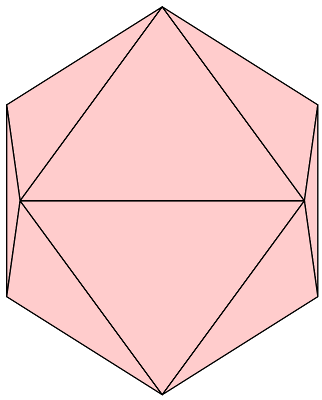

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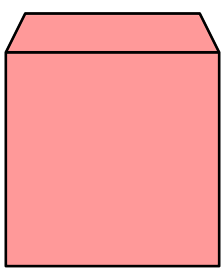

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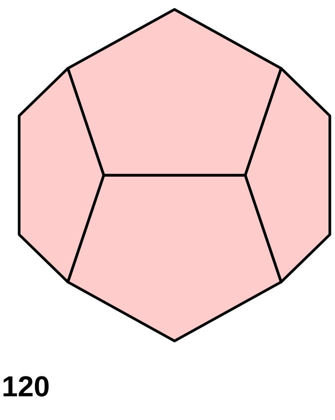

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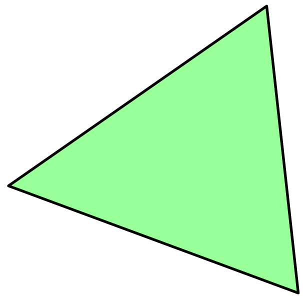

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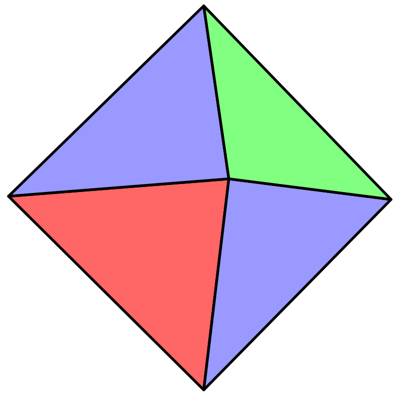

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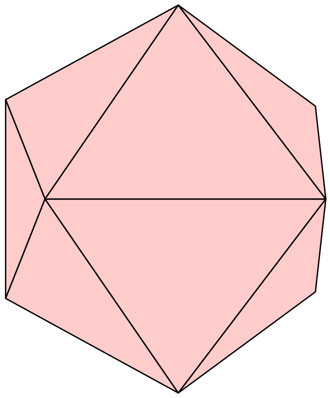

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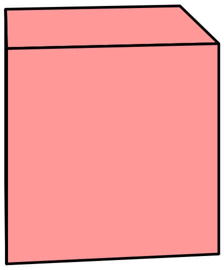

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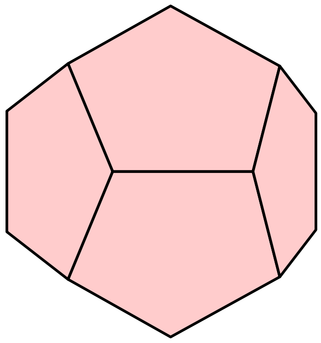

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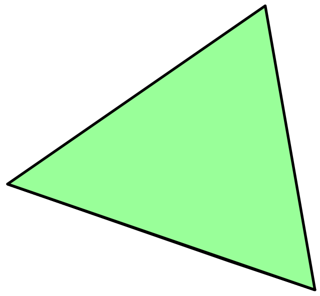

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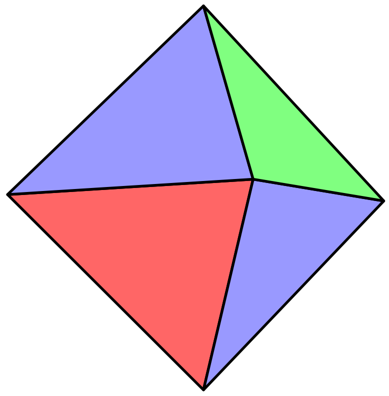

