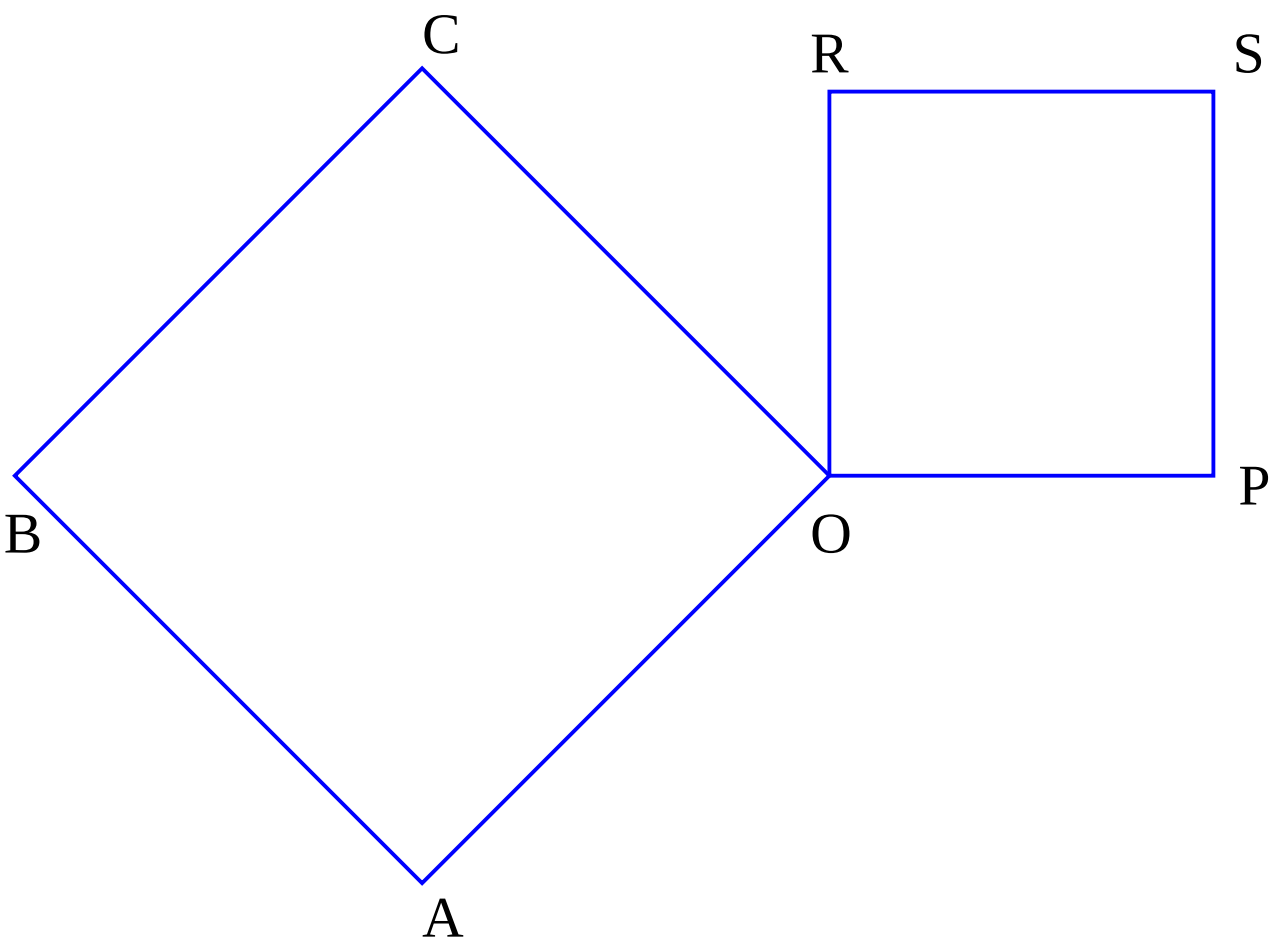
Math 308 Project

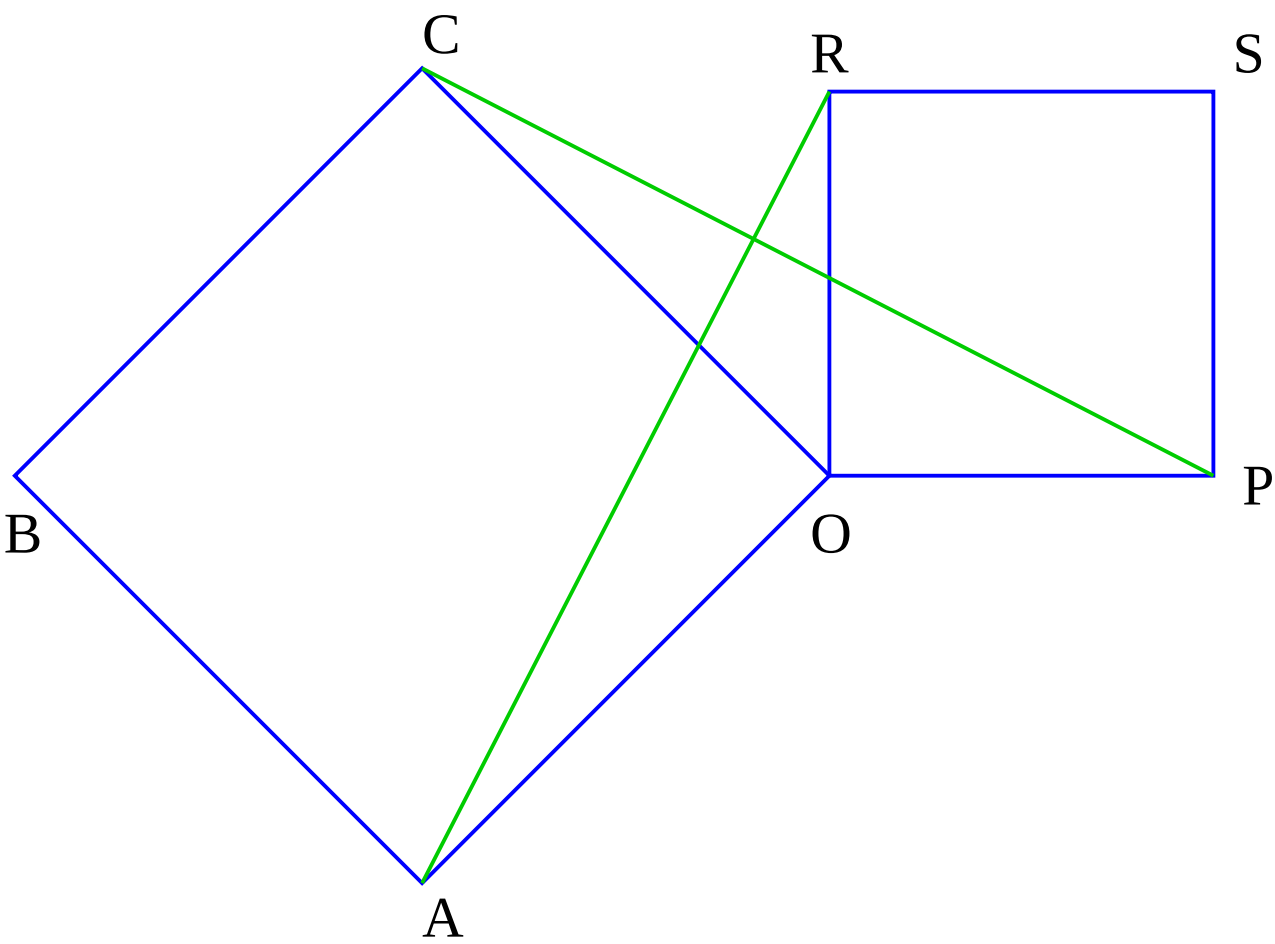
Finsler Hadwiger Theo

Let the squares ABCO and RSPO share one common vertex O. The midpoints L and K of the segments CR and AP together with the centers of the original squares M and N then form another square KMLN.

student: Queenie Lo
student no.: 55875009



~ABCO & RSPO, two squares share 1 common vertex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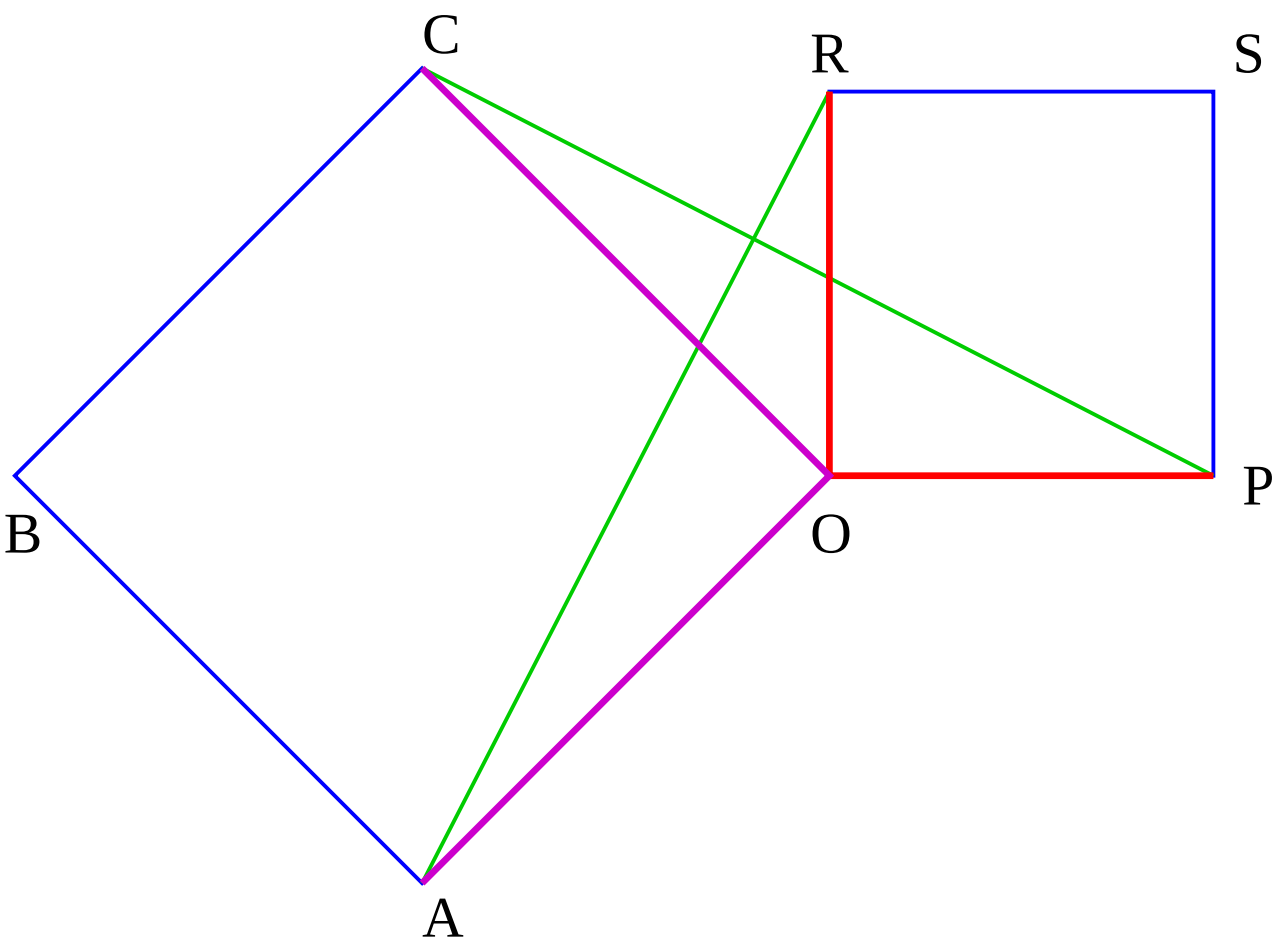
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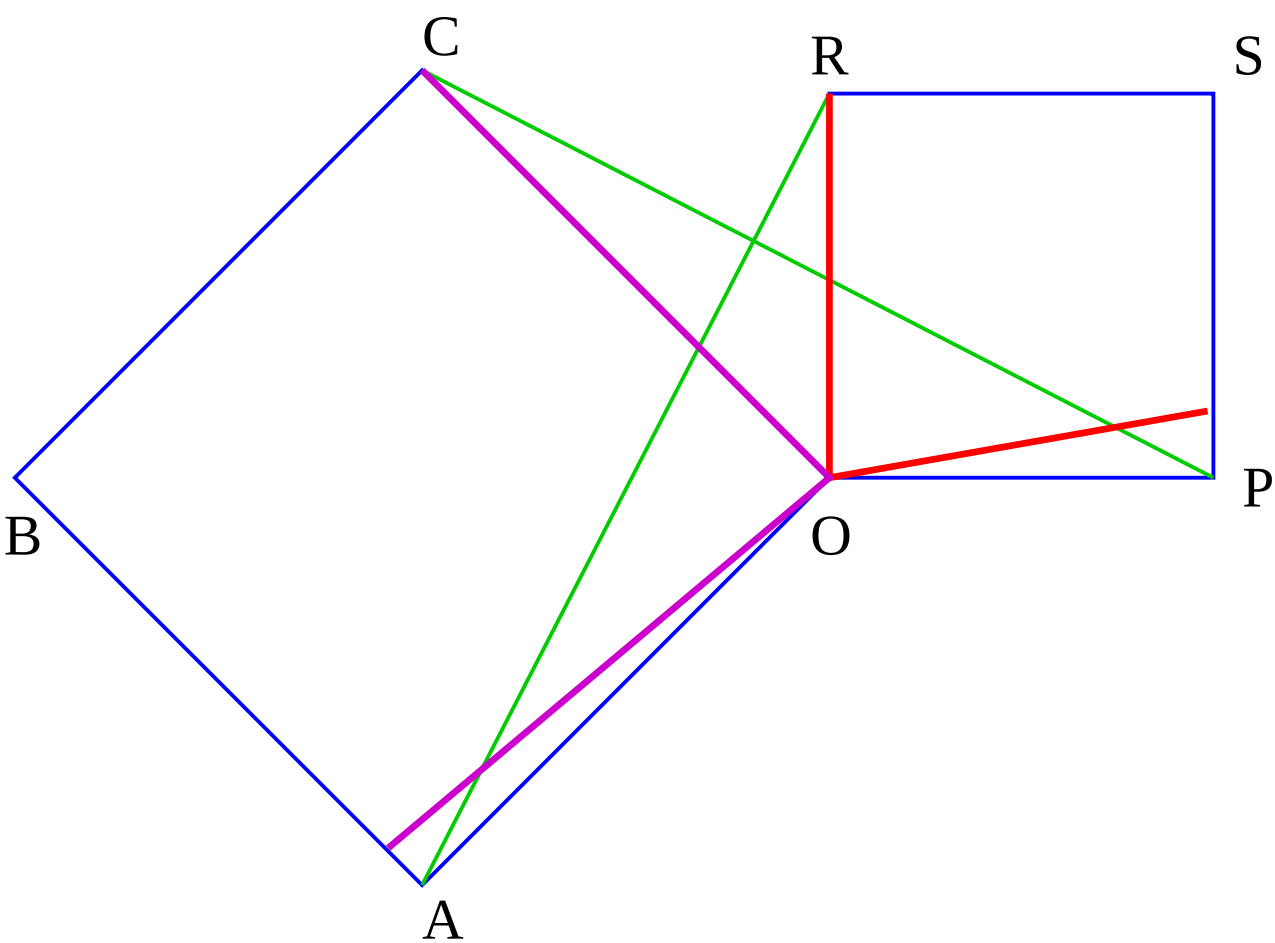
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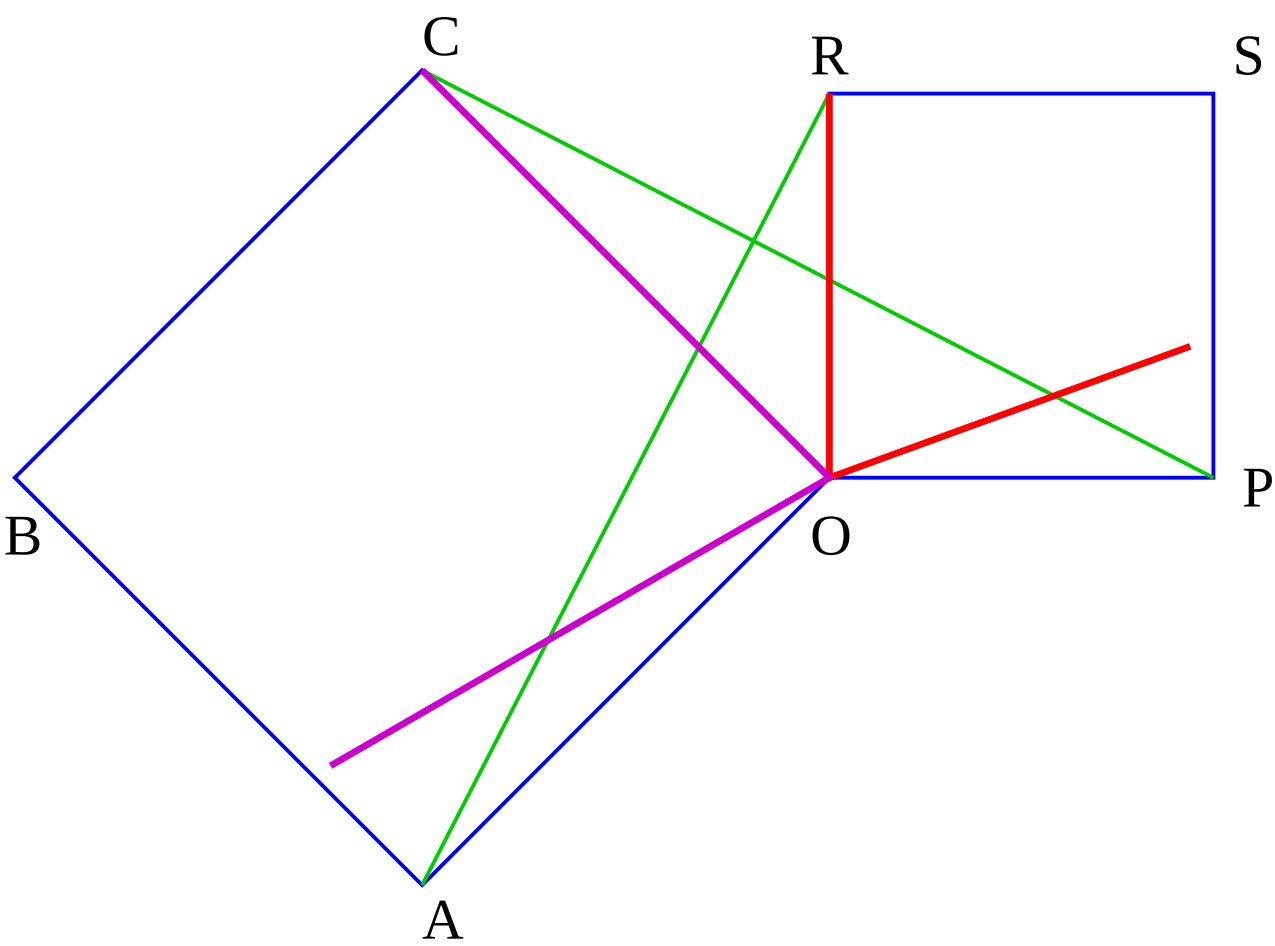
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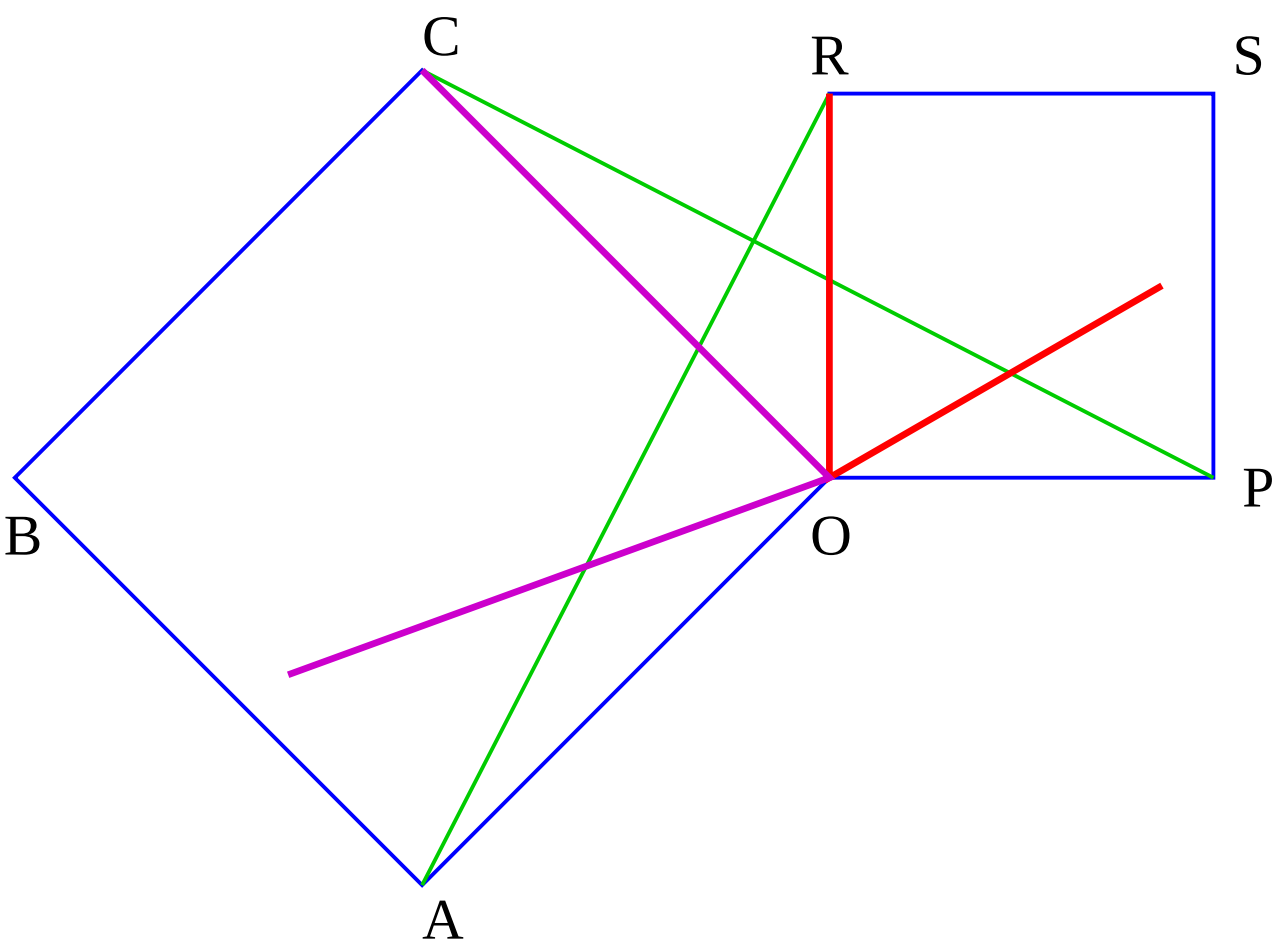
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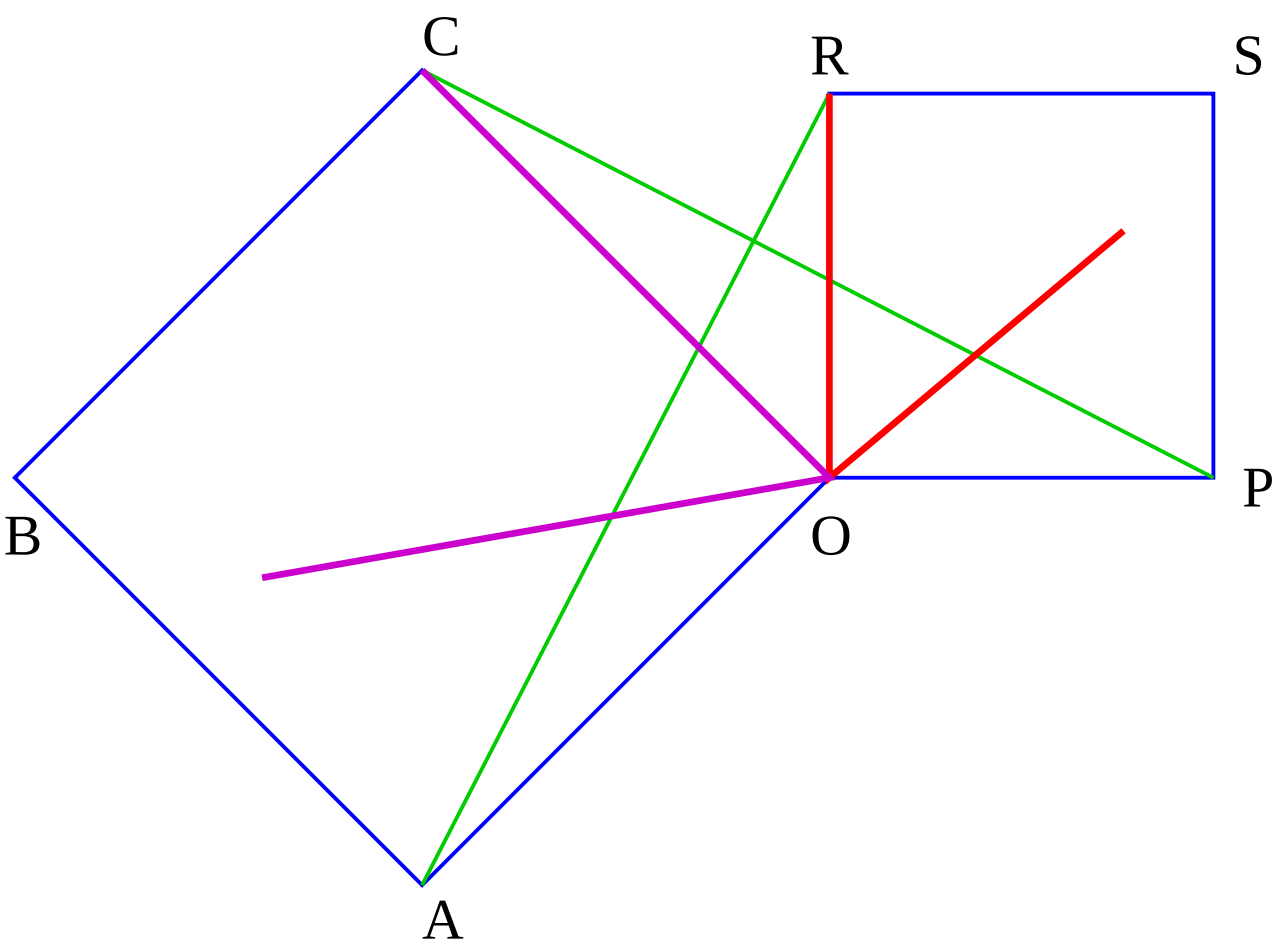
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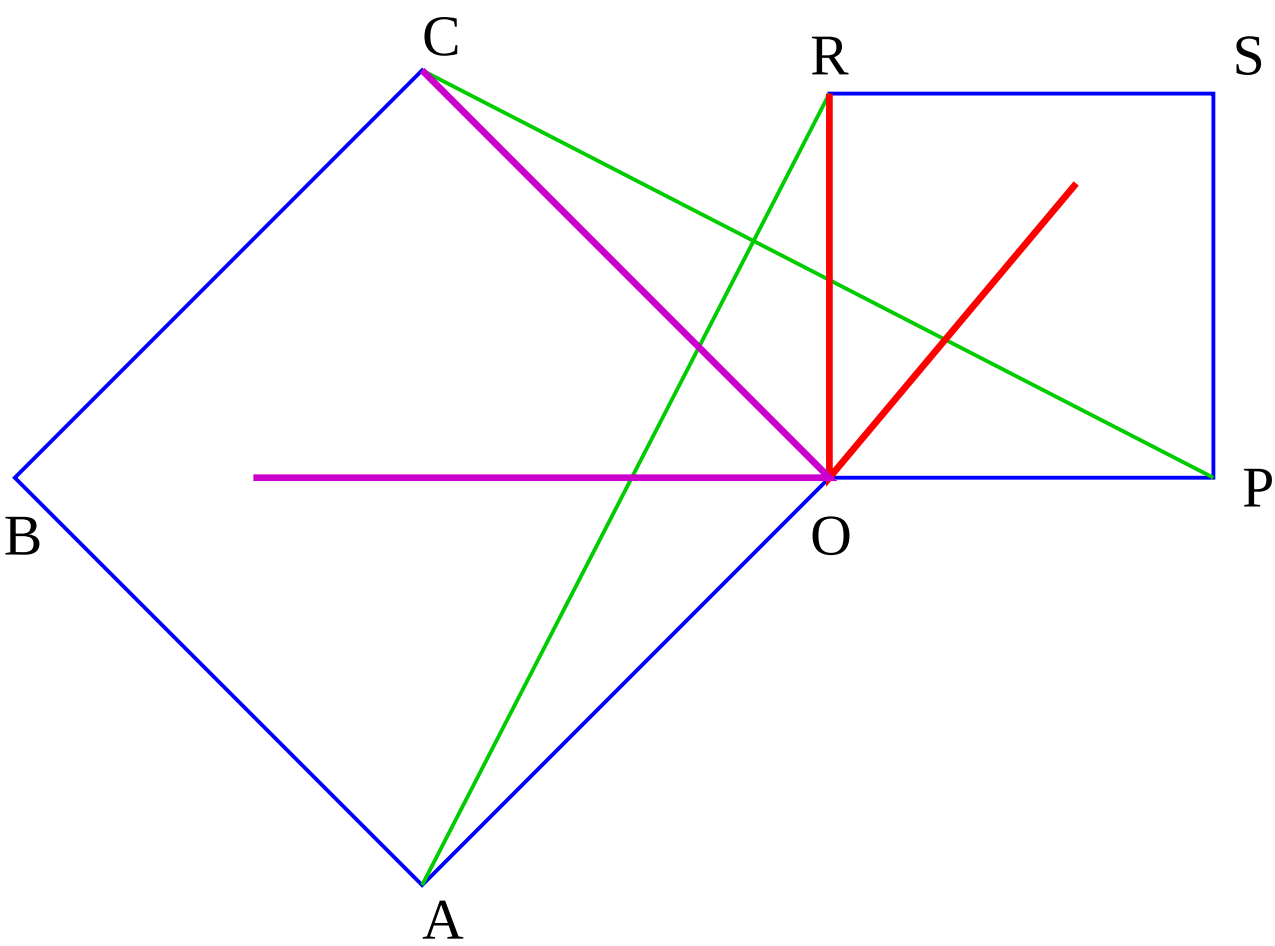