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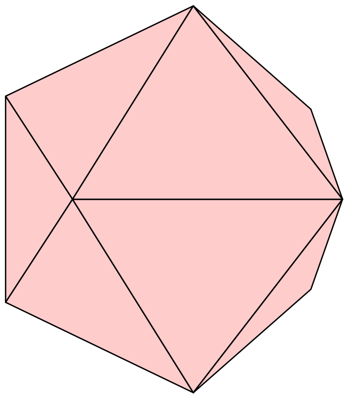

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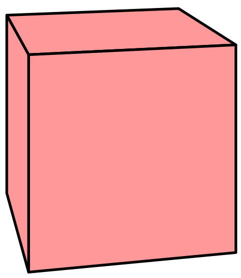

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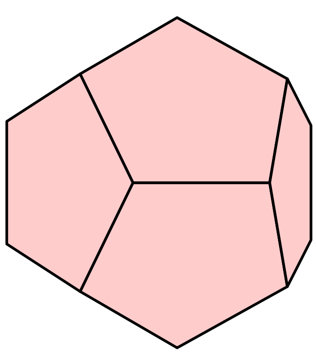

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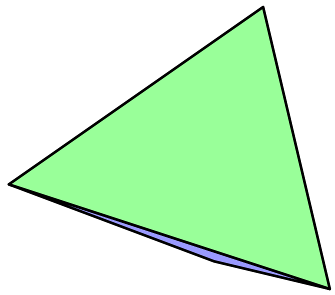

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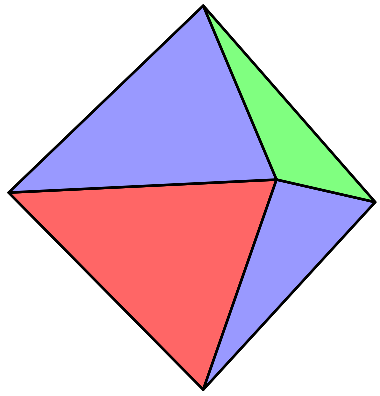

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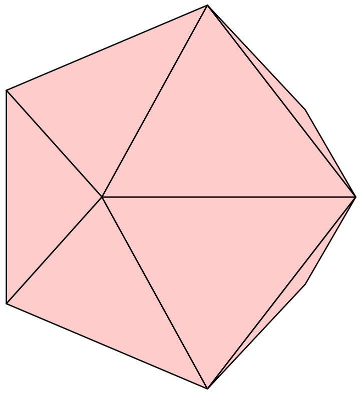

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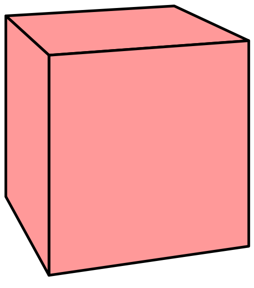

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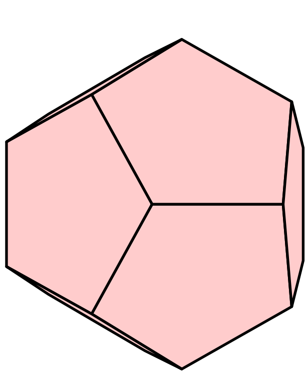

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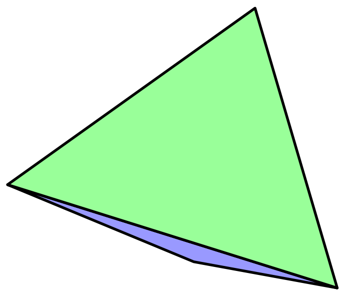