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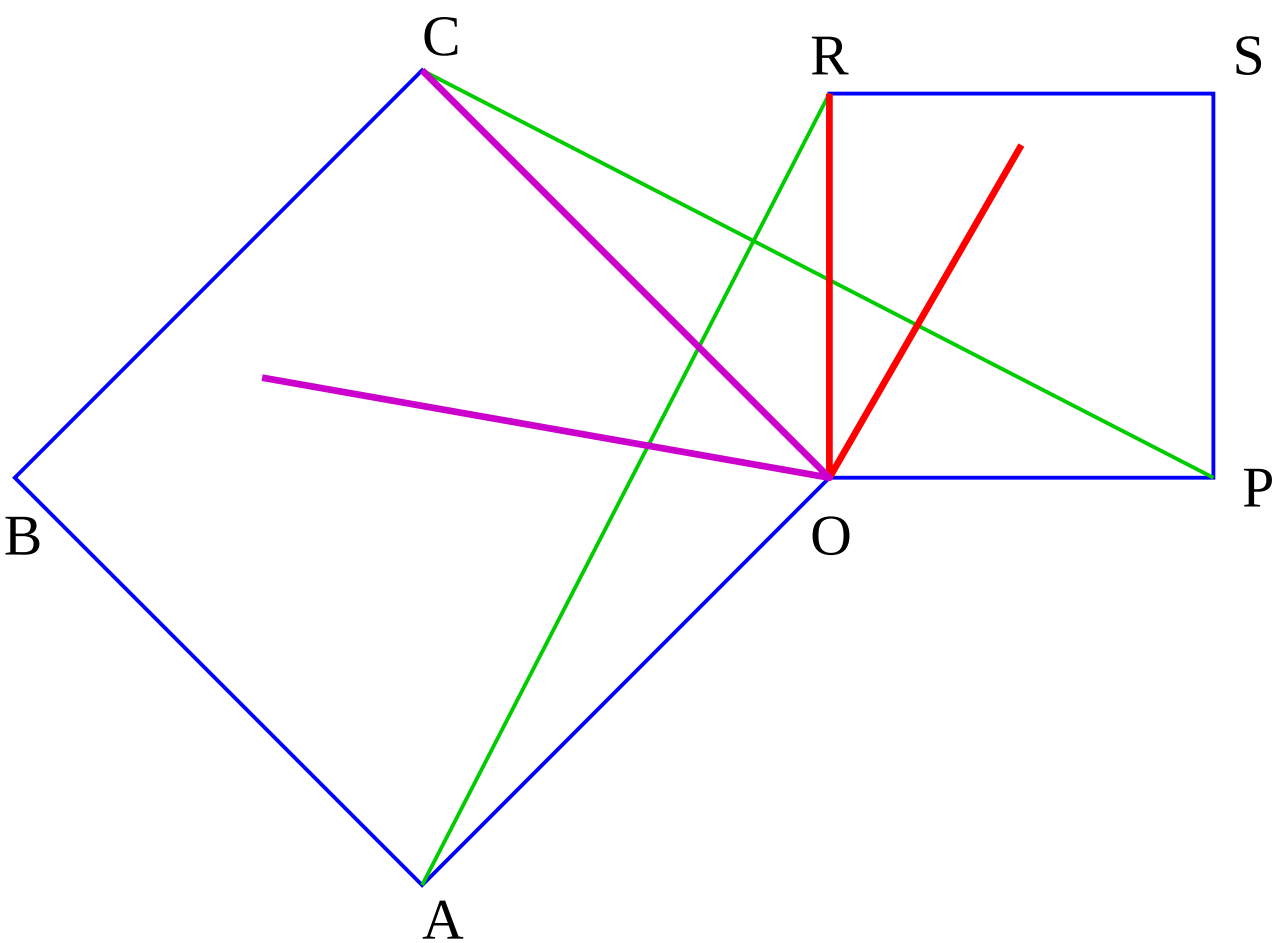
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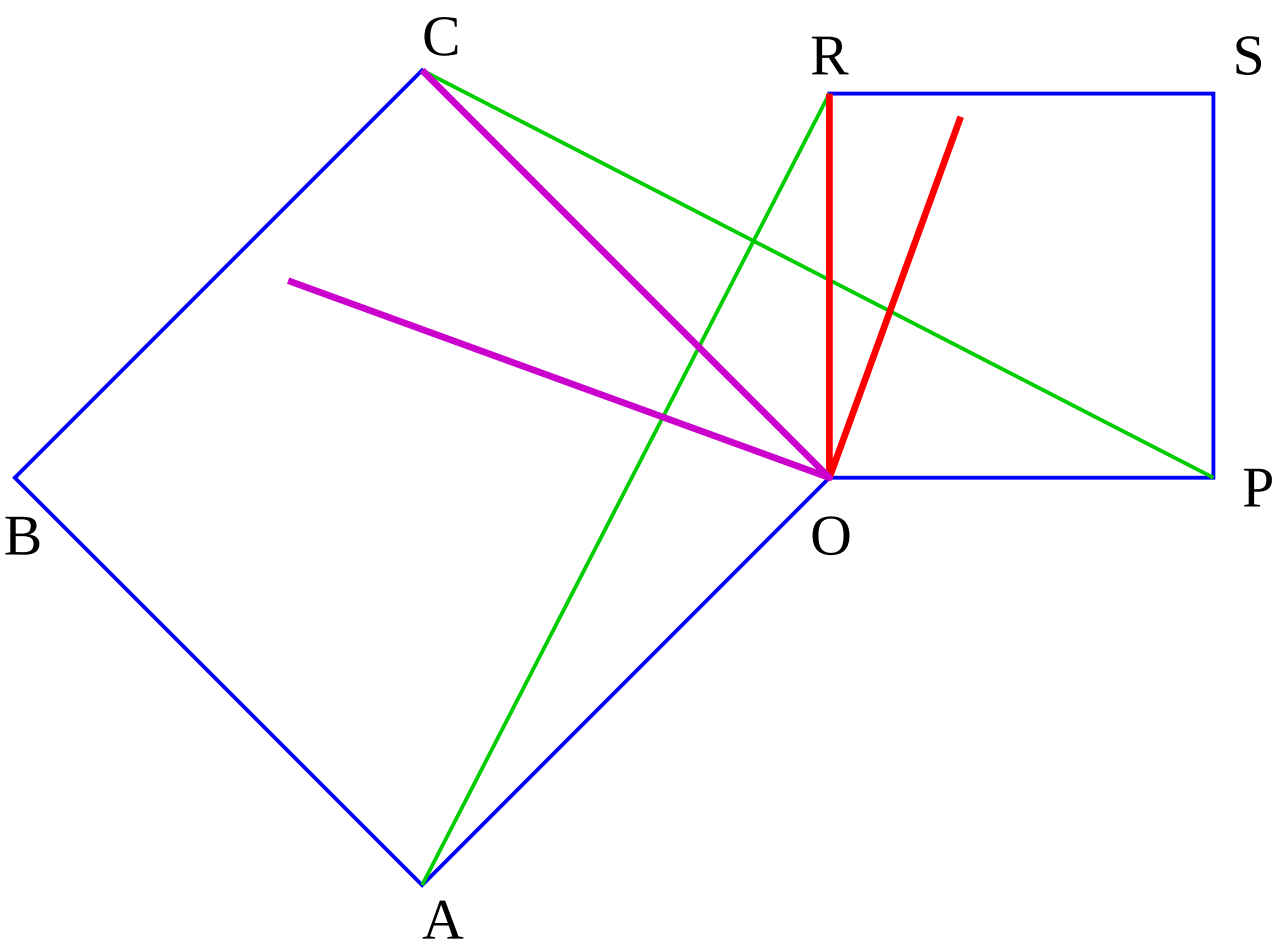
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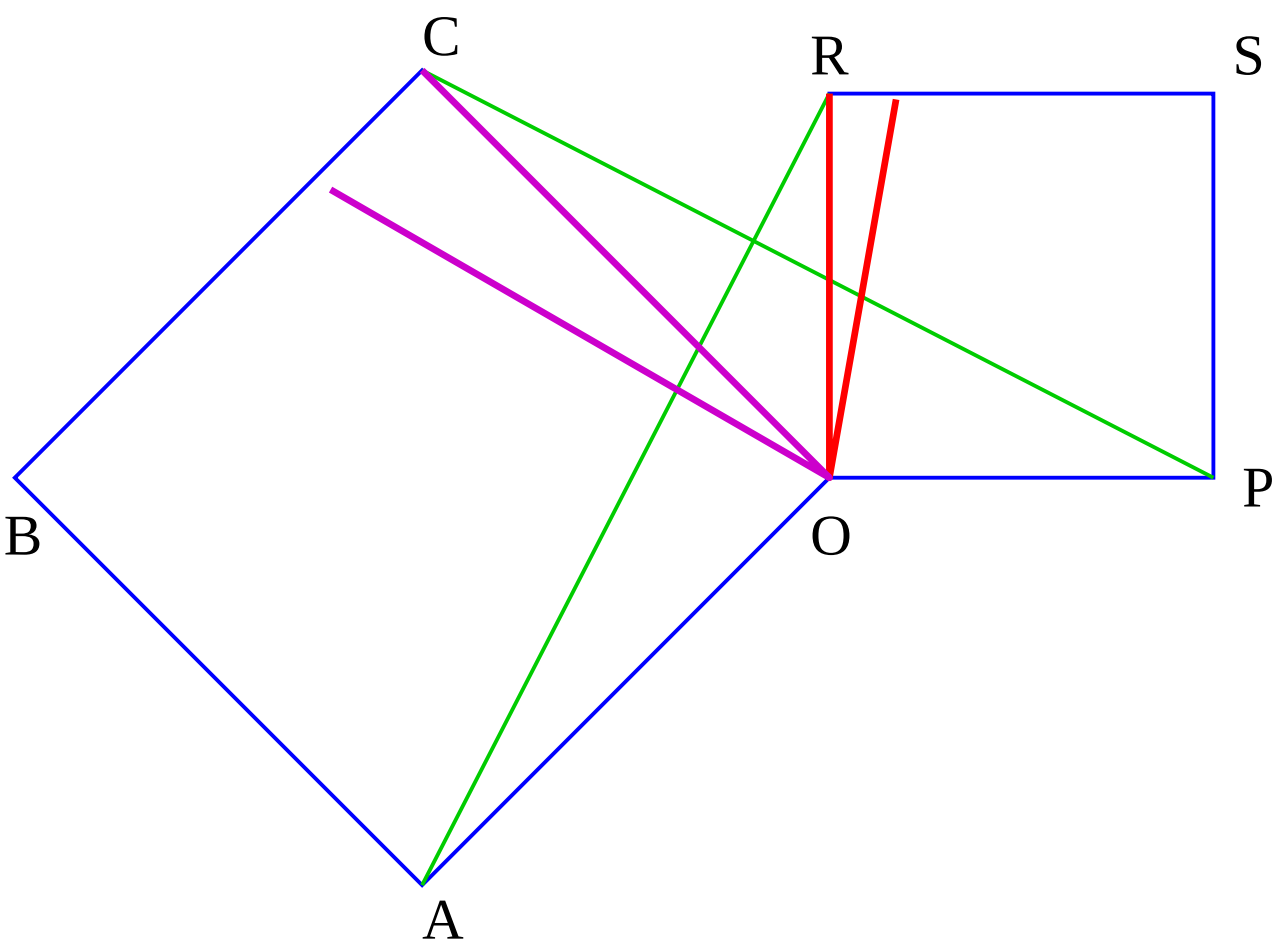
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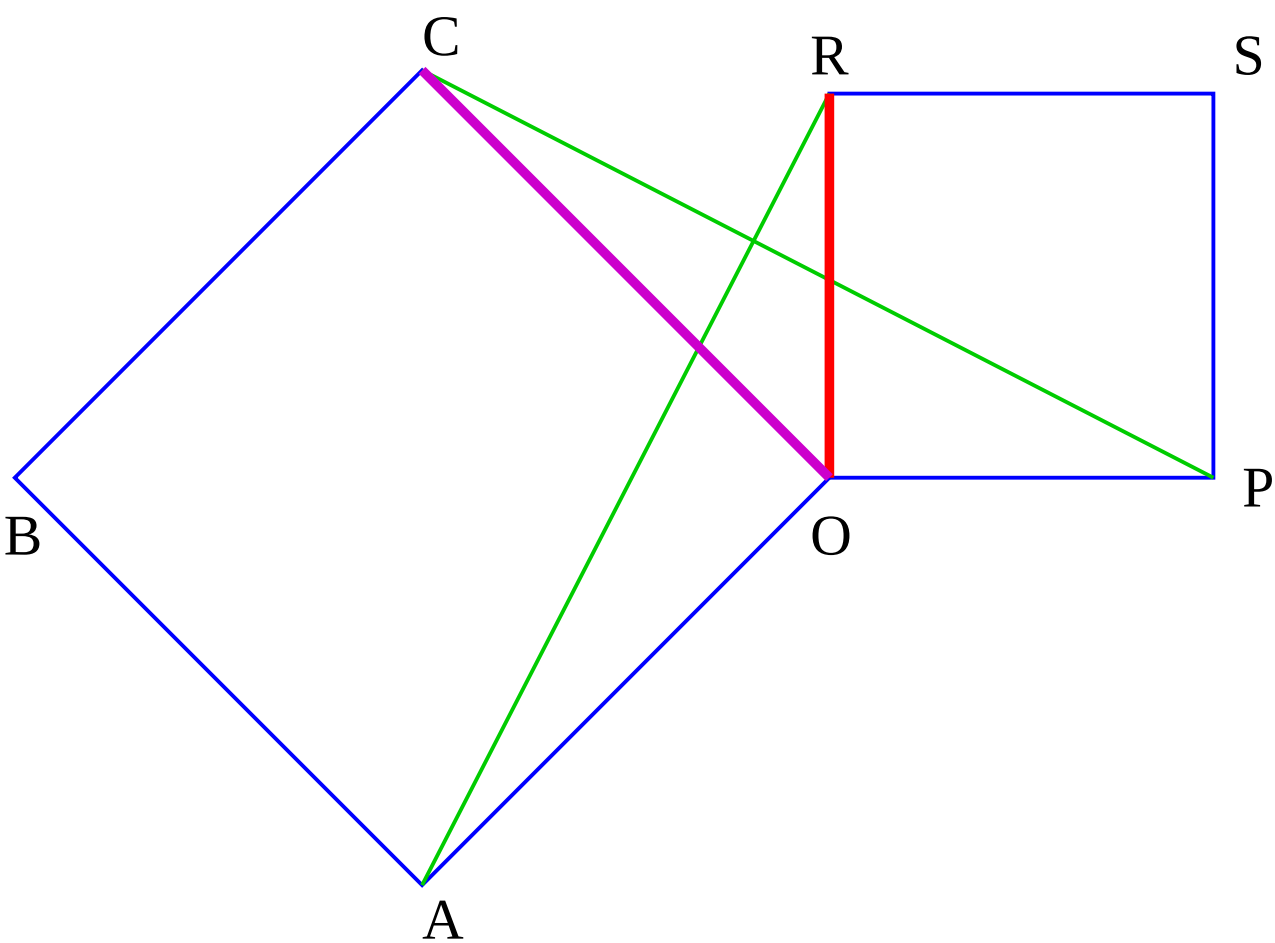
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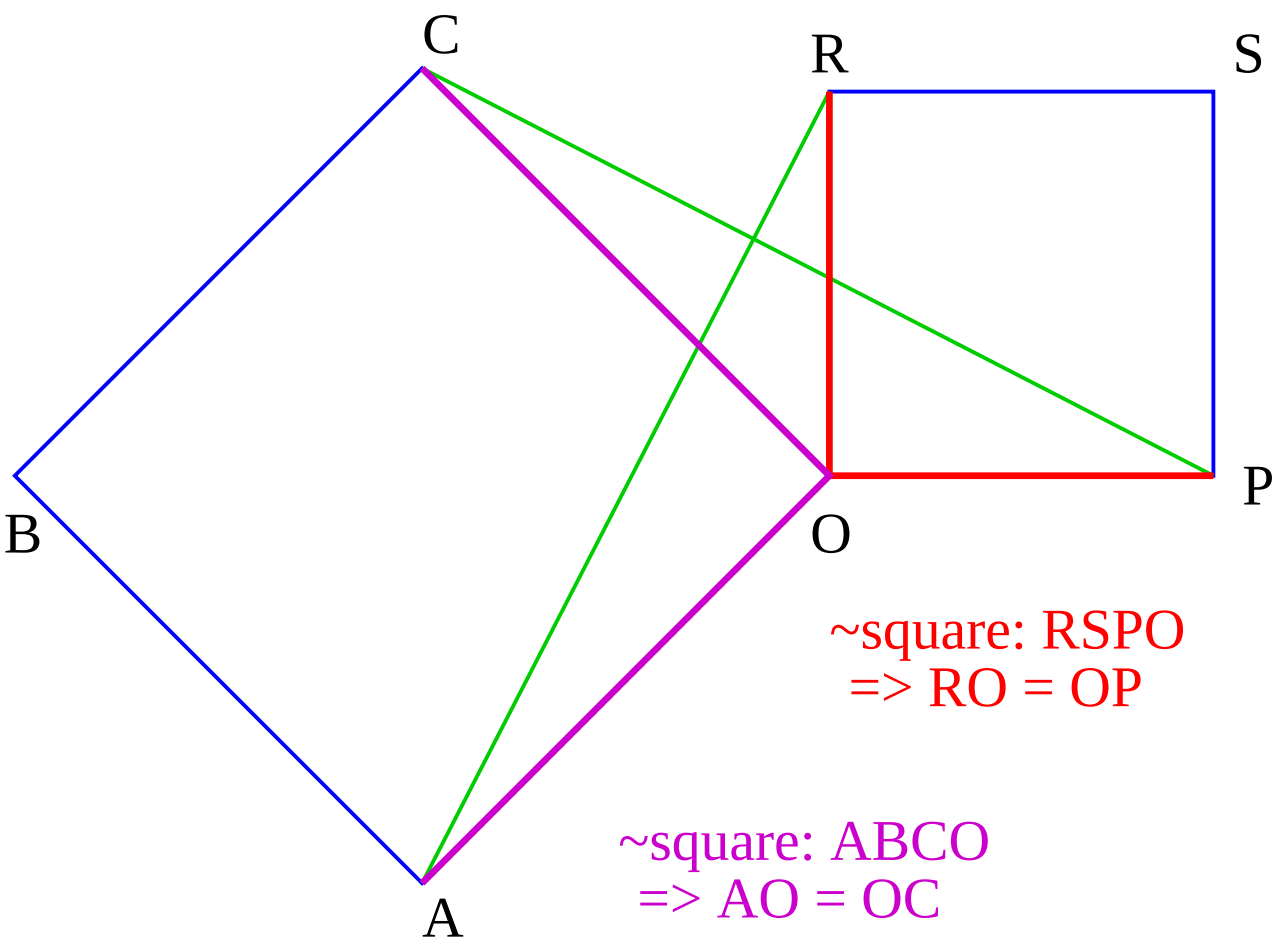
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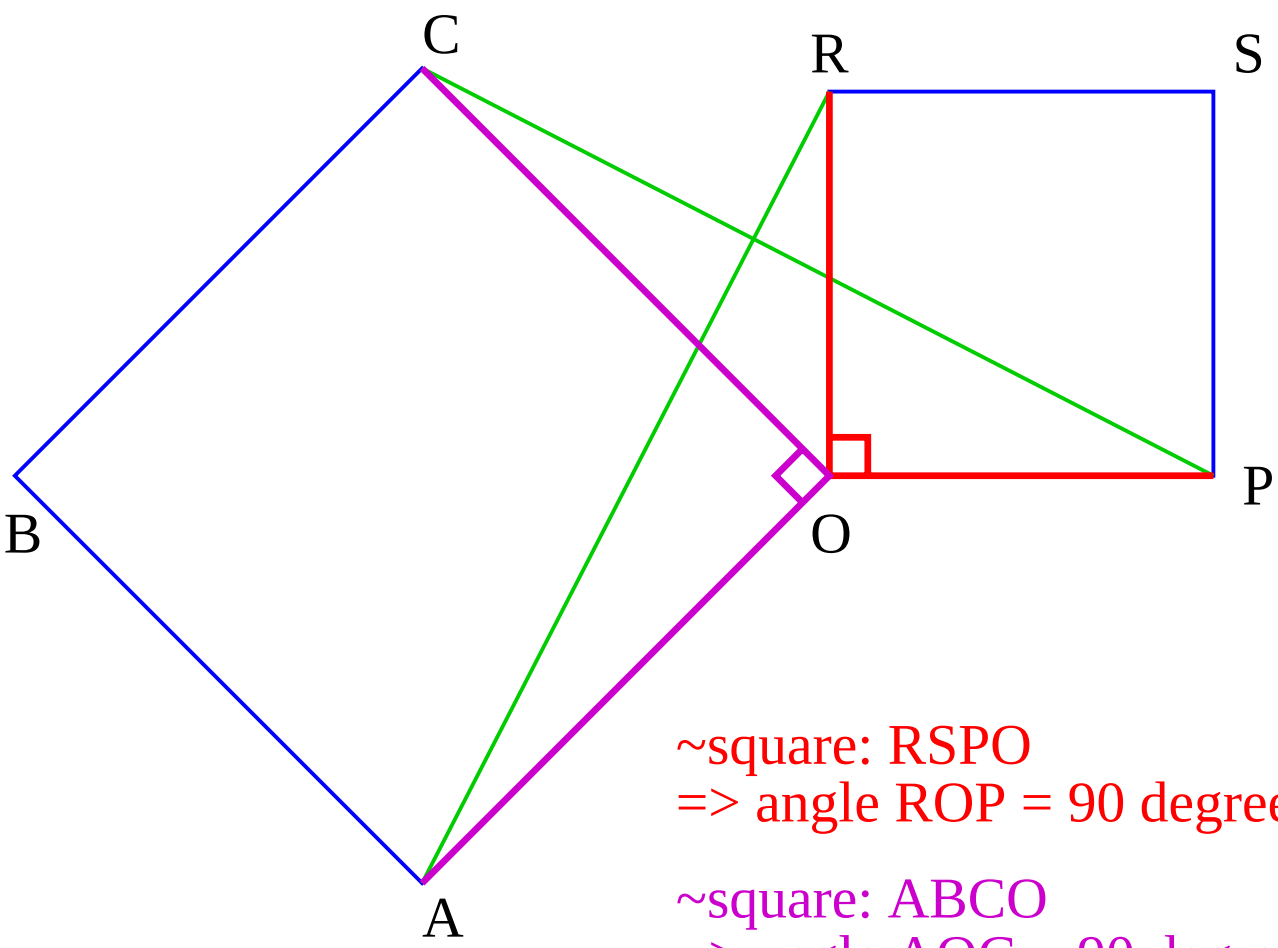
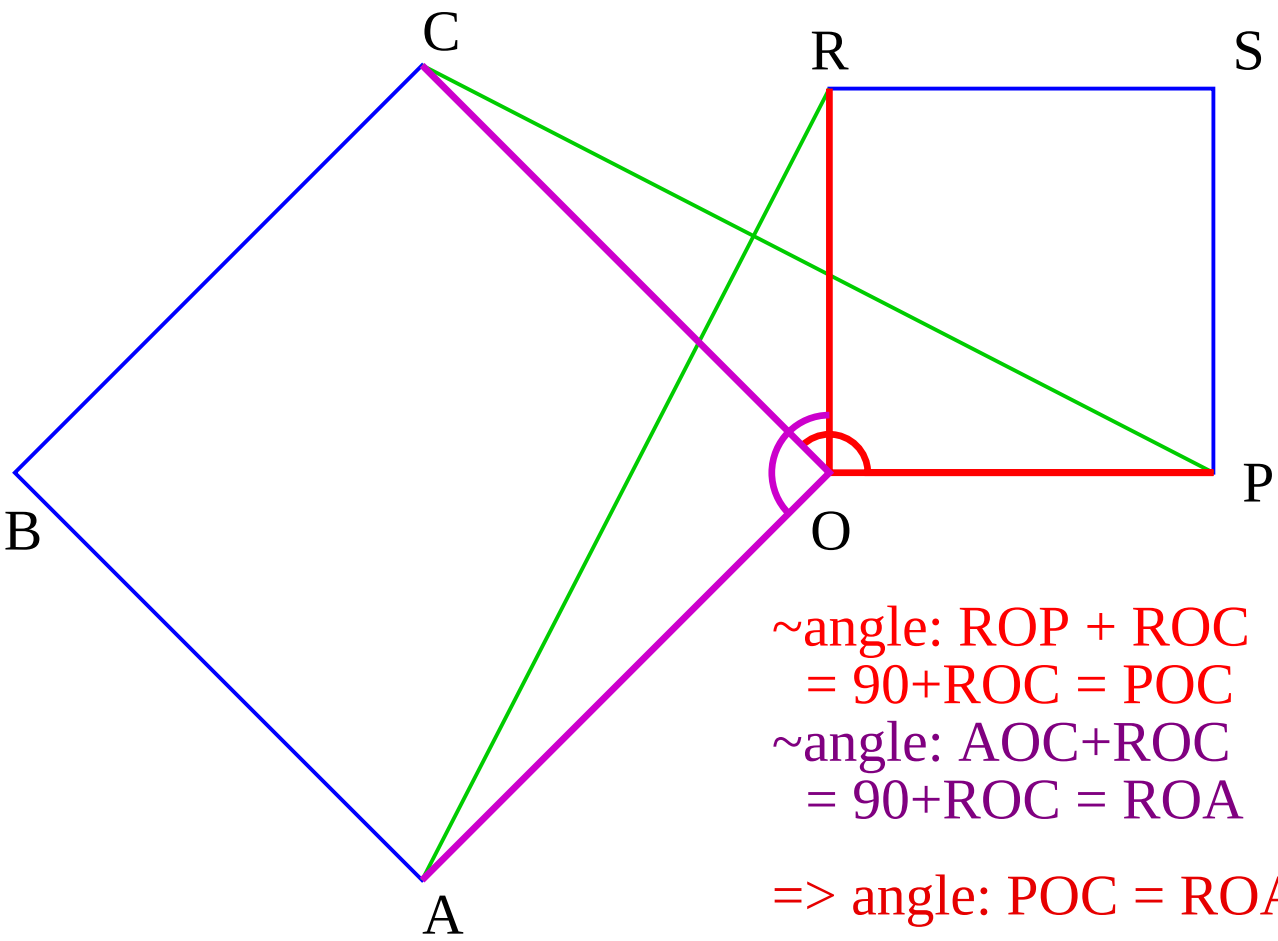
~square: RSPO
=> RO = OP
~square: ABCO
=> AO = OC



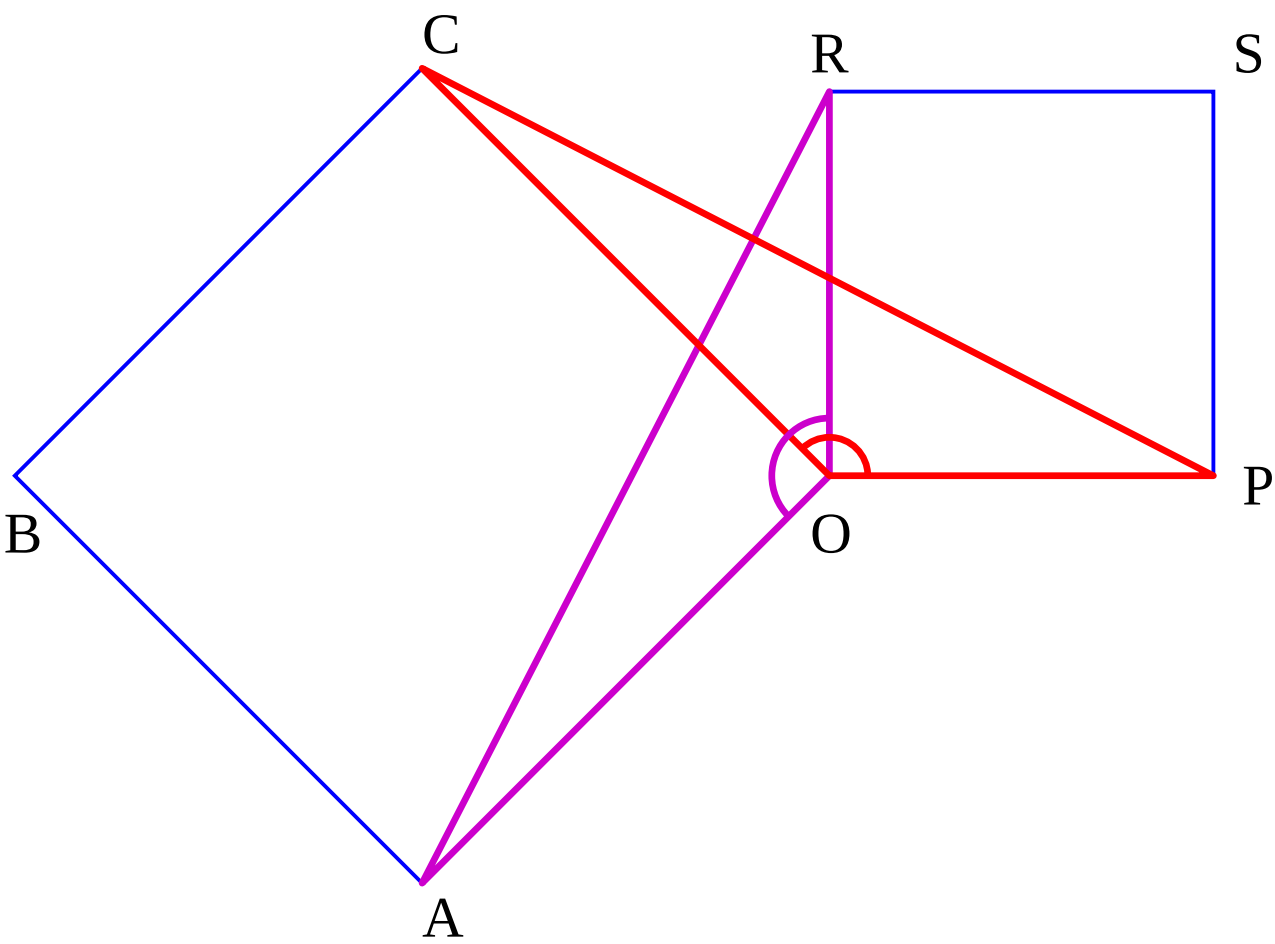
~square: RSPO
=> angle ROP = 90 degree

~square: ABCO
=> angle AOC = 90 degree



~angle: ROP + ROC
= 90+ROC = POC
~angle: AOC+ROC
= 90+ROC = ROA

=> angle: POC = ROA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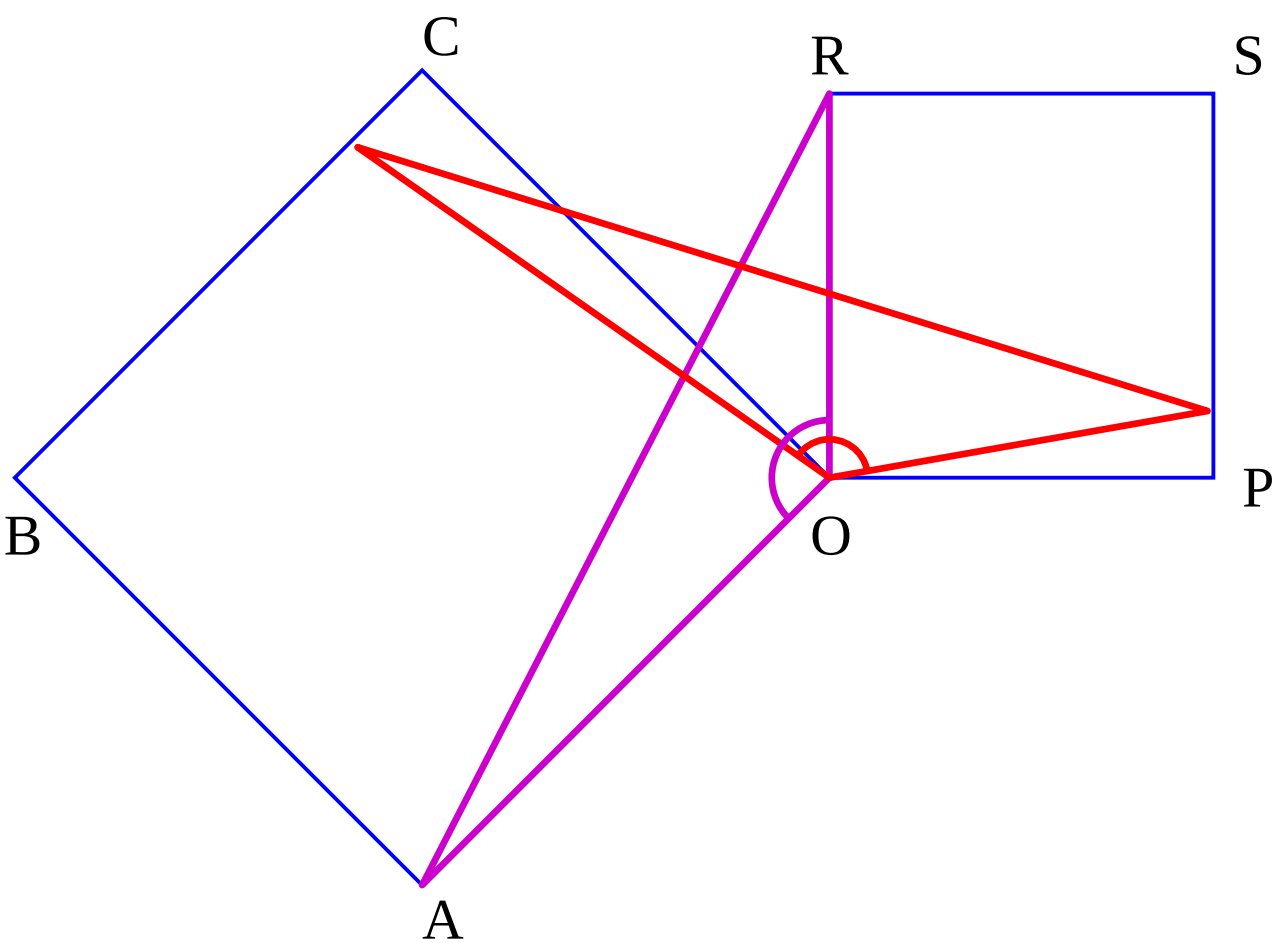
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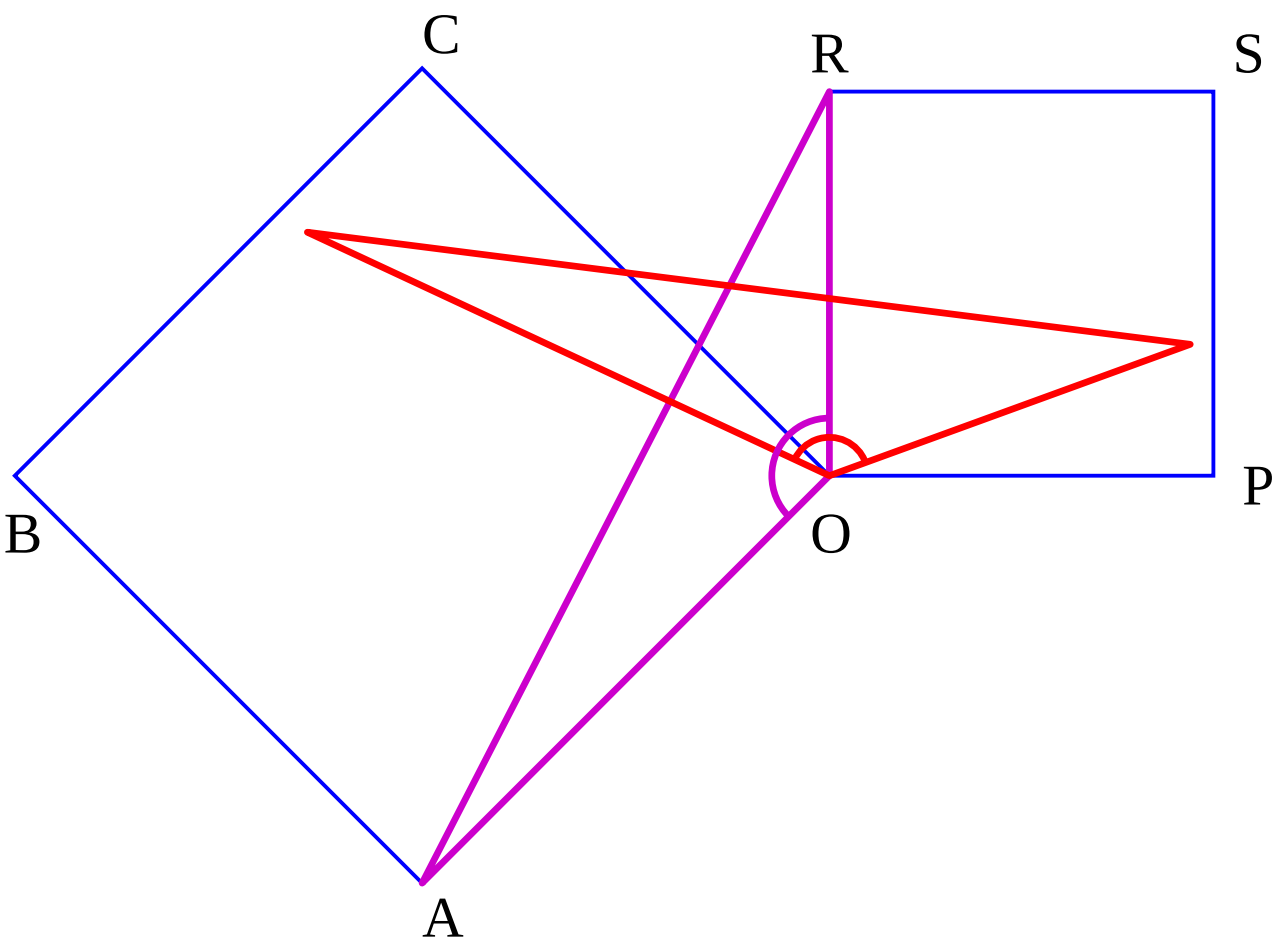
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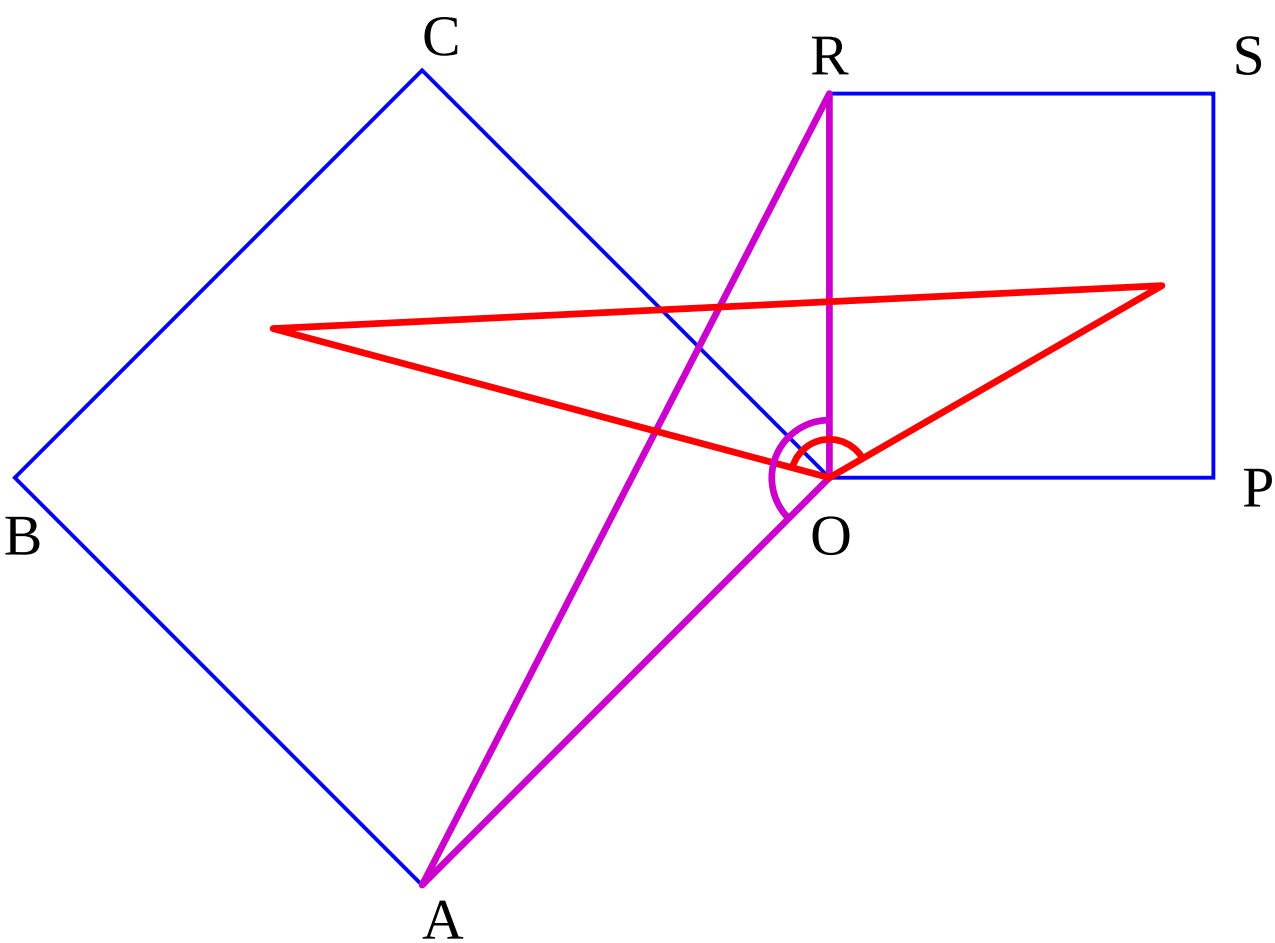
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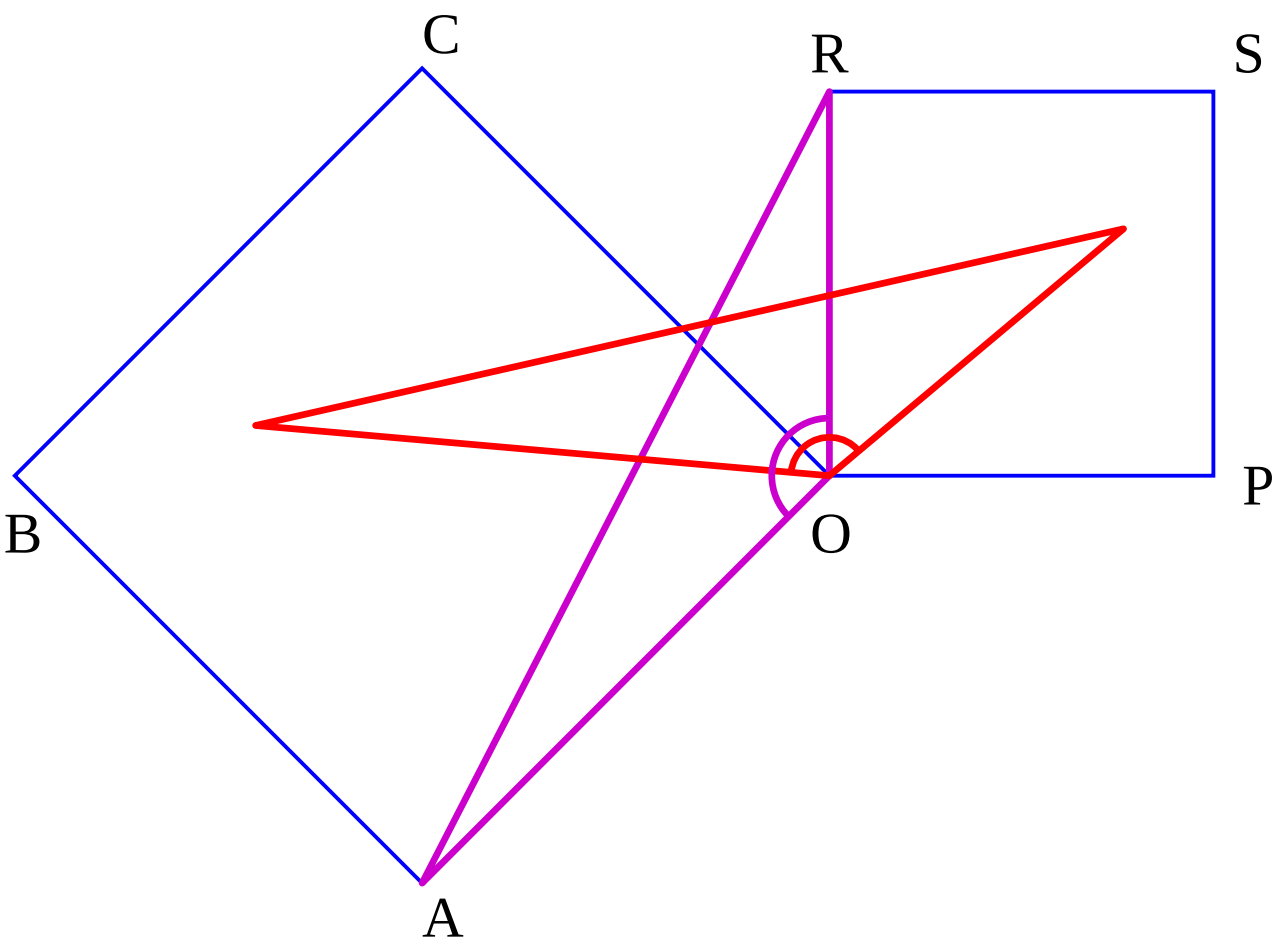
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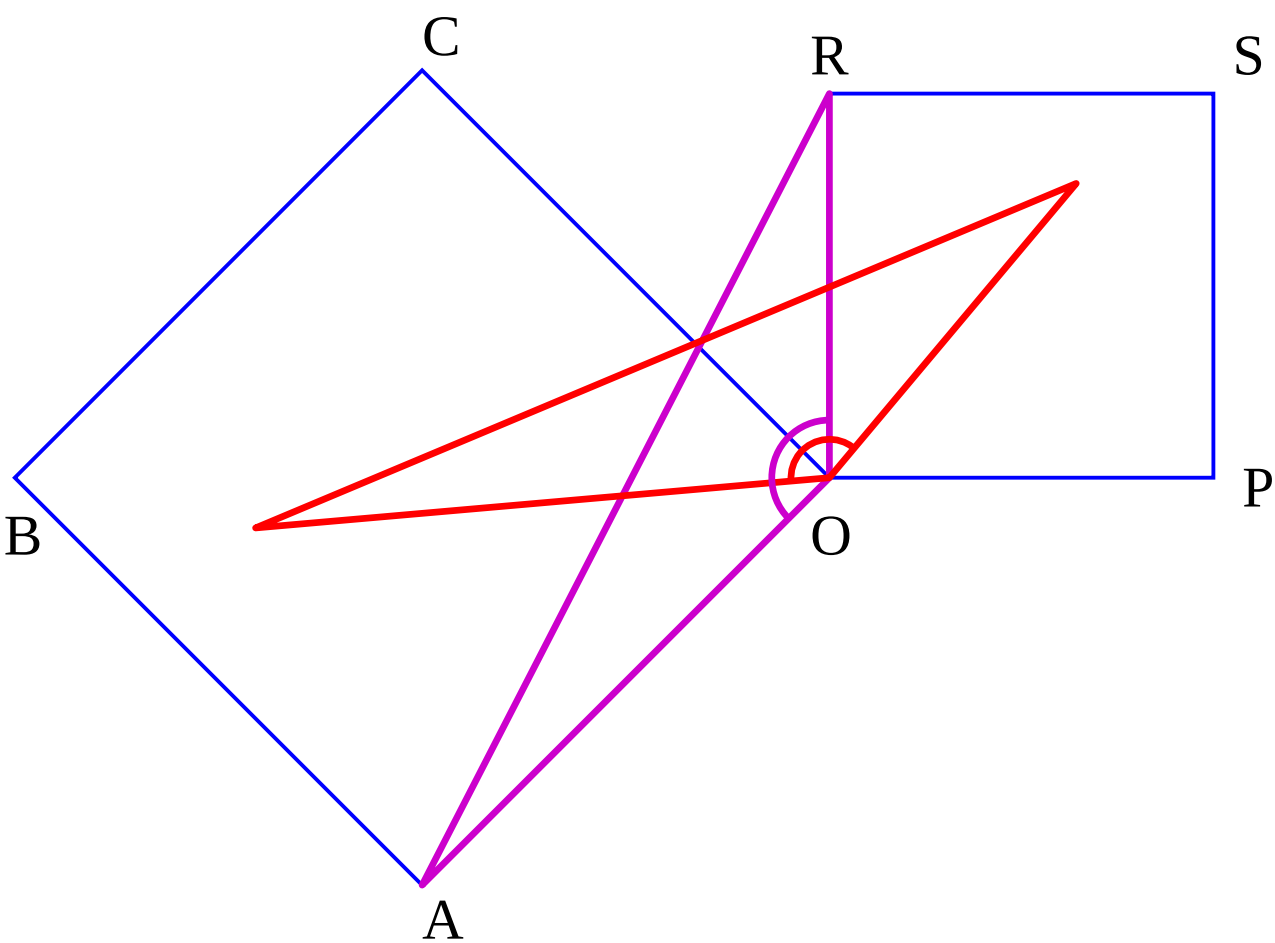
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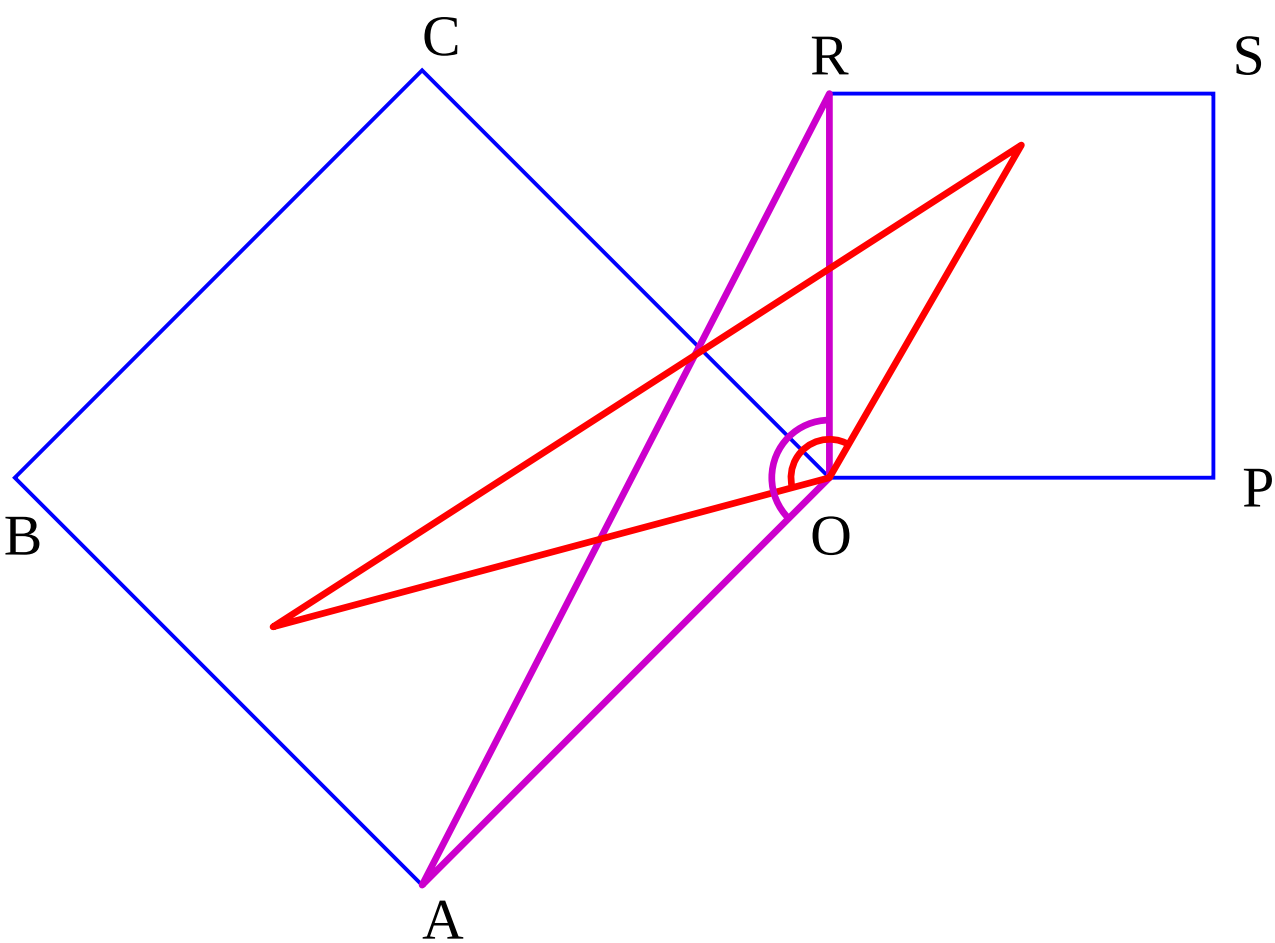
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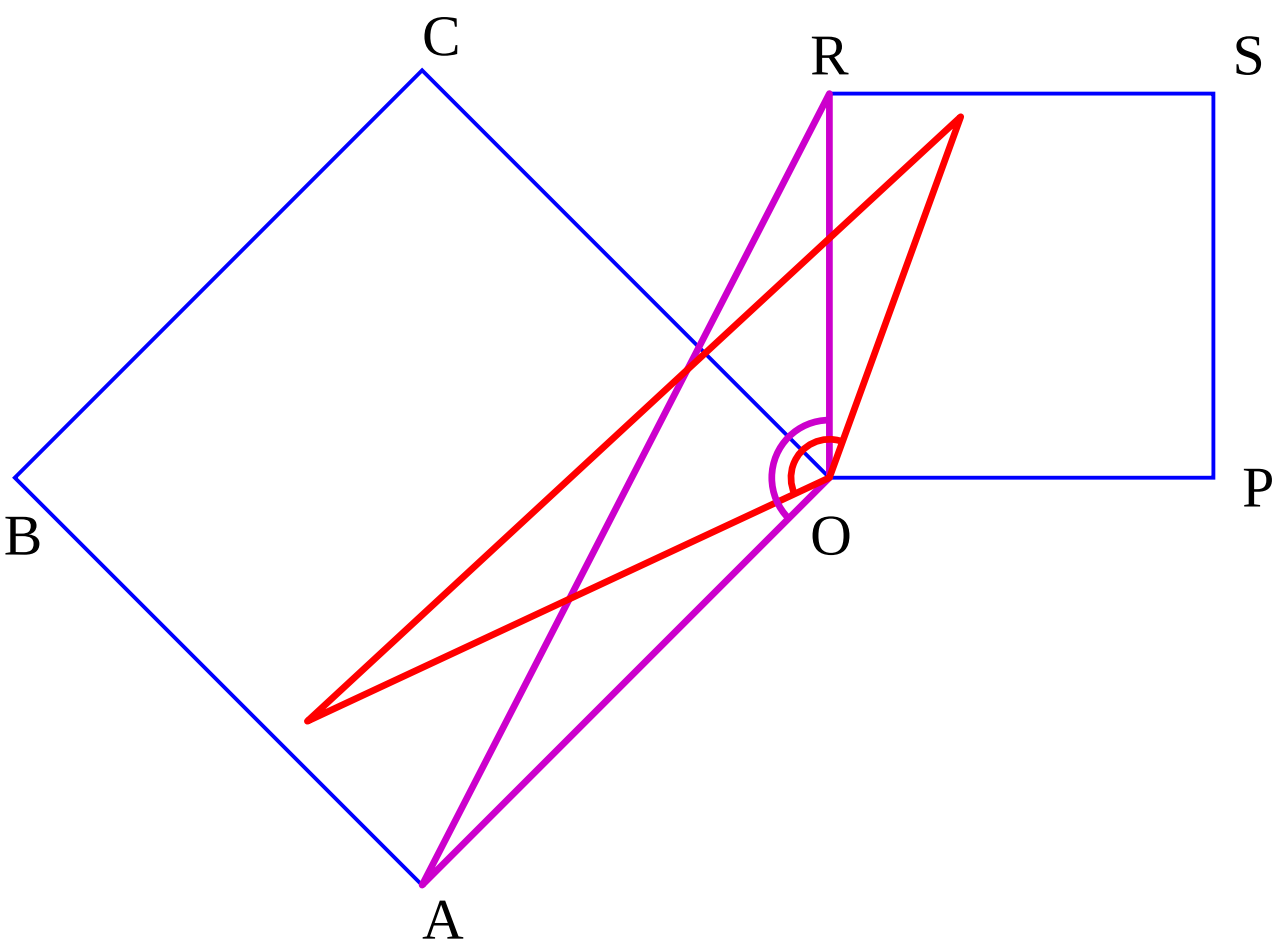
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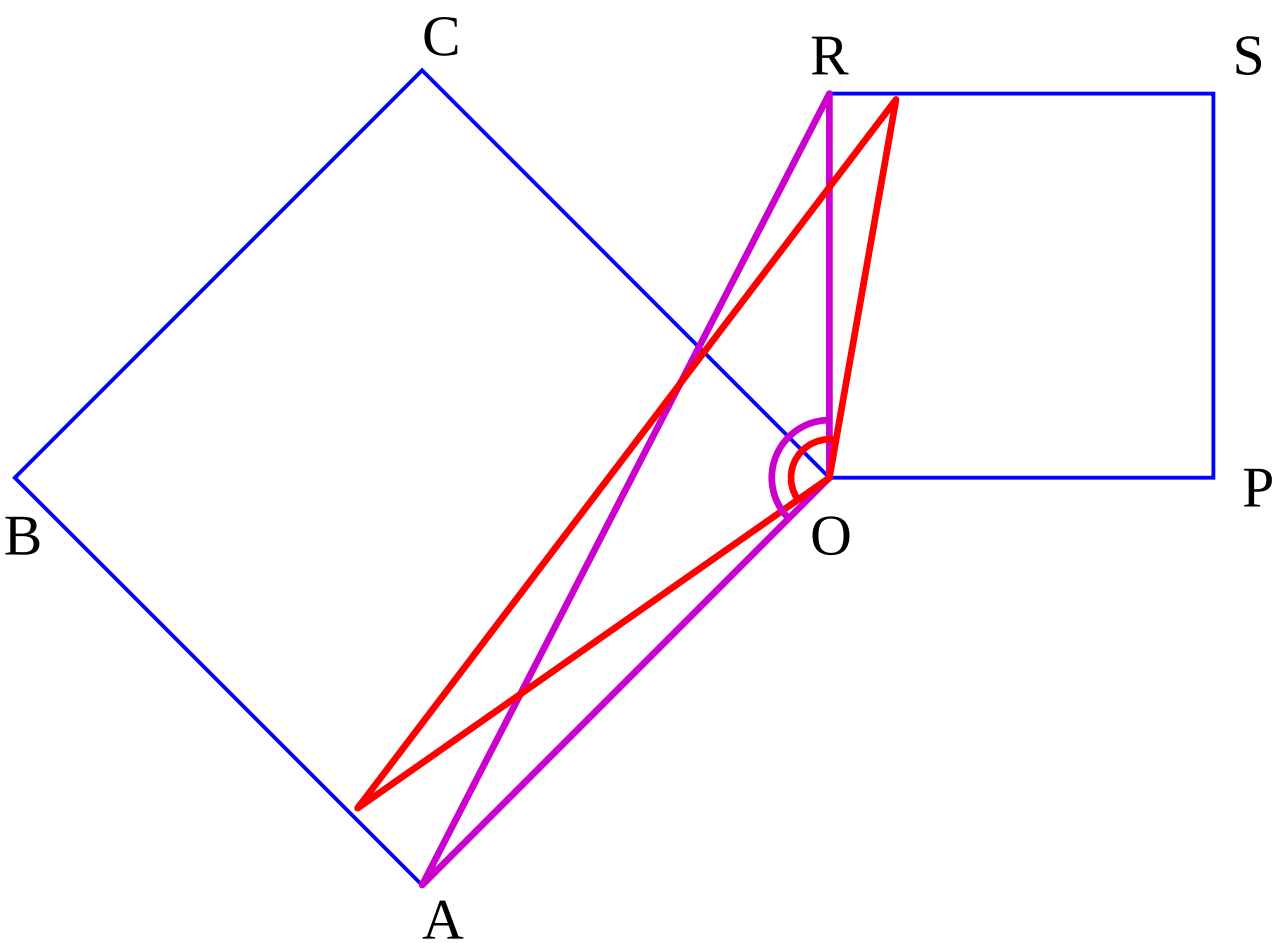
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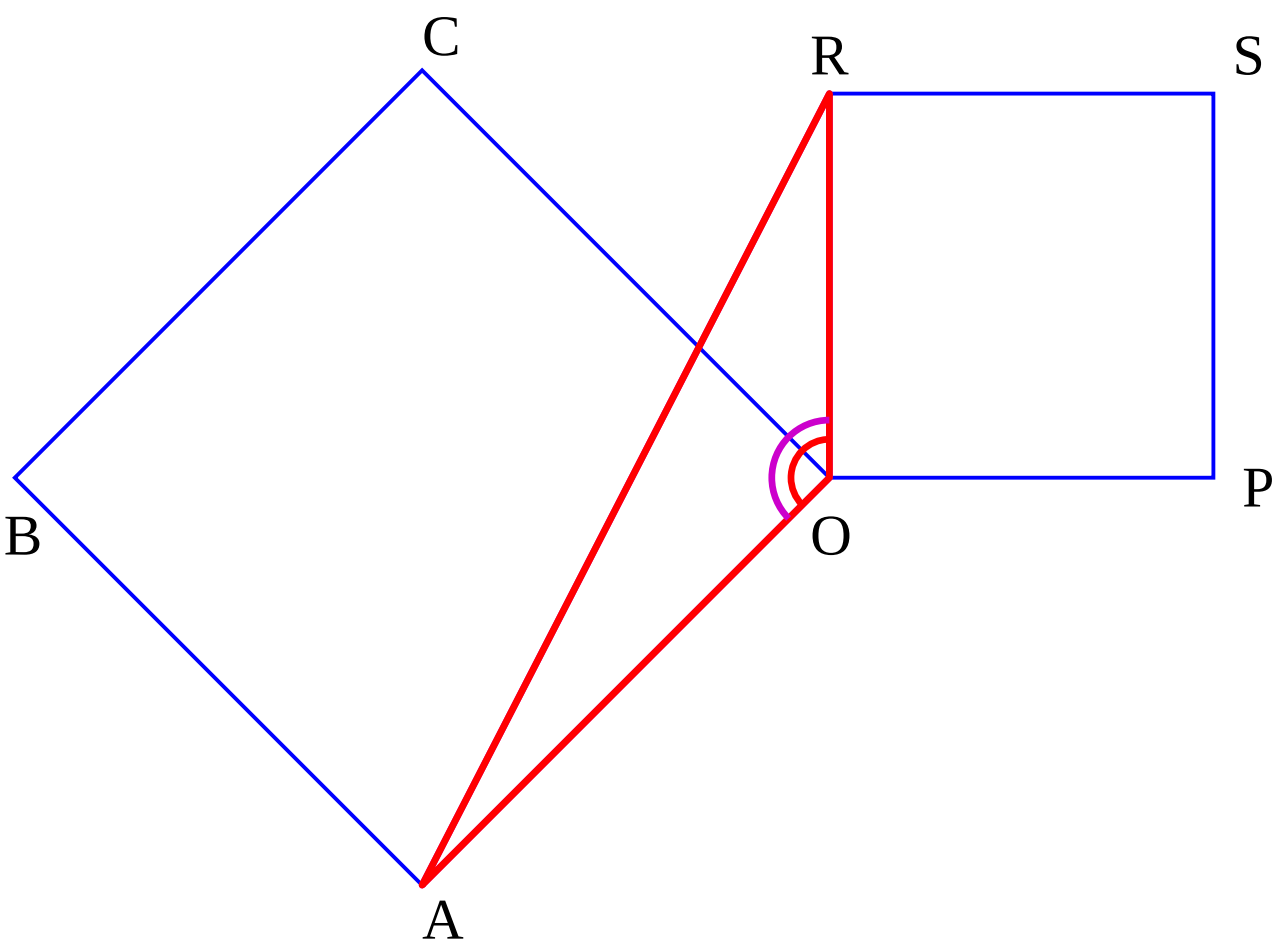
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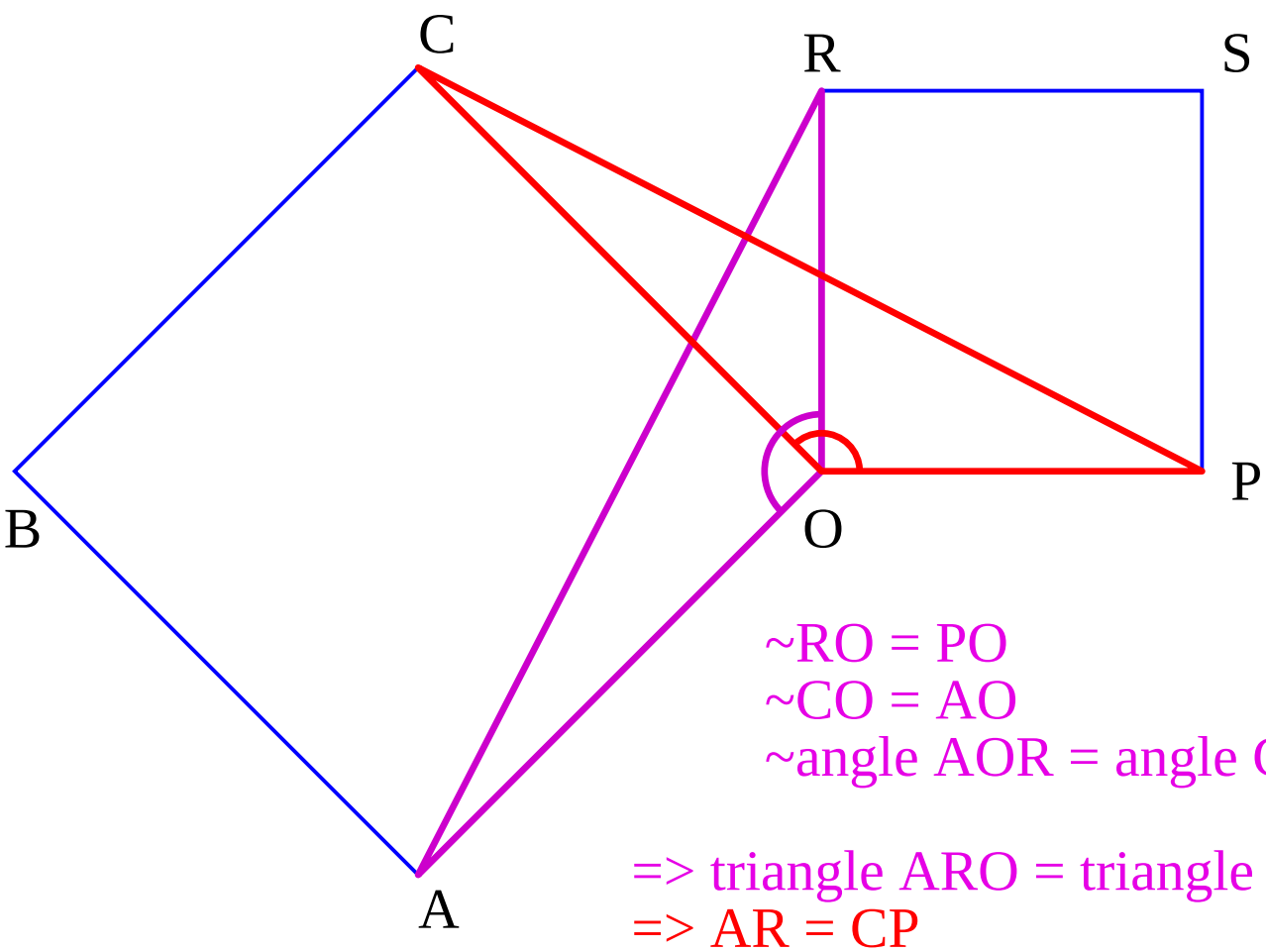
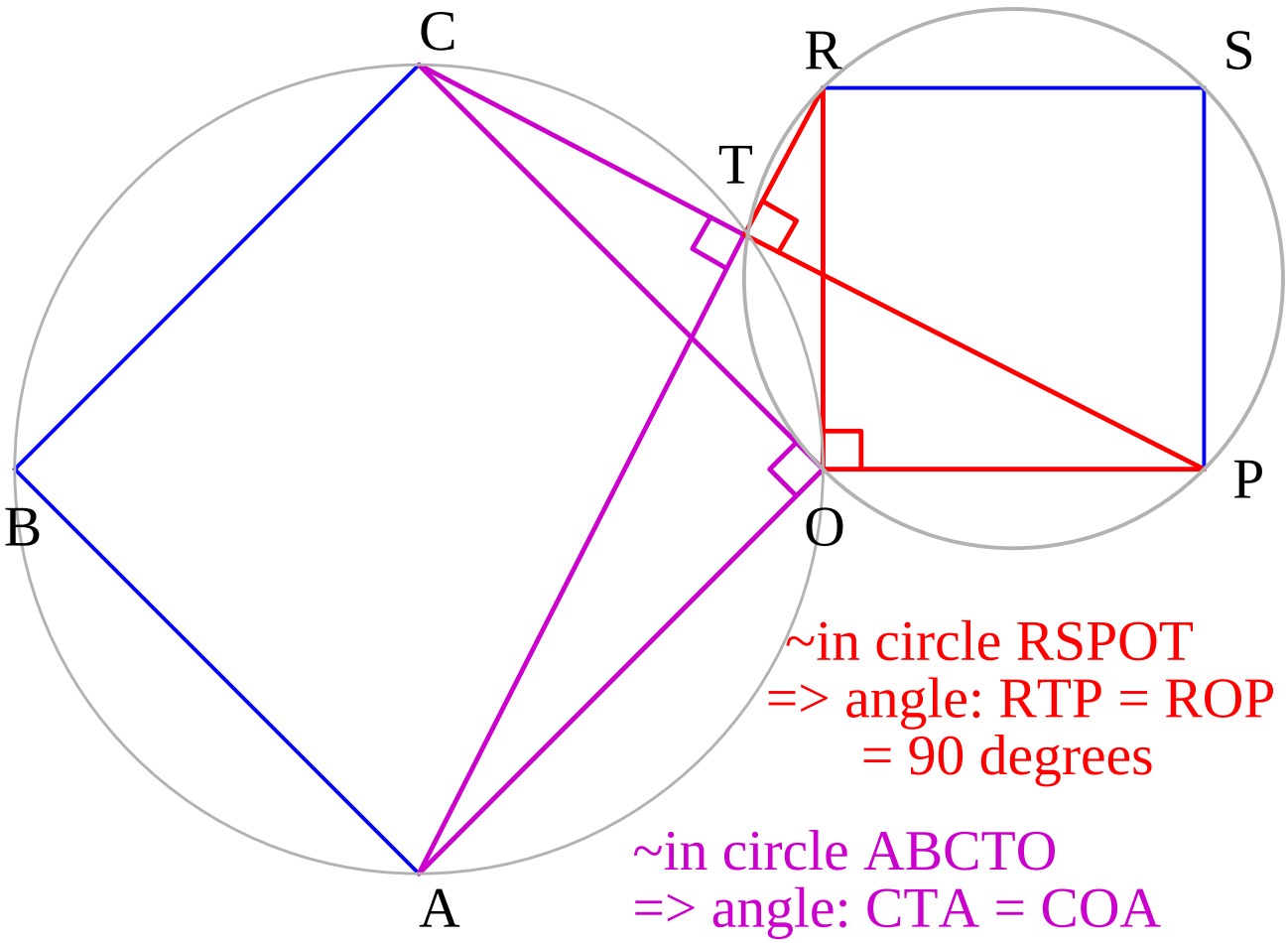