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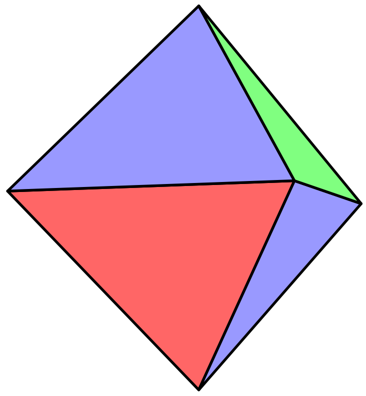

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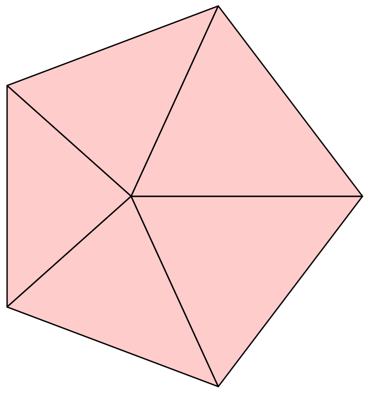

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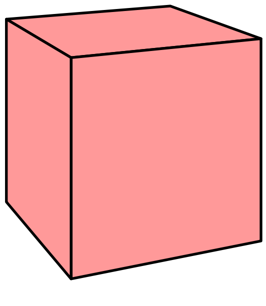

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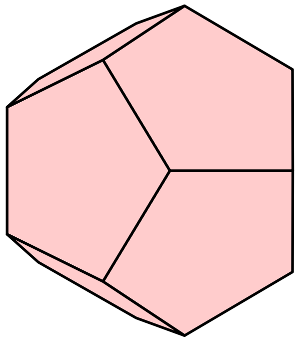

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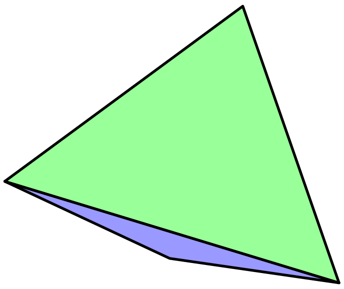

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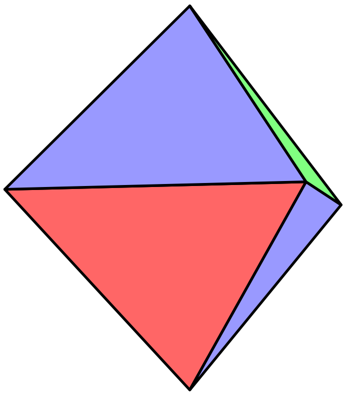

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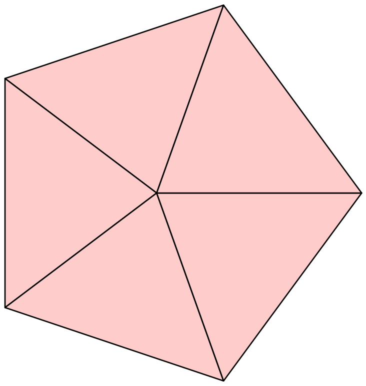

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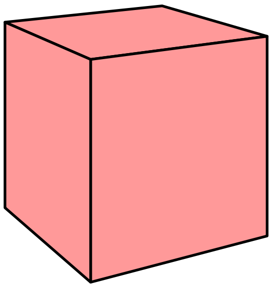

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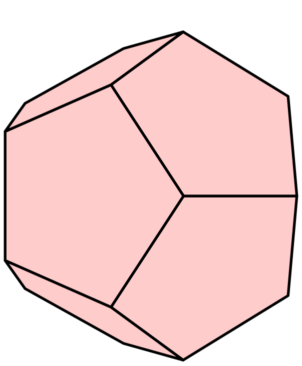

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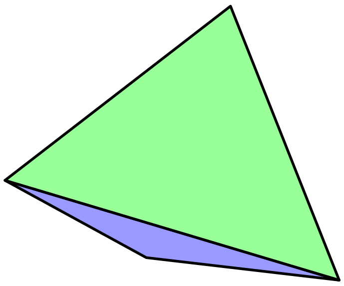