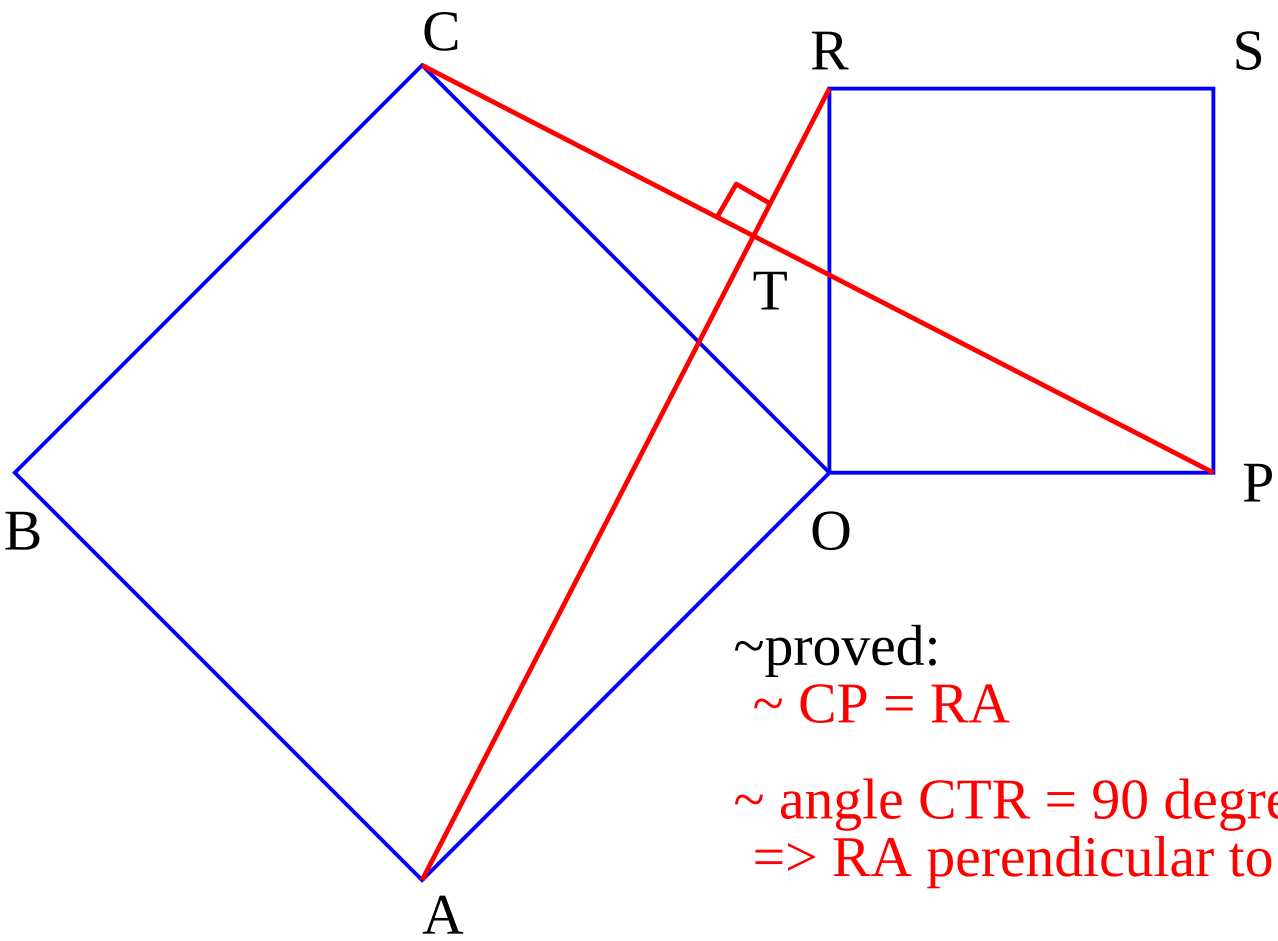
~RO = PO
~CO = AO
~angle AOR = angle COP

=> triangle ARO = triangle CPO
=> AR = CP



~in circle RSPOT
=> angle: RTP = ROP
= 90 degrees

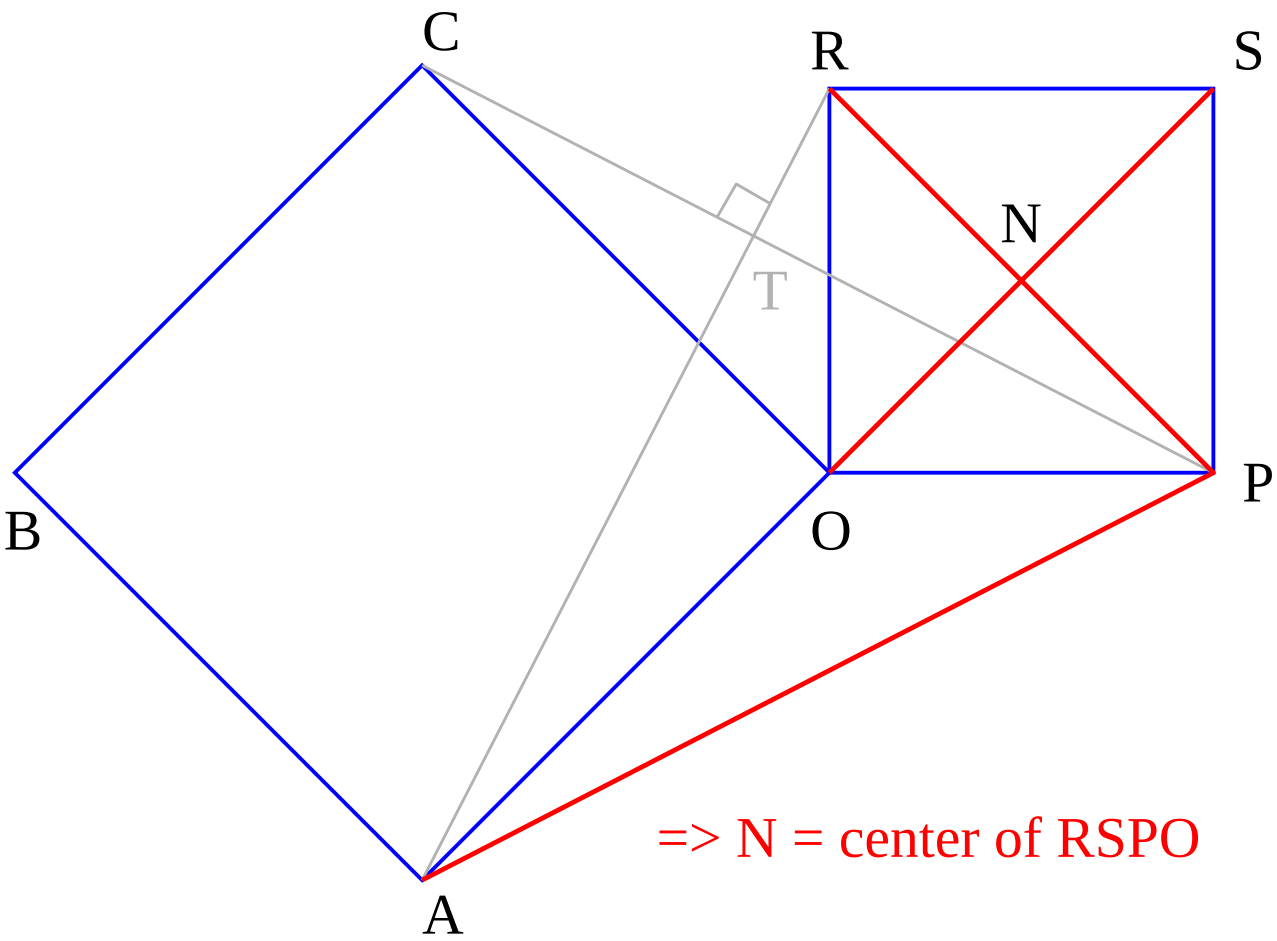
~in circle ABCTO
=> angle: CTA = COA
= 90 degrees



~proved:

~ CP = RA

~ angle CTR = 90 degree
=> RA perendicular to CP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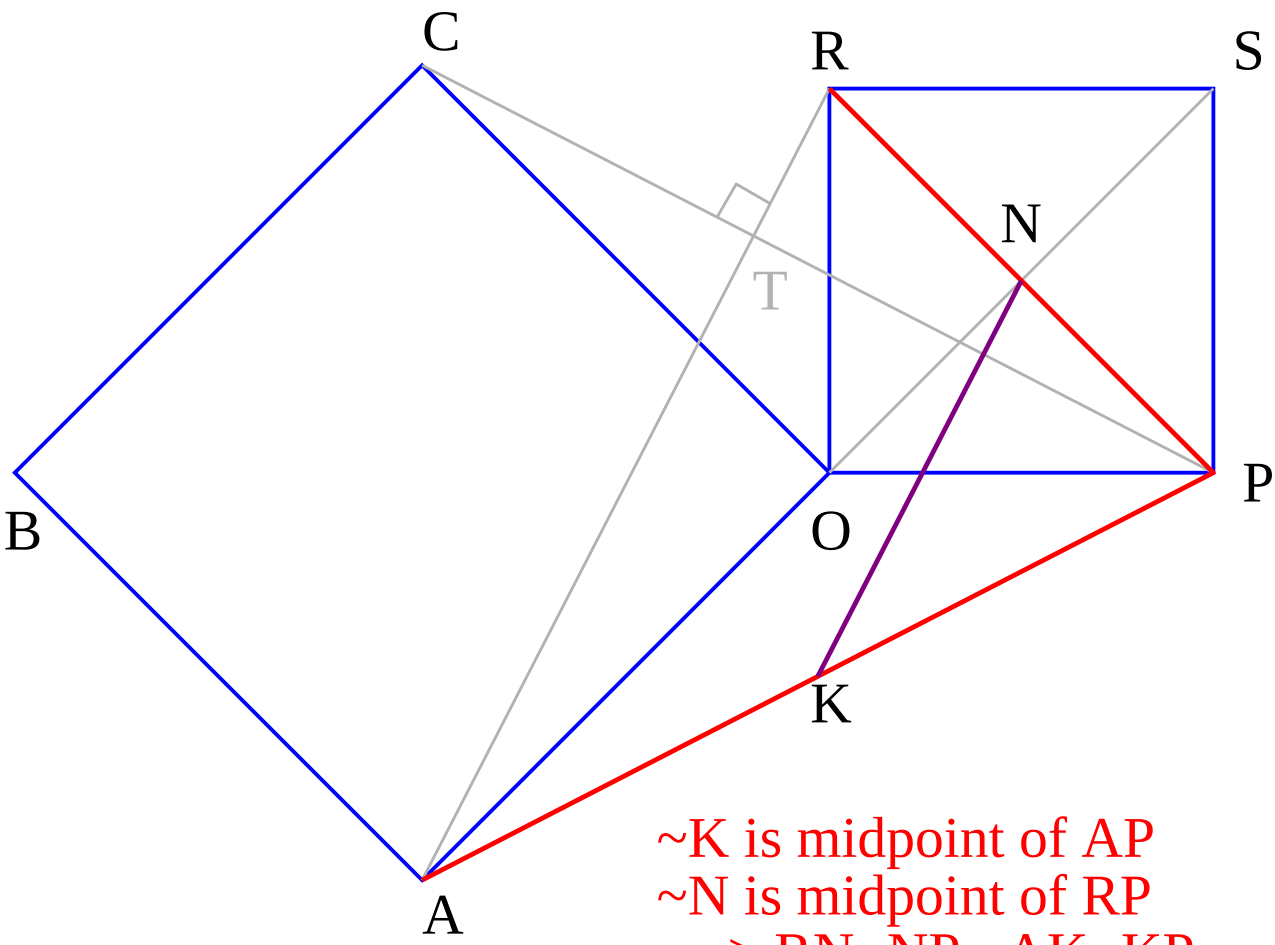
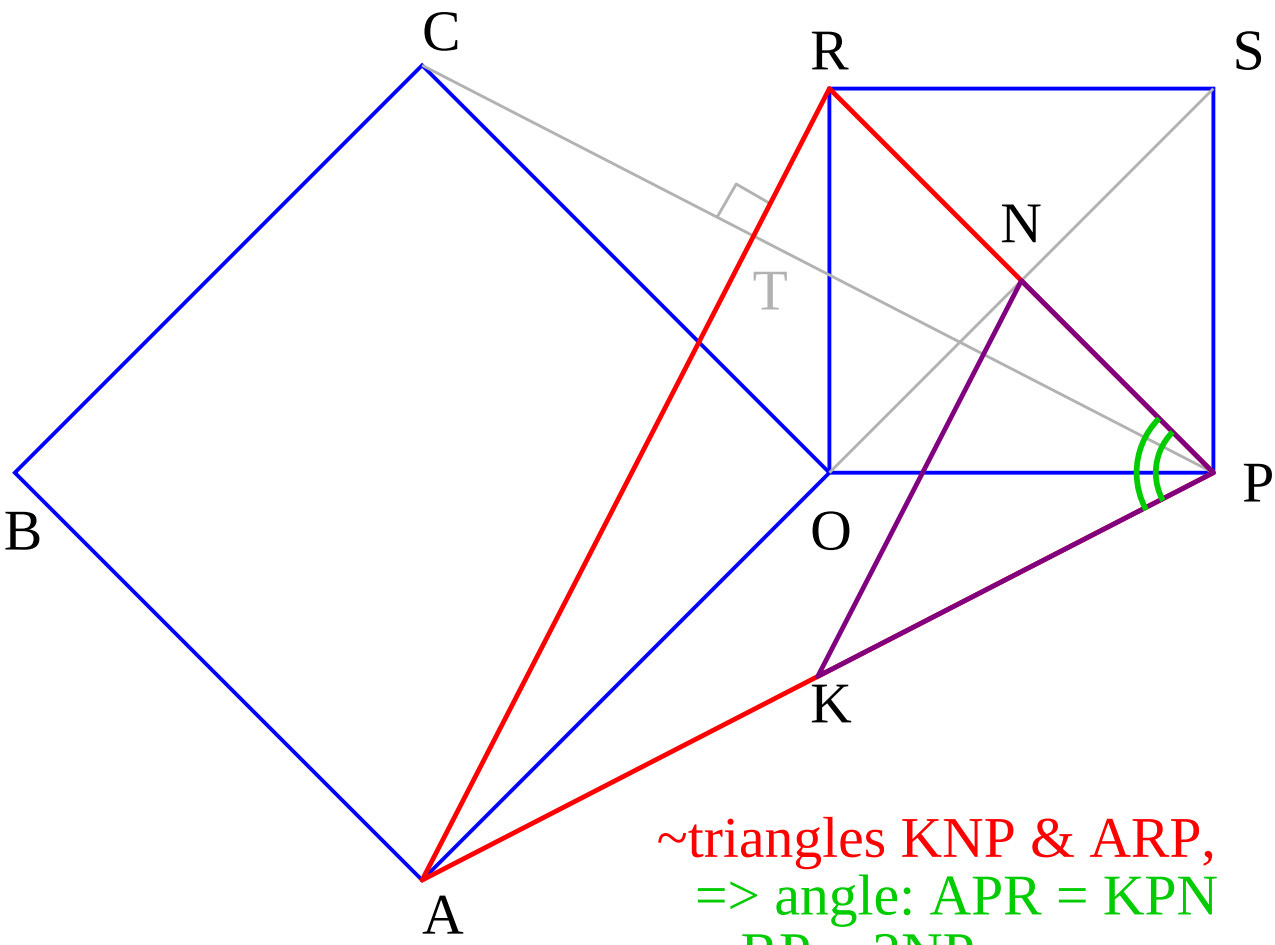
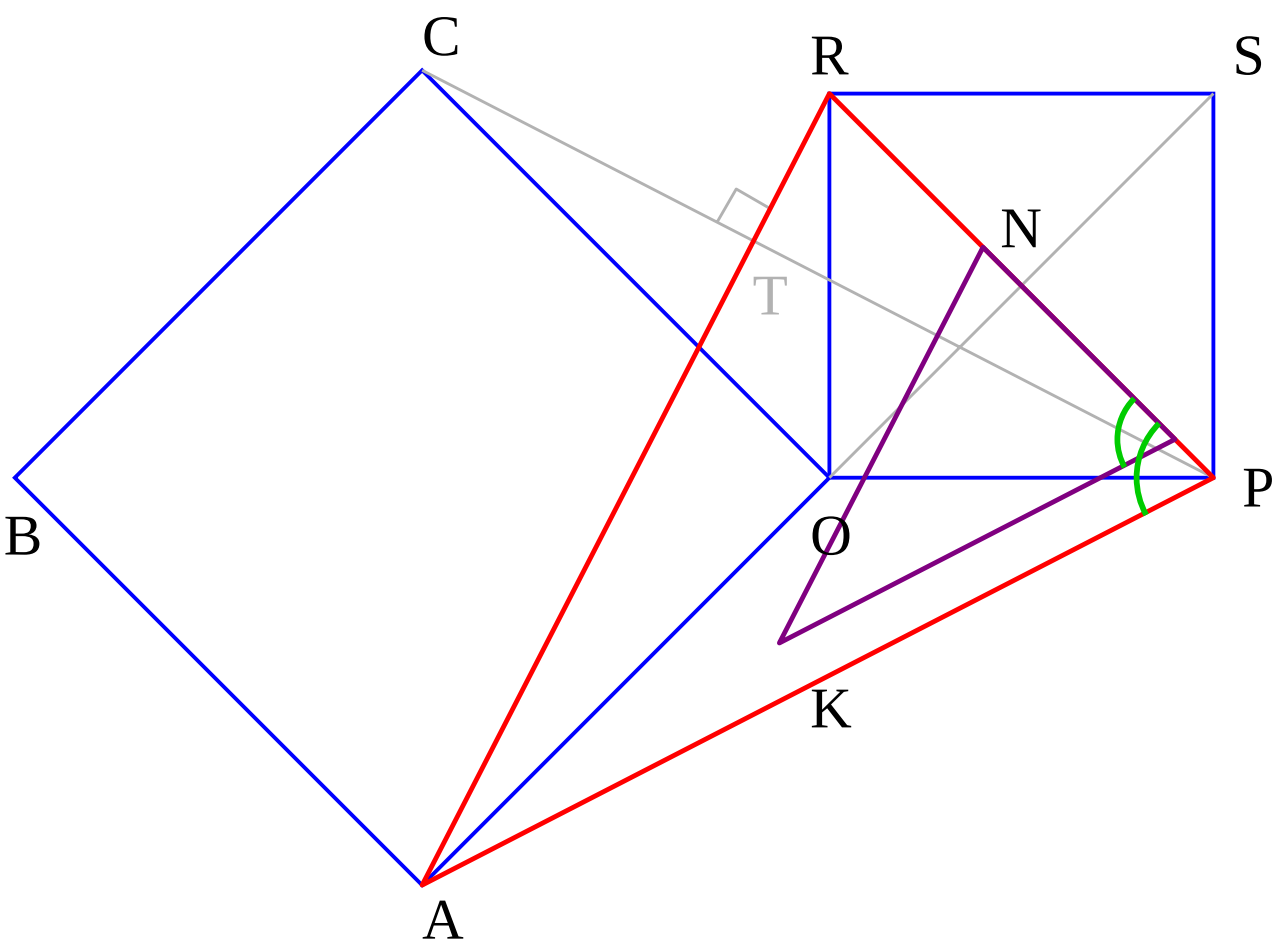
=> N = center of RSPO



~K is midpoint of AP
~N is midpoint of RP
=> RN=NP ; AK=KP



~triangles KNP & ARP,
=> angle: APR = KPN
~ RP = 2NP
~ AP = 2KP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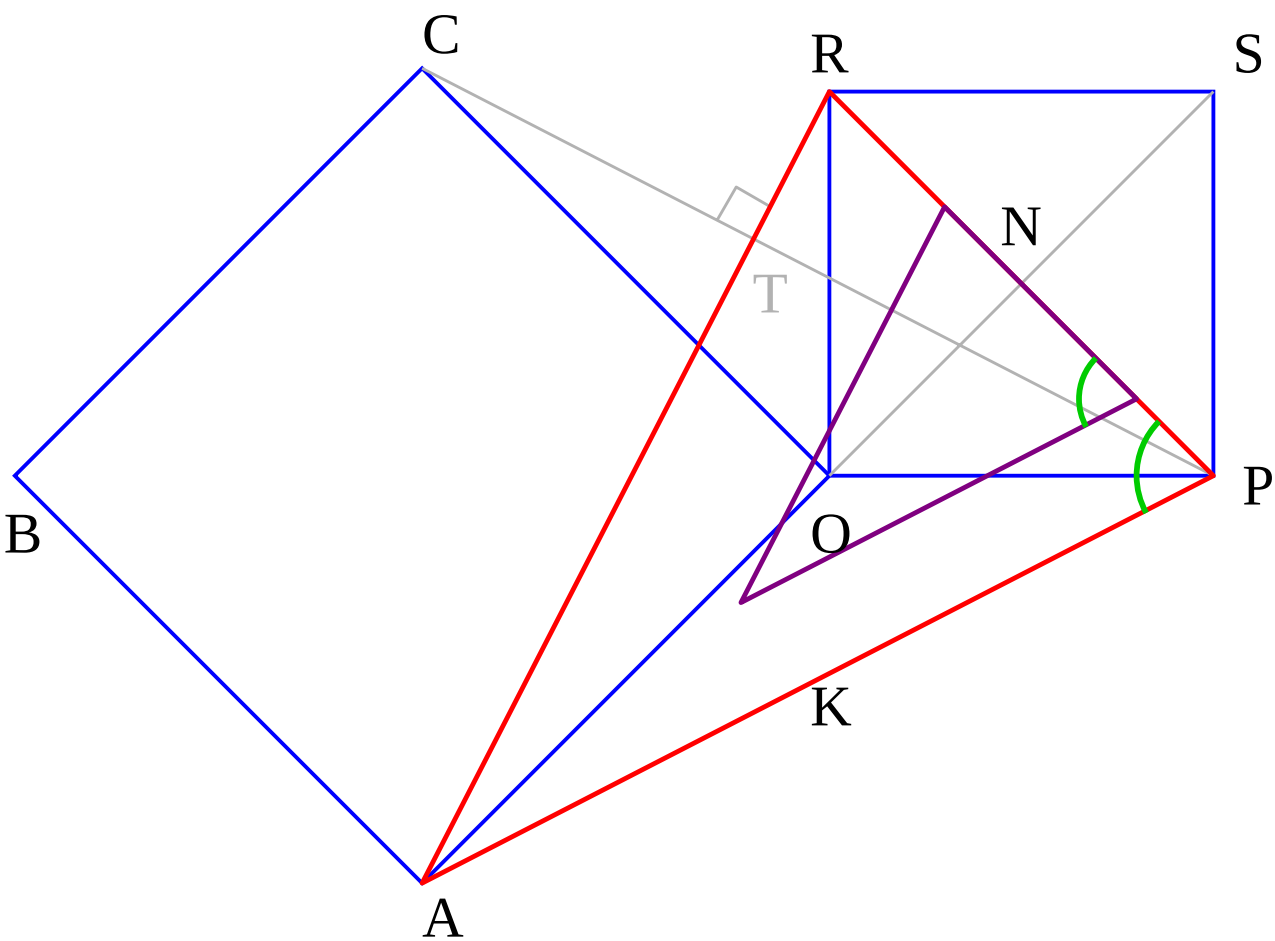
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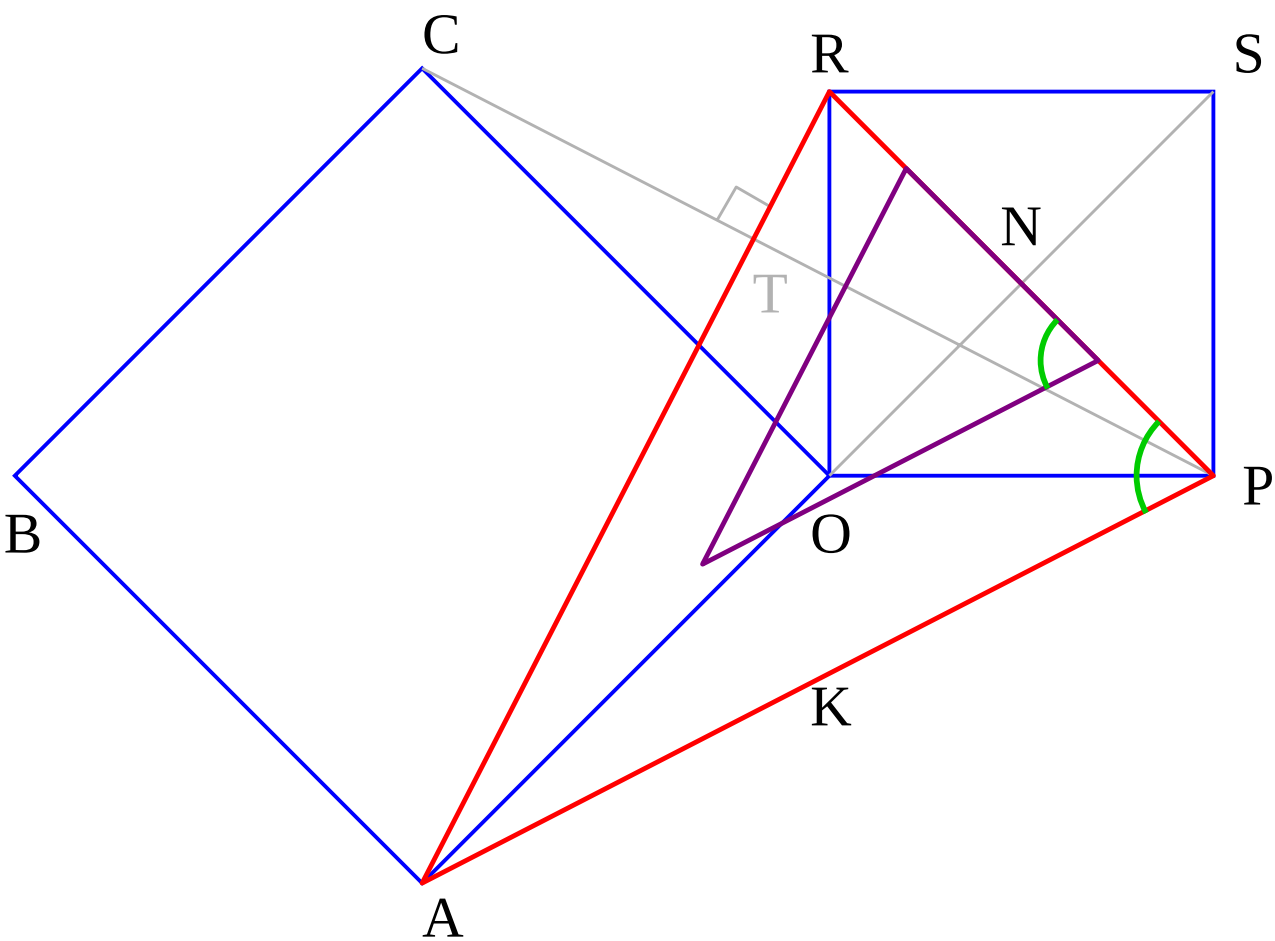
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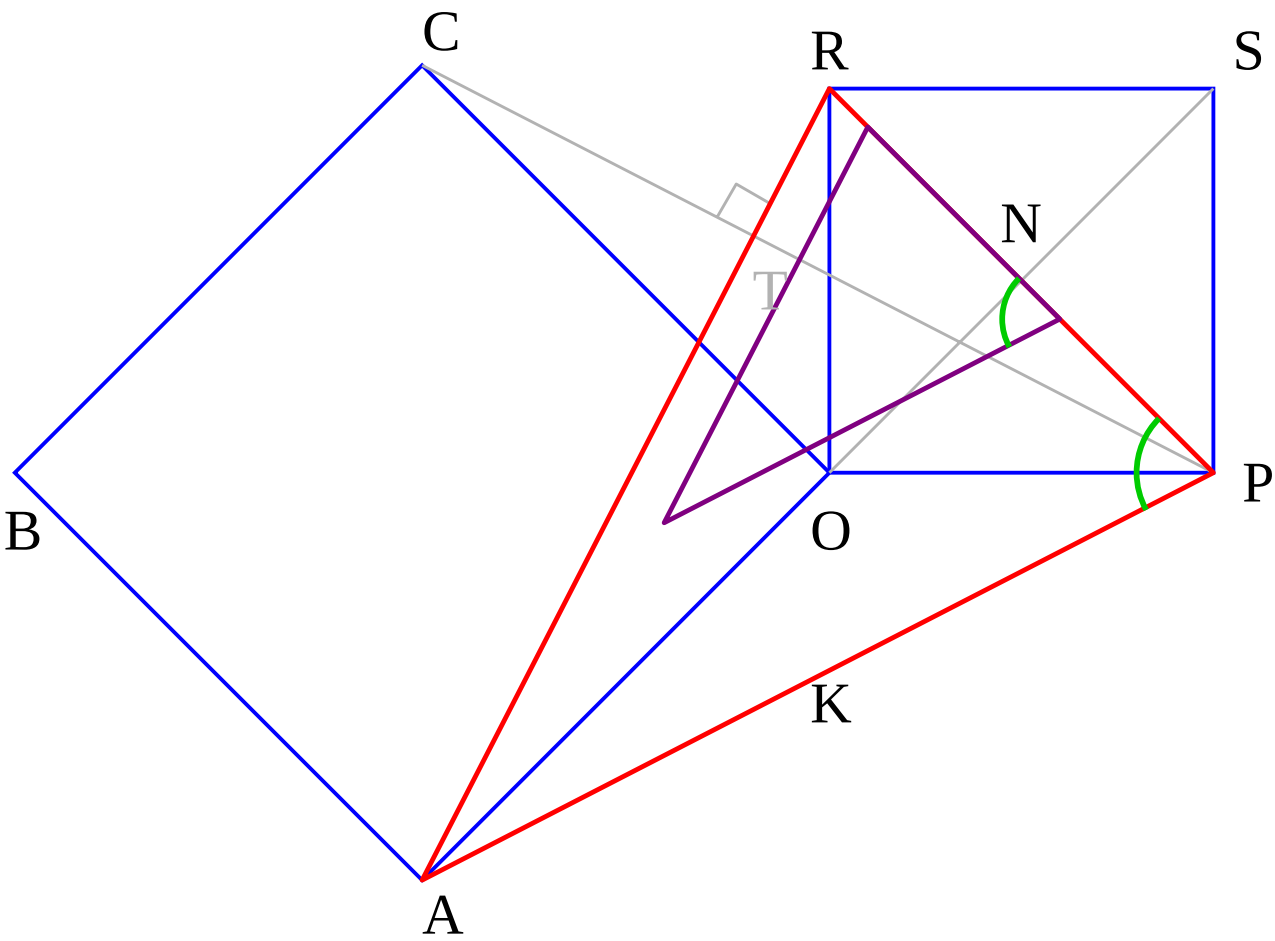
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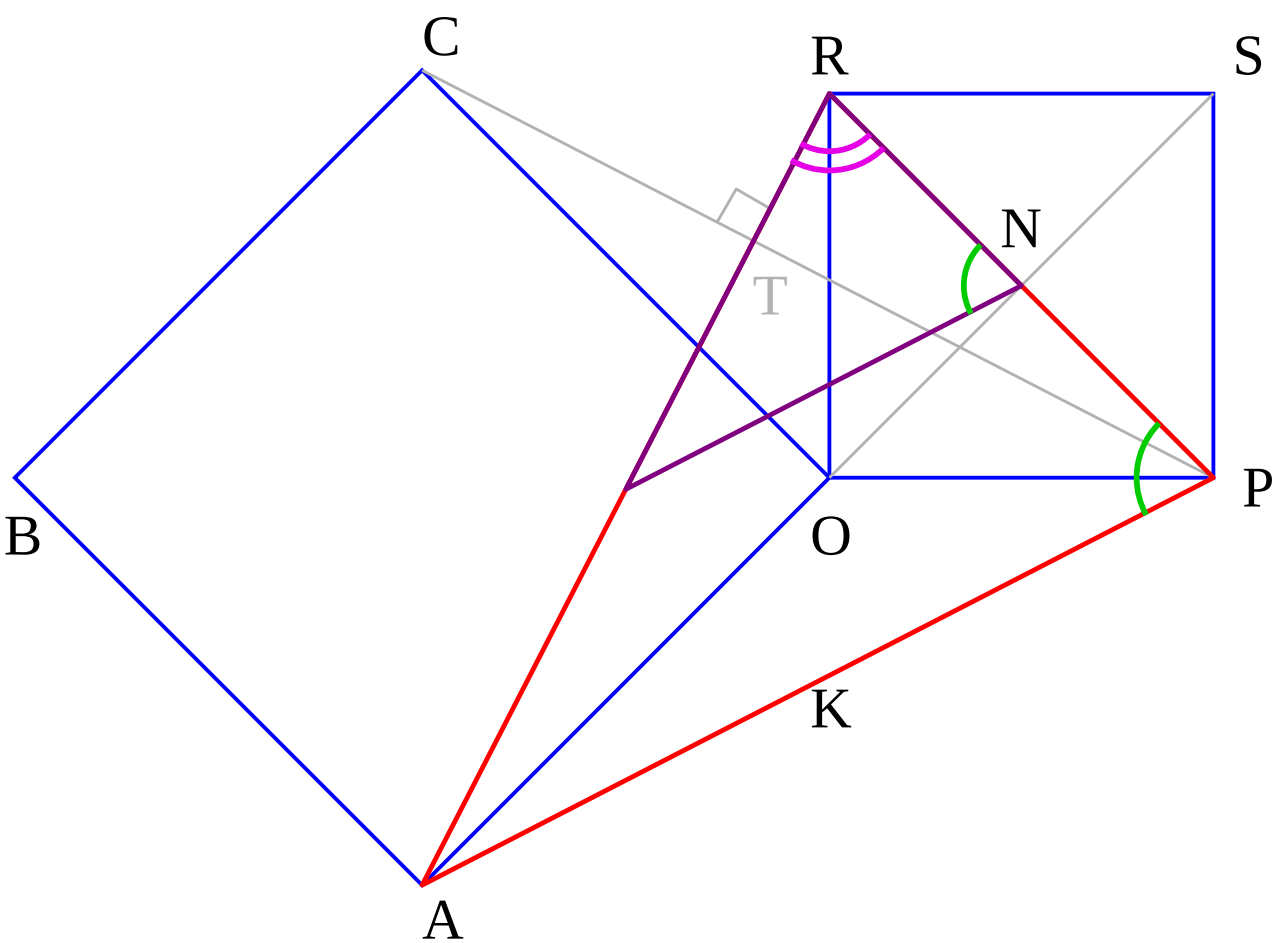
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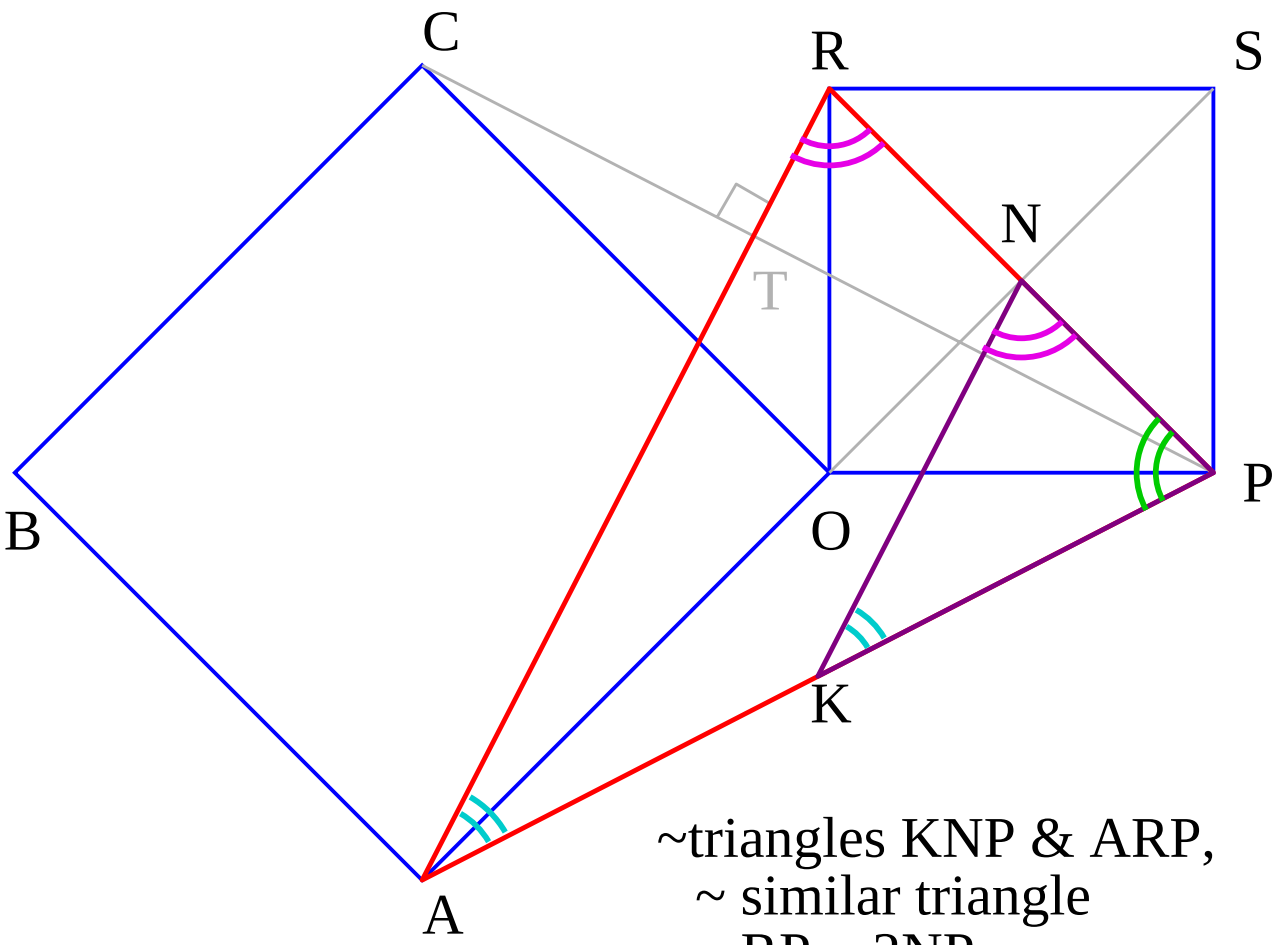
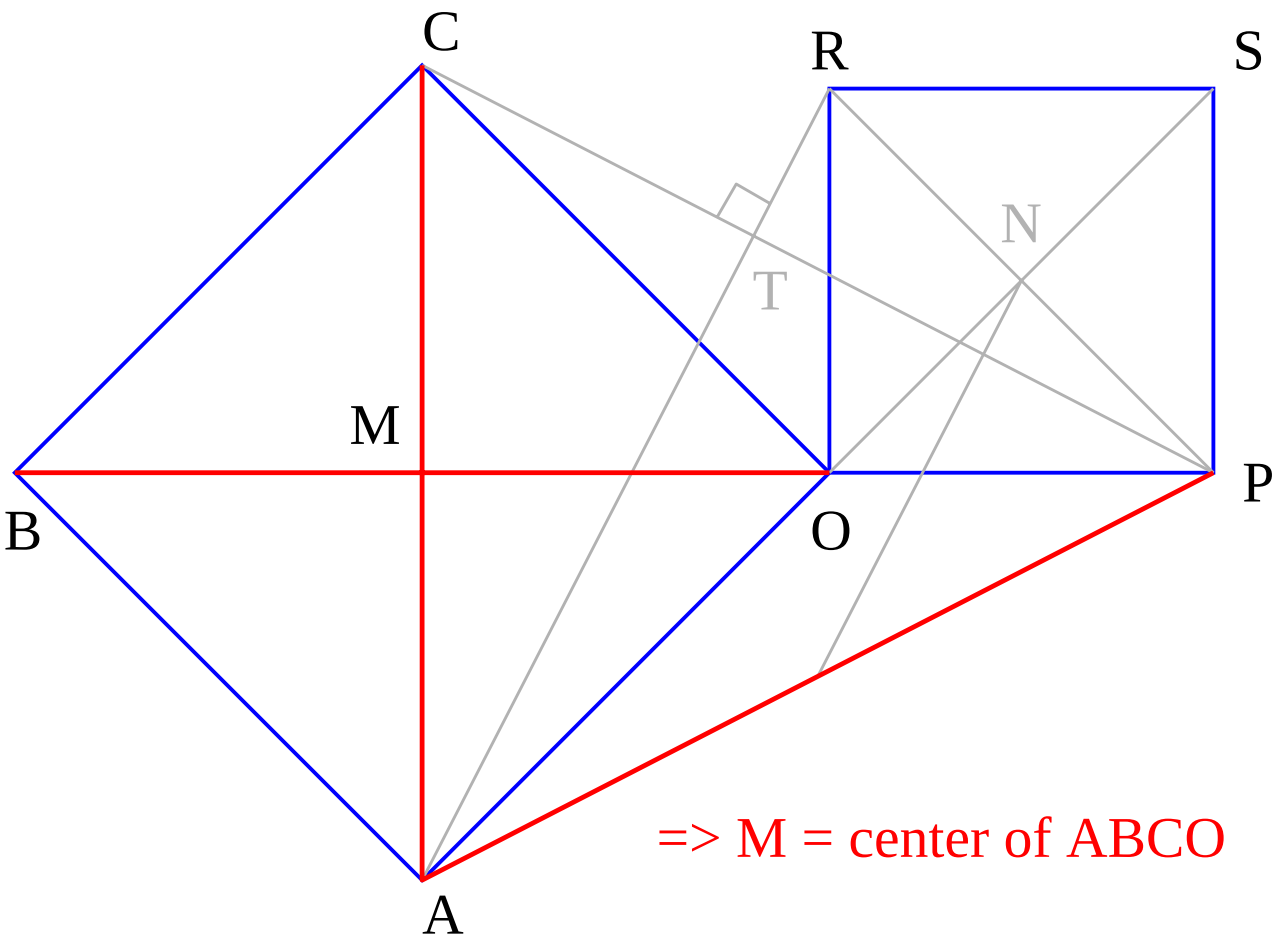