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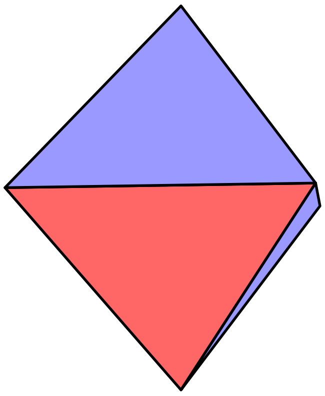

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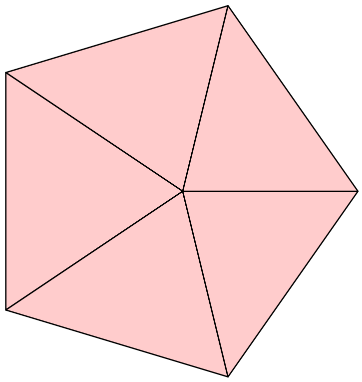

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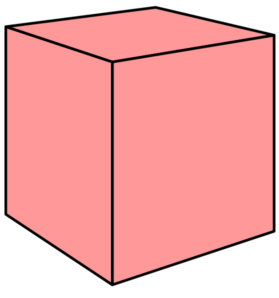

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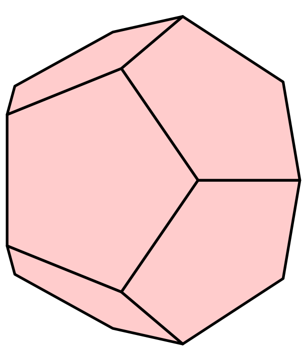

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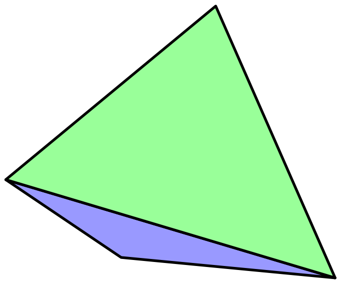

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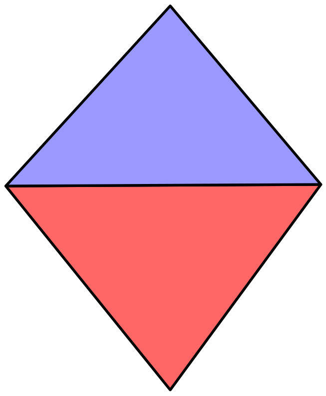
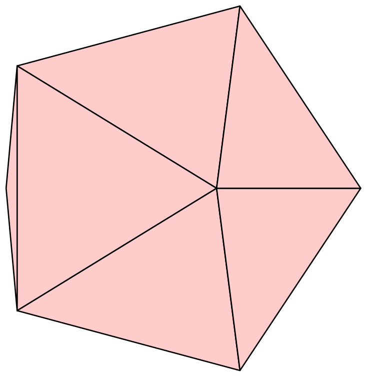
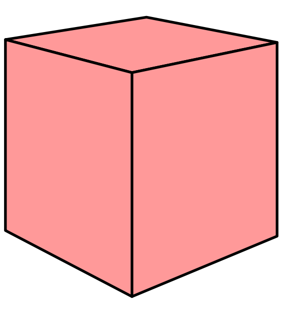


Icosahedron:



Cube:



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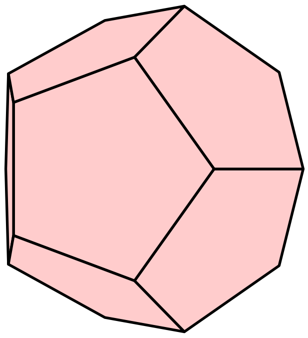

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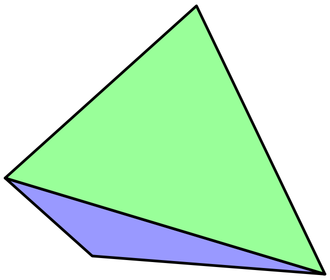
Tetrahedron:



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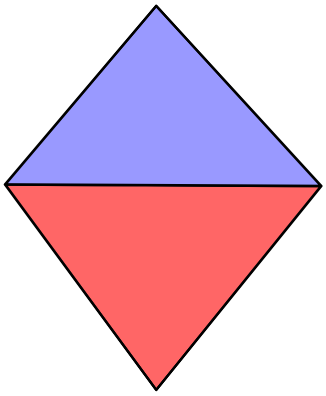

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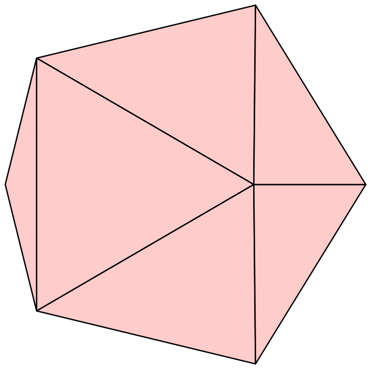

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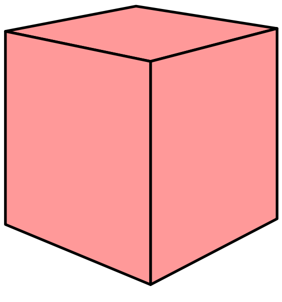

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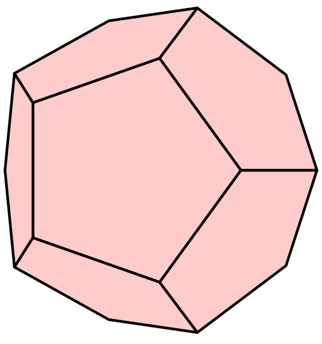

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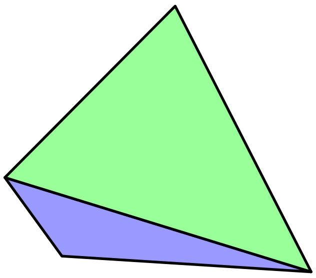

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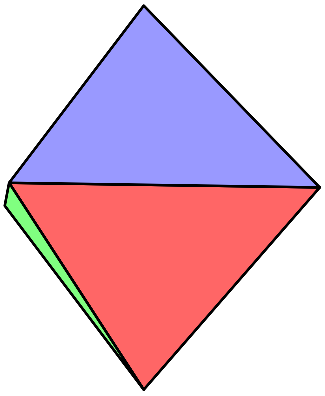

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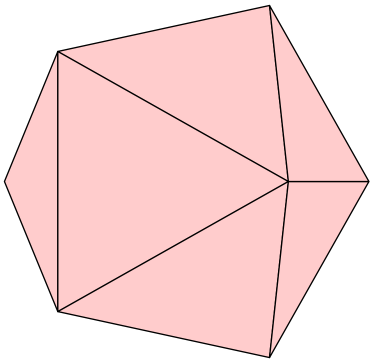

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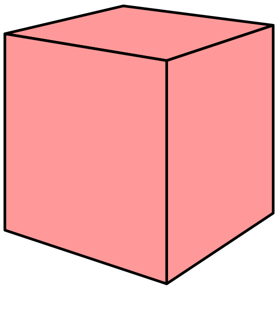

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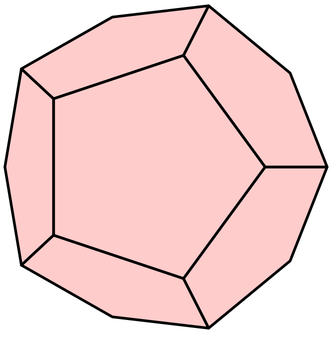

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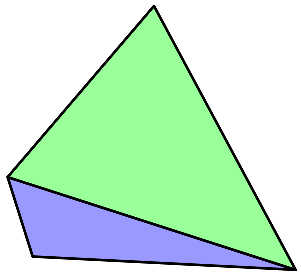

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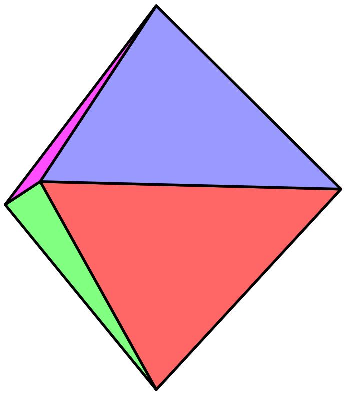

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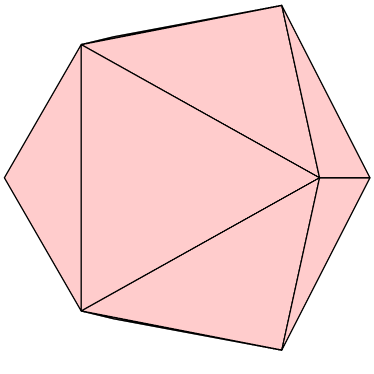

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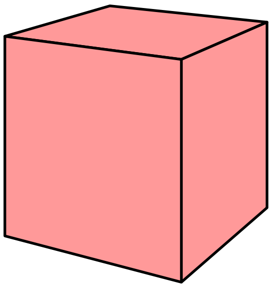

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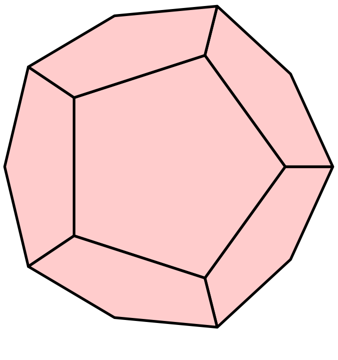

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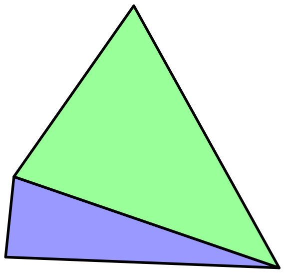

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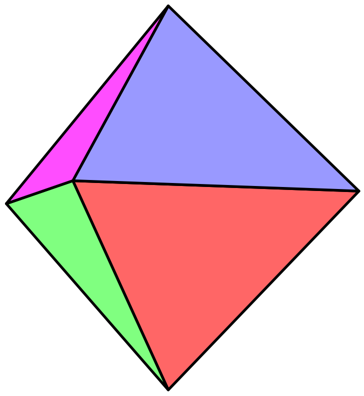

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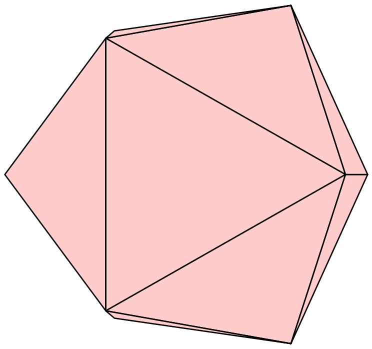

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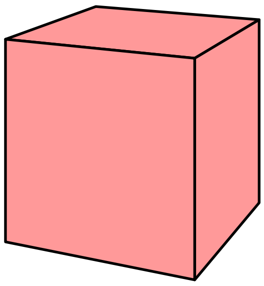

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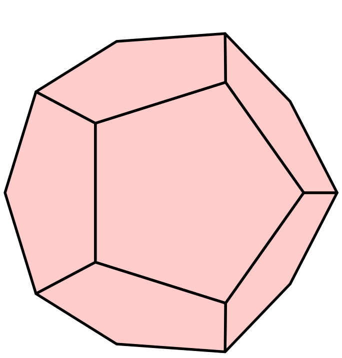