~triangles KNP & ARP,
~ similar triangle
~ RP = 2NP
~ AP = 2KP

=> RA = 2NK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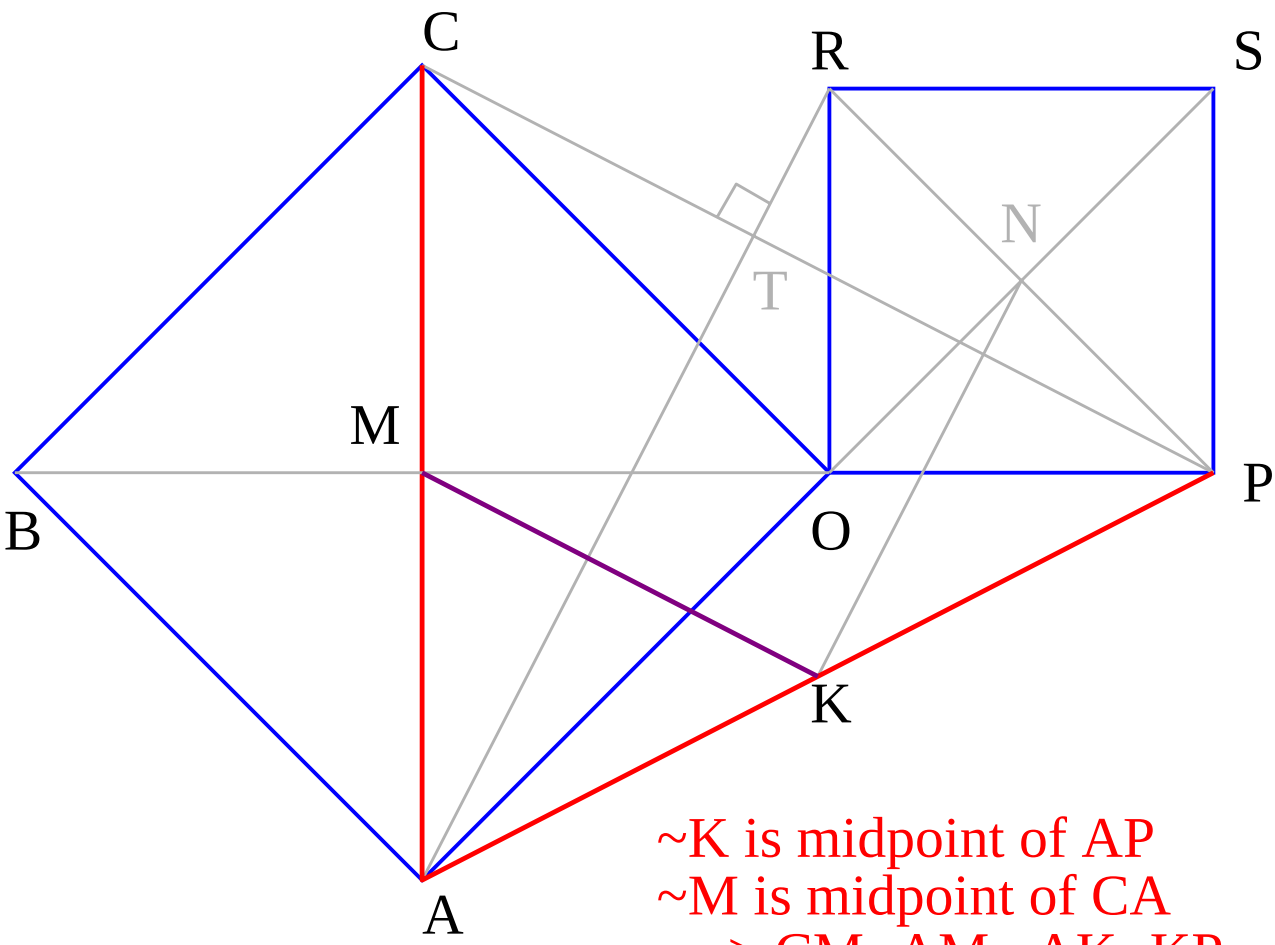
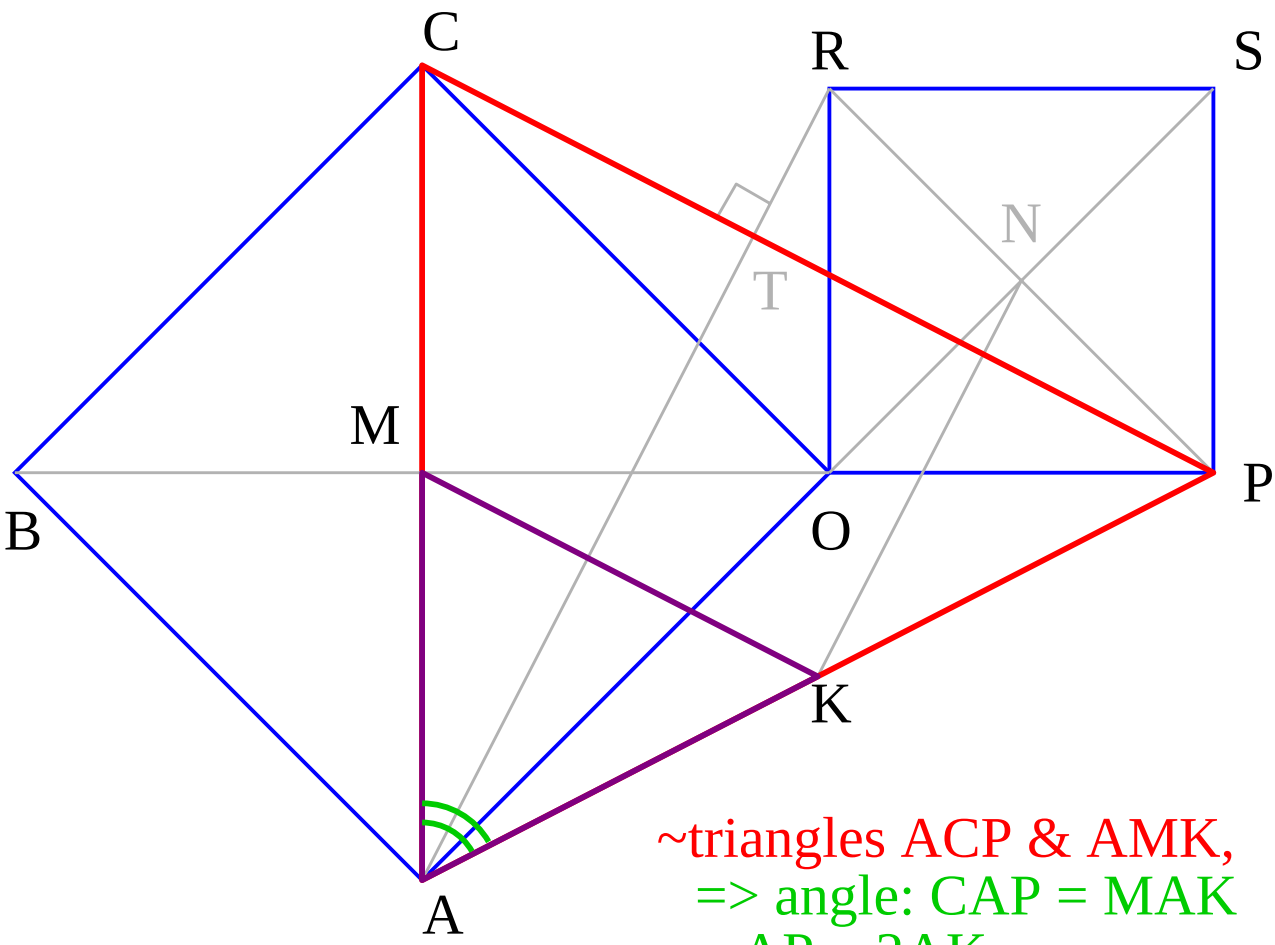
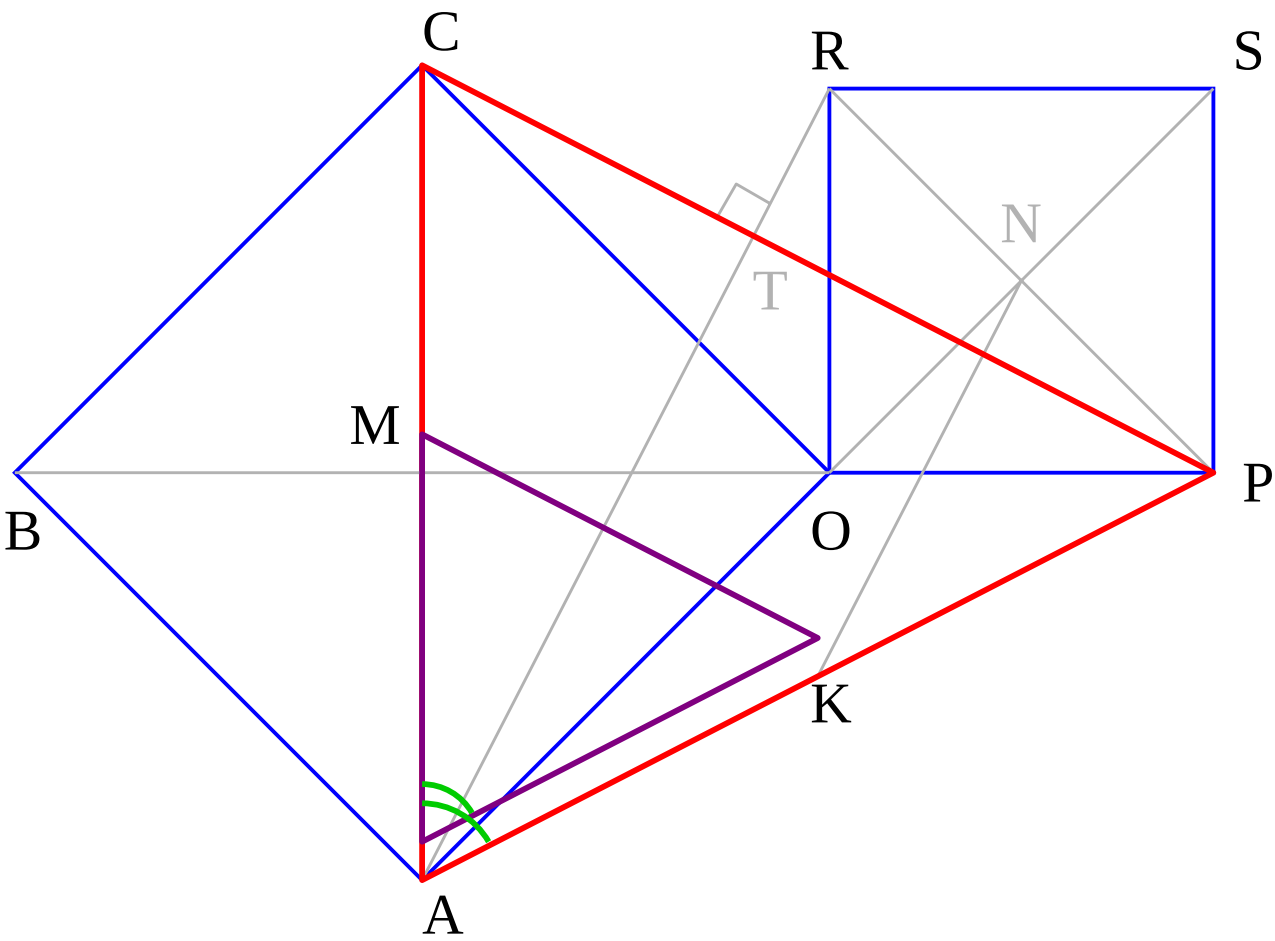
=> M = center of ABCO