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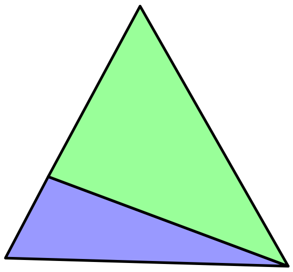

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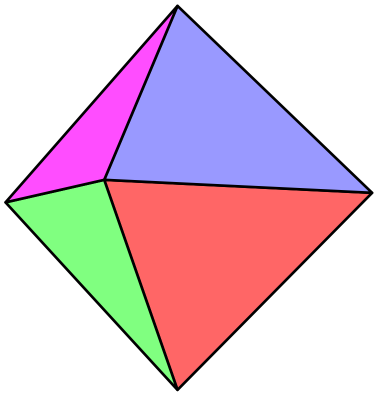

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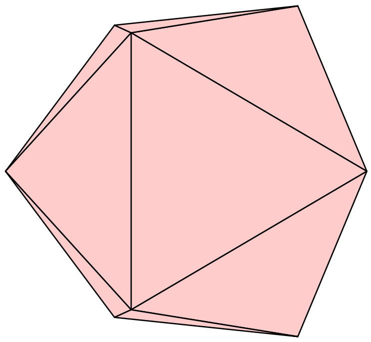

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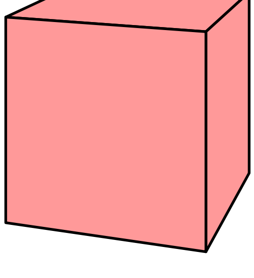

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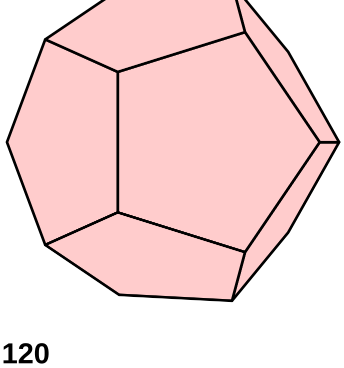

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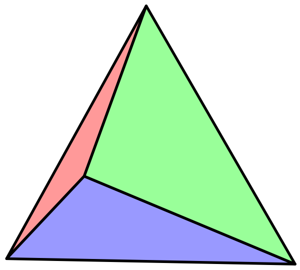

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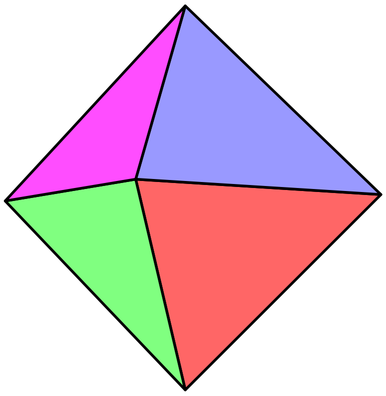

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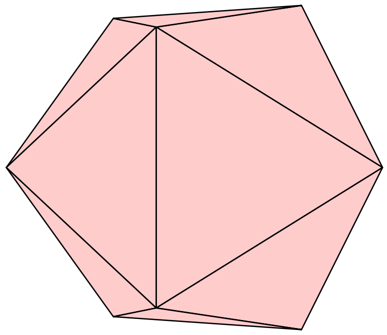

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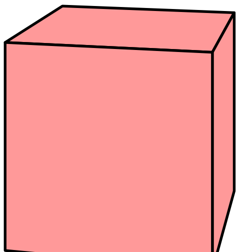

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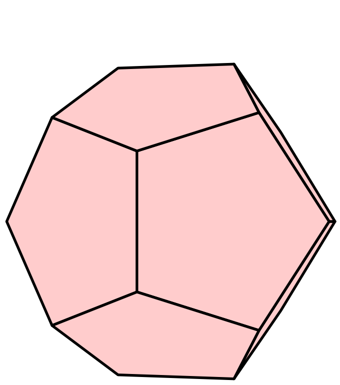

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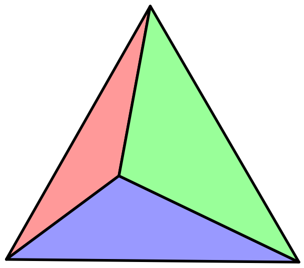
Tetrahedron:



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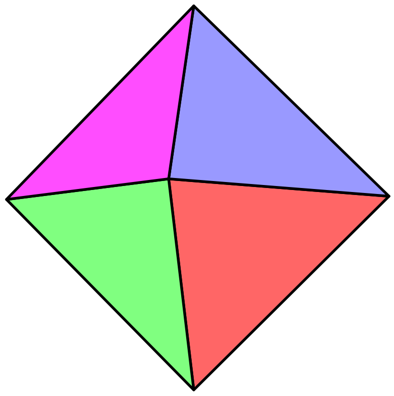

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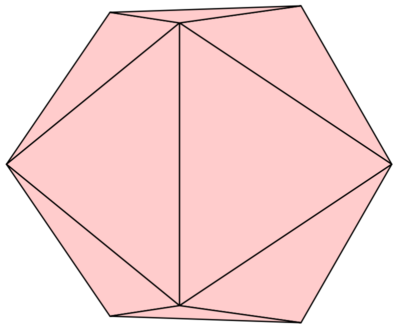

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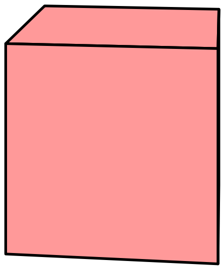

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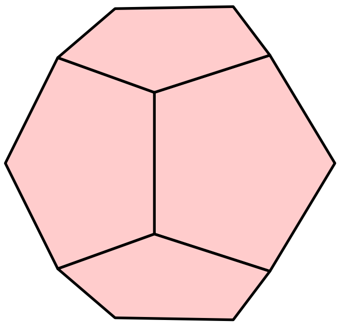

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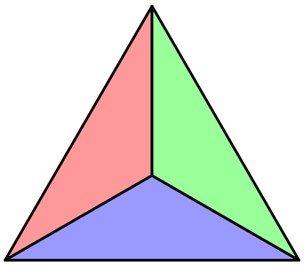

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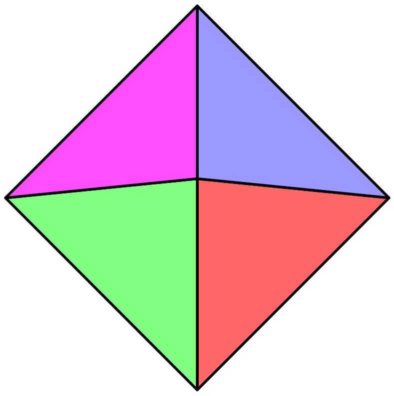

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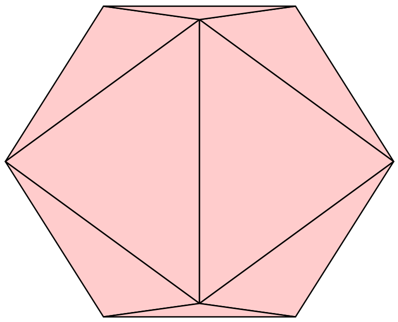

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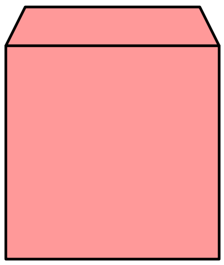

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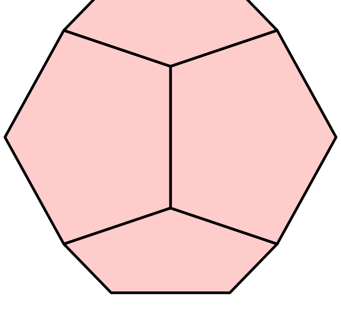

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