~K is midpoint of AP
~M is midpoint of CA
=> CM=AM ; AK=KP



~triangles ACP & AMK,
=> angle: CAP = MAK
~ AP = 2AK
~ AC = 2AM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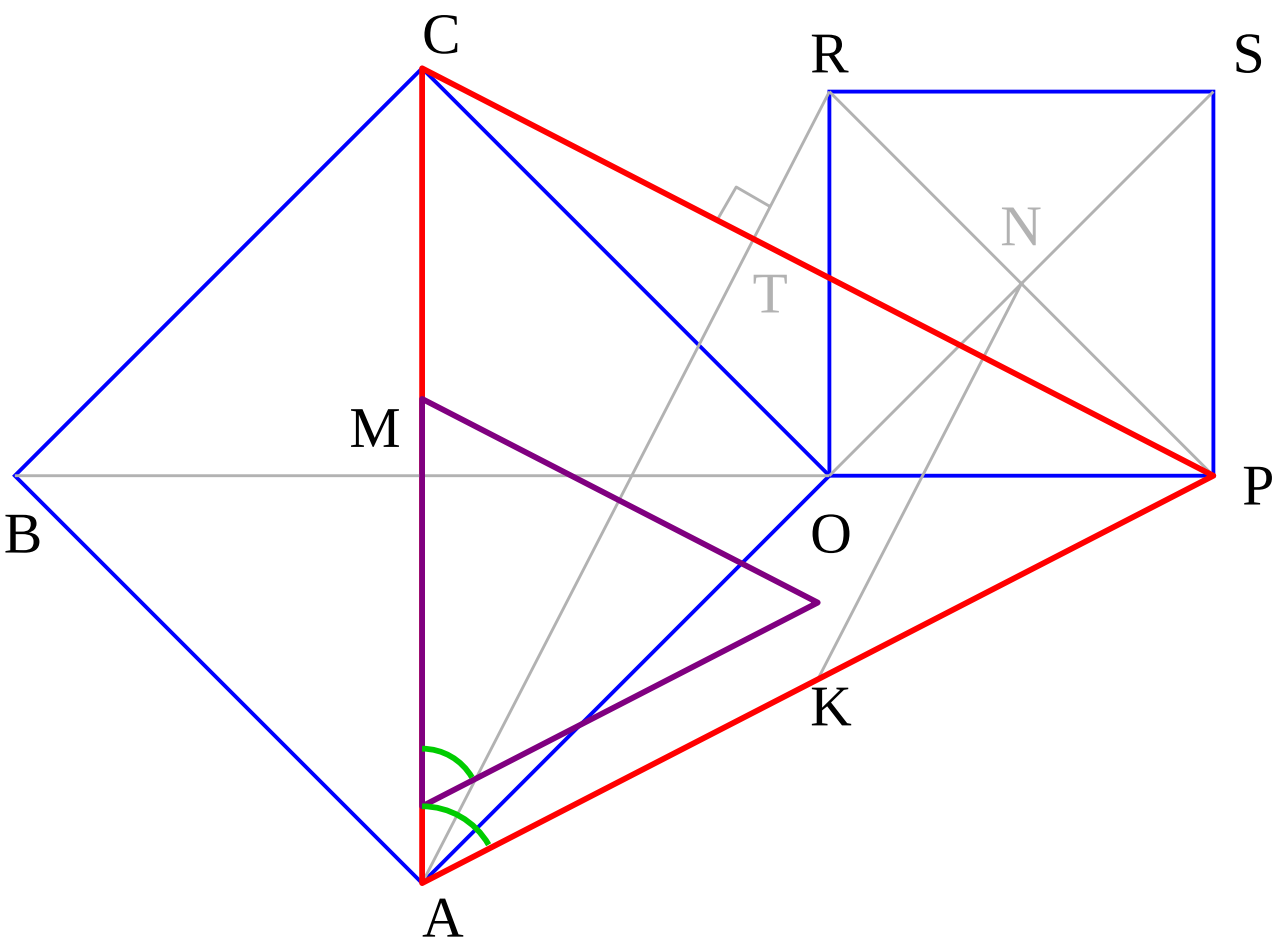
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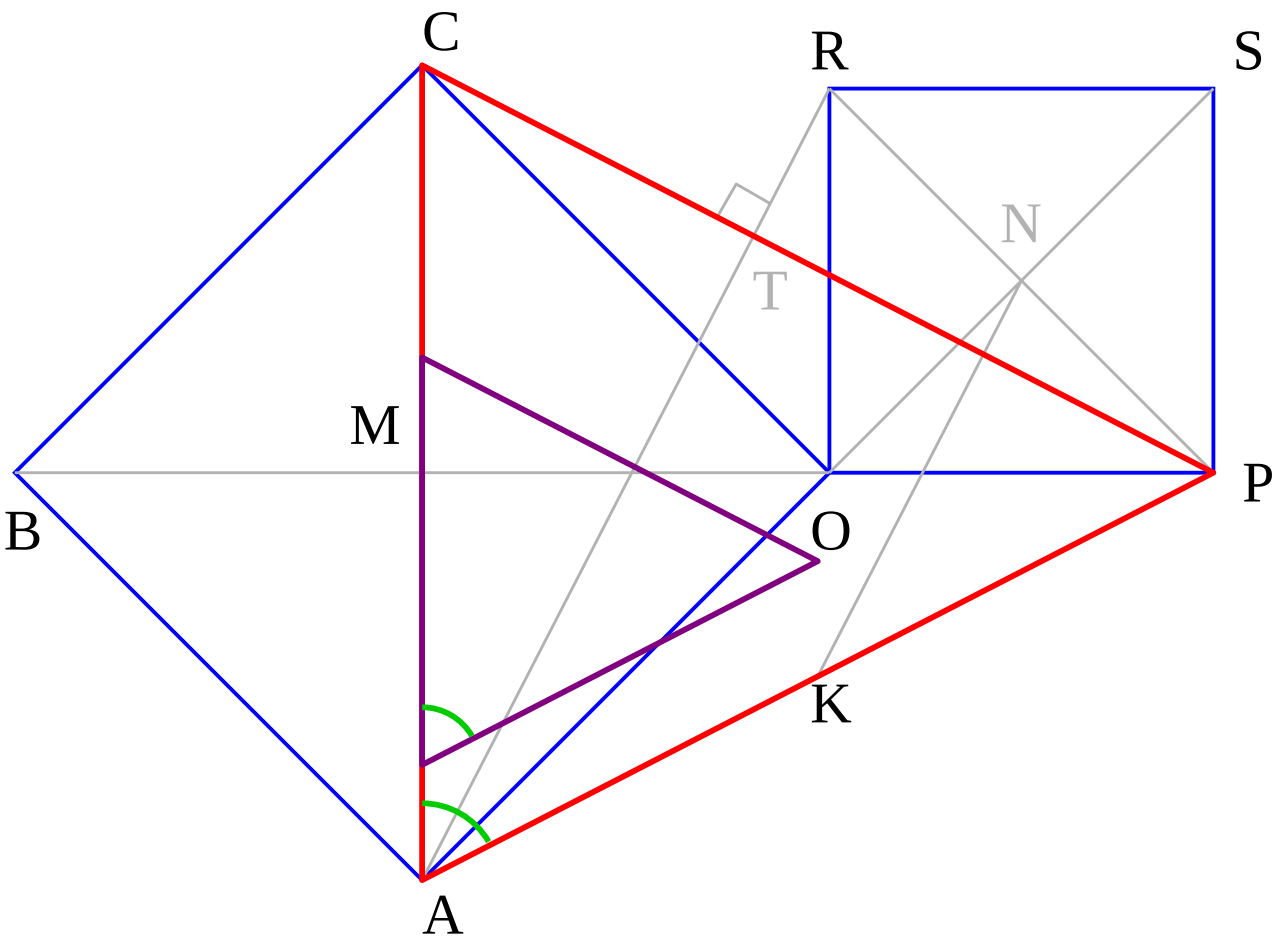
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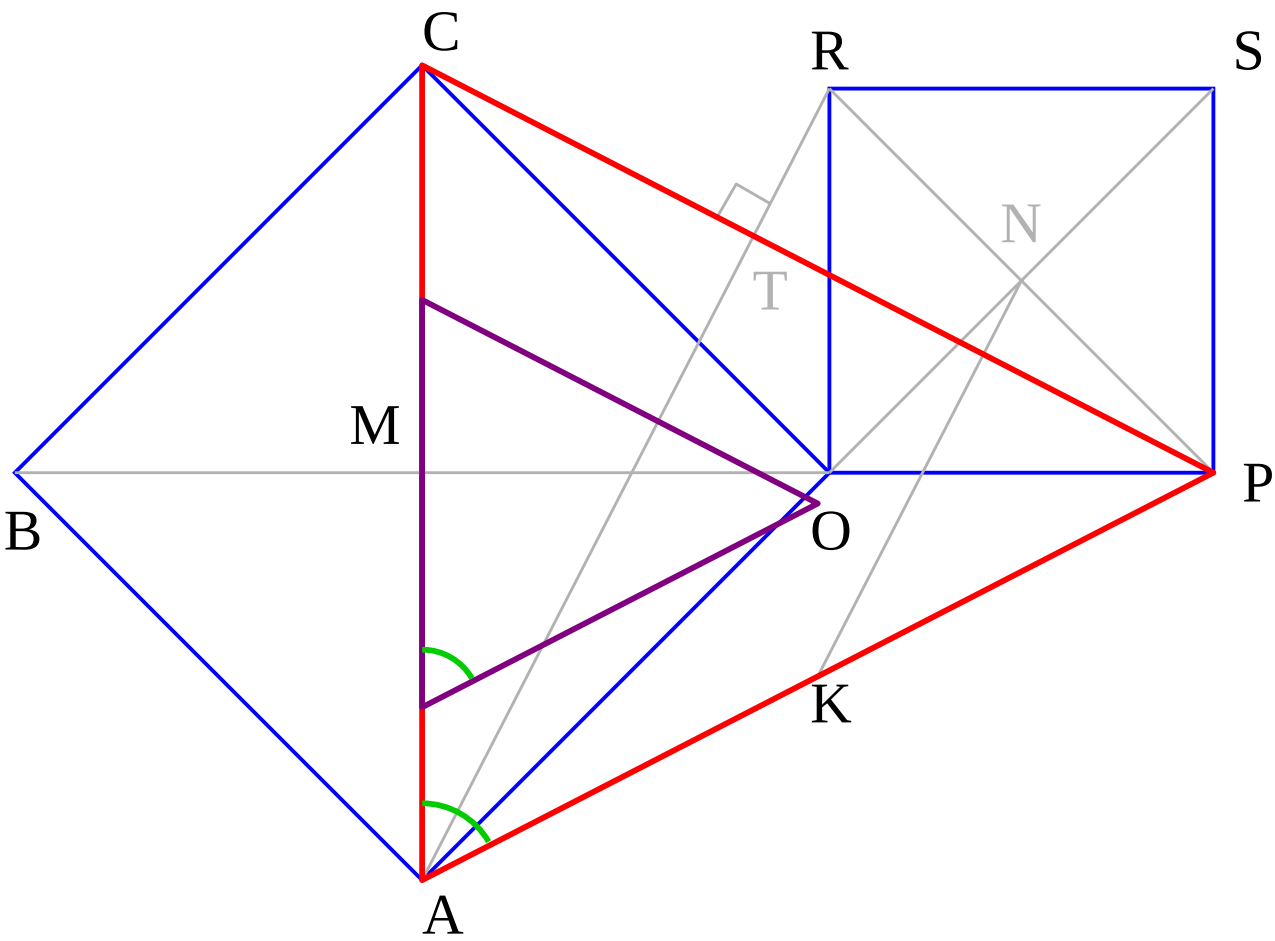
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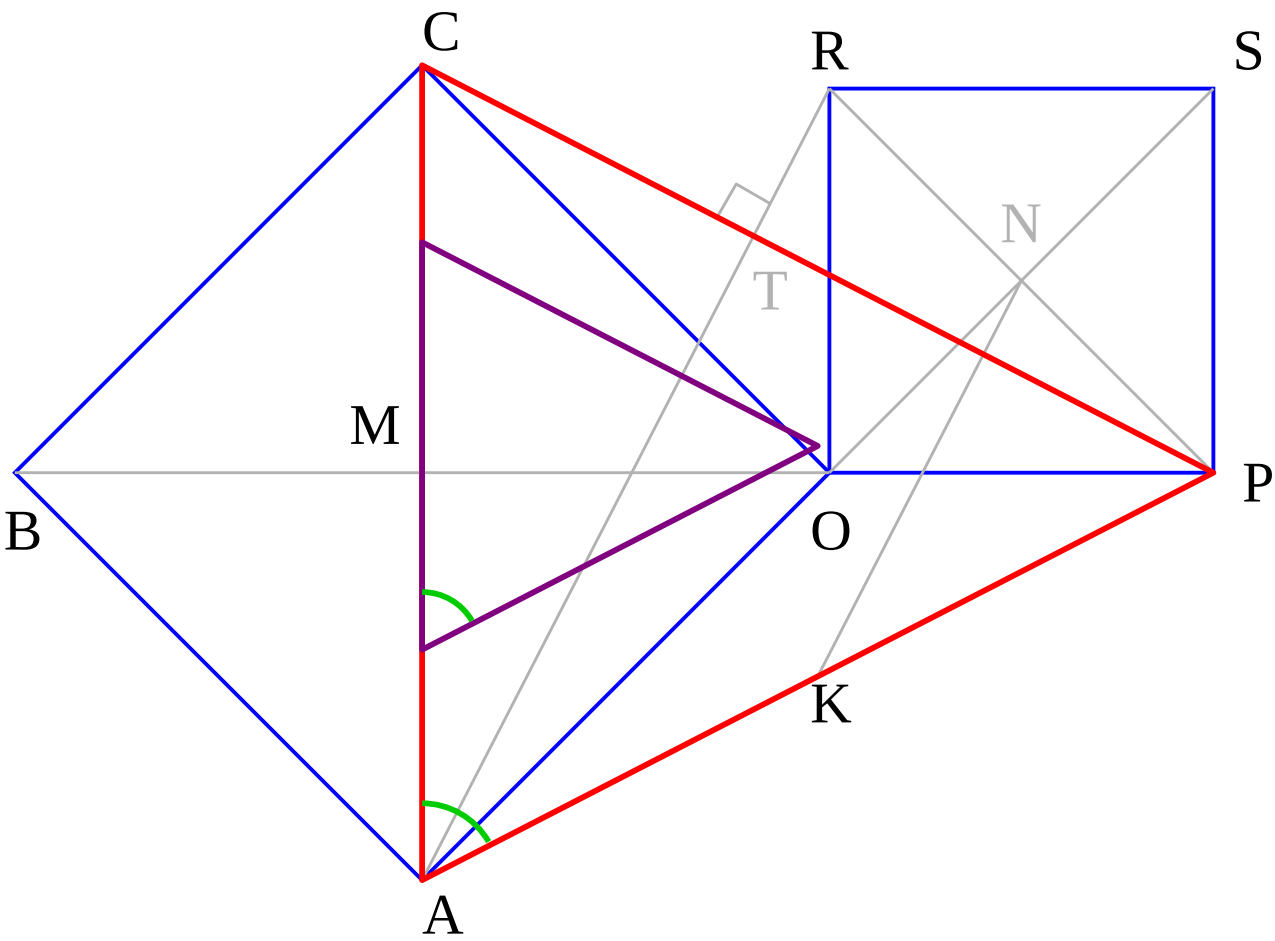
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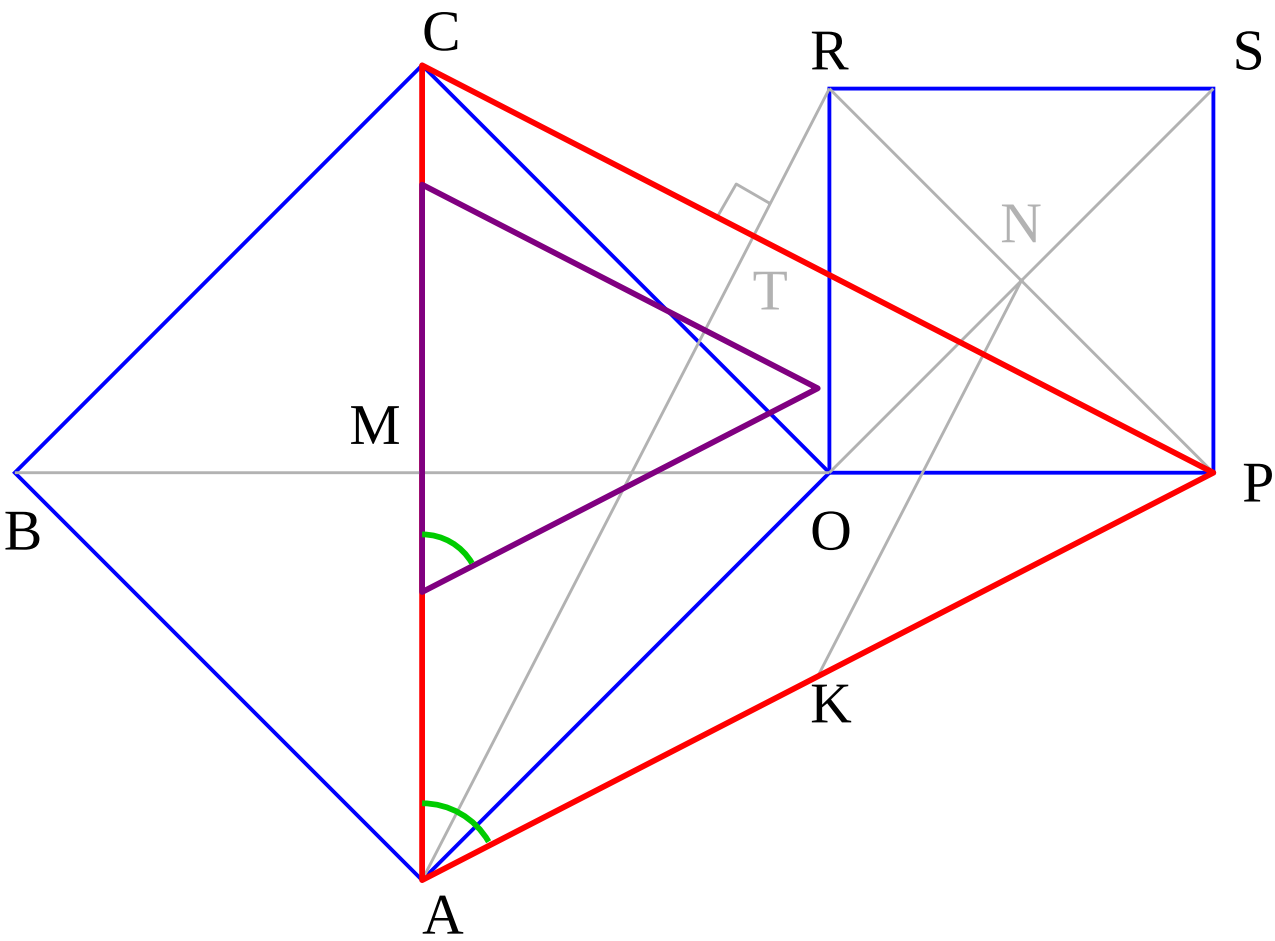
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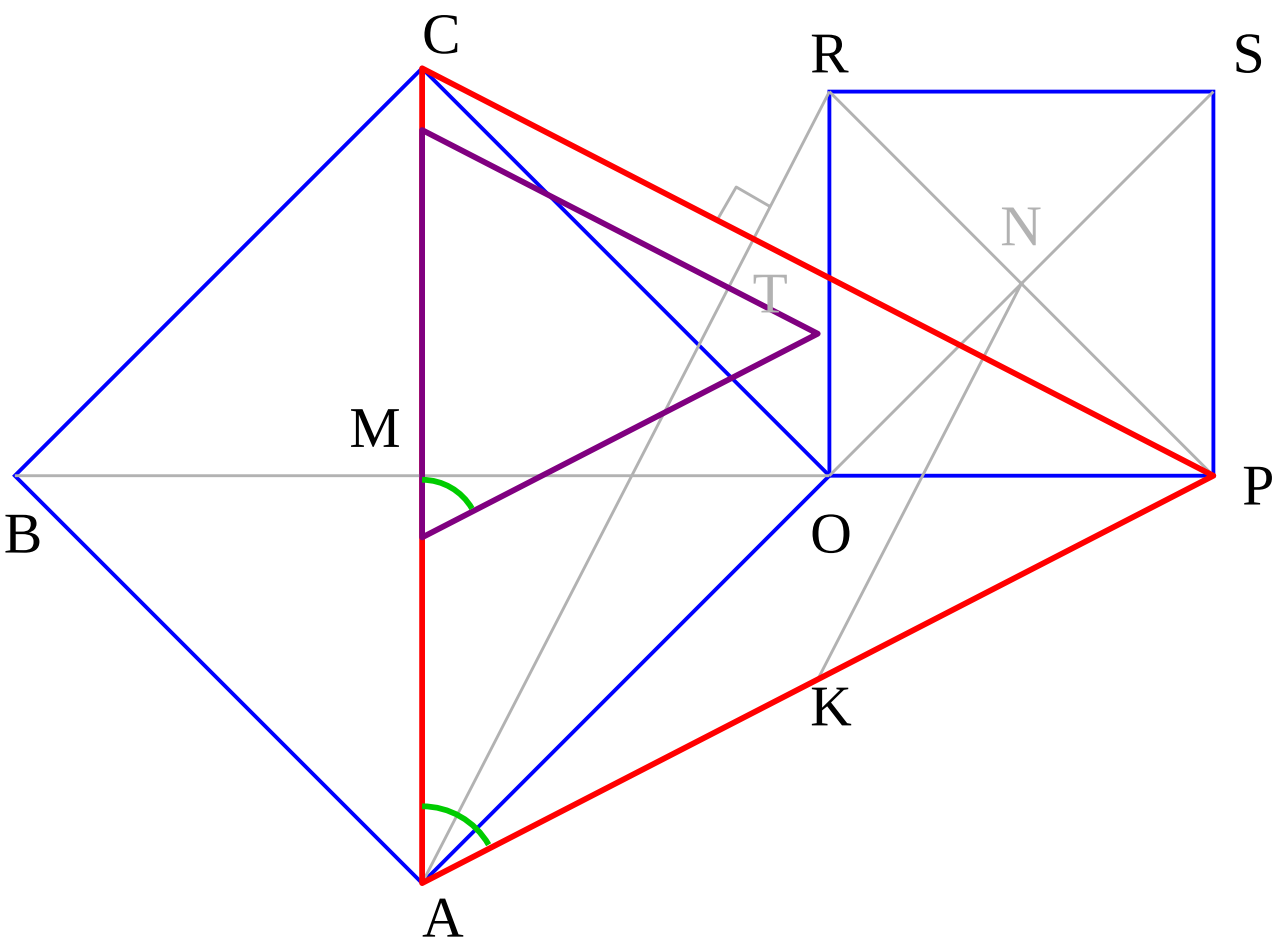
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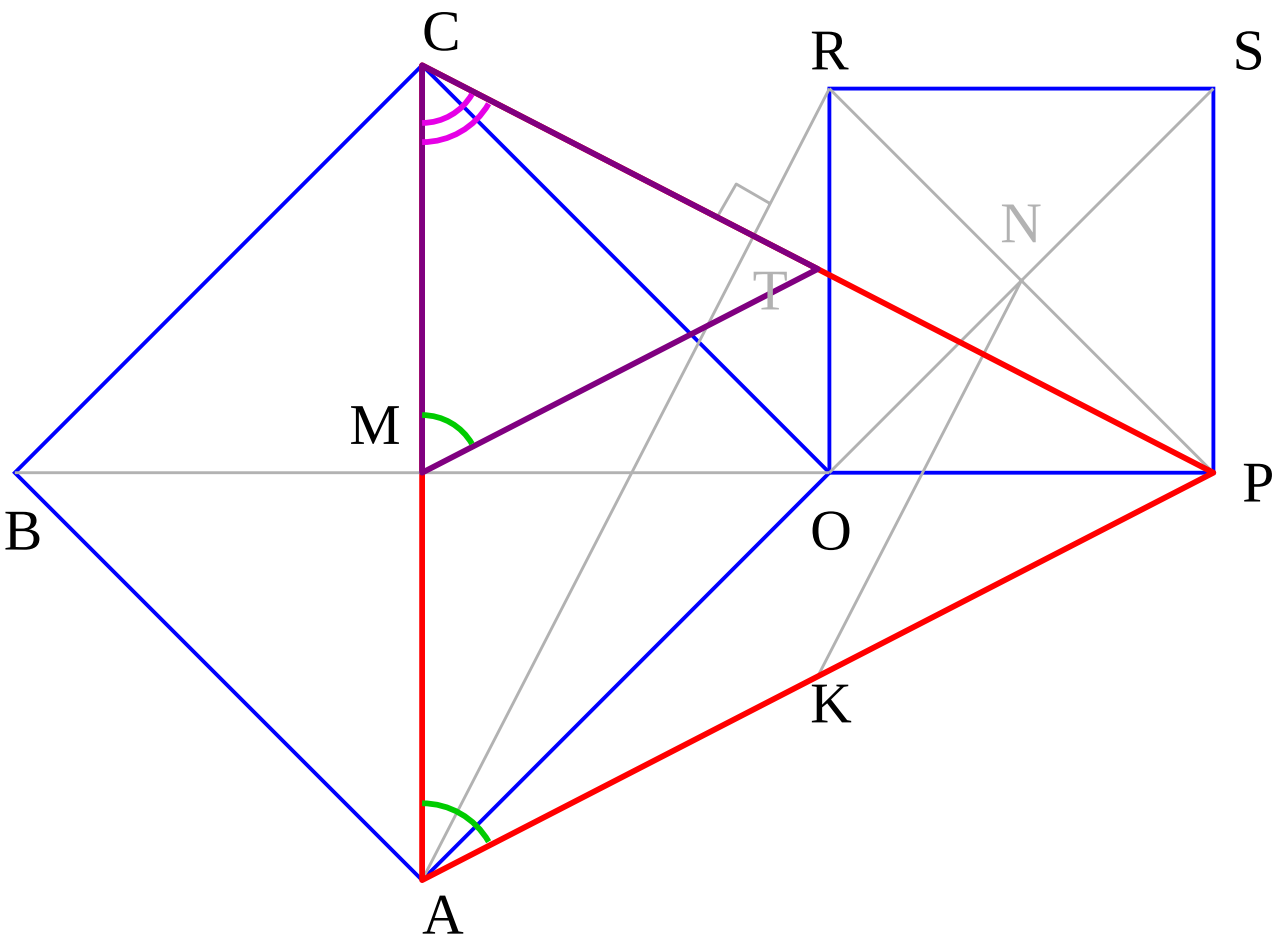
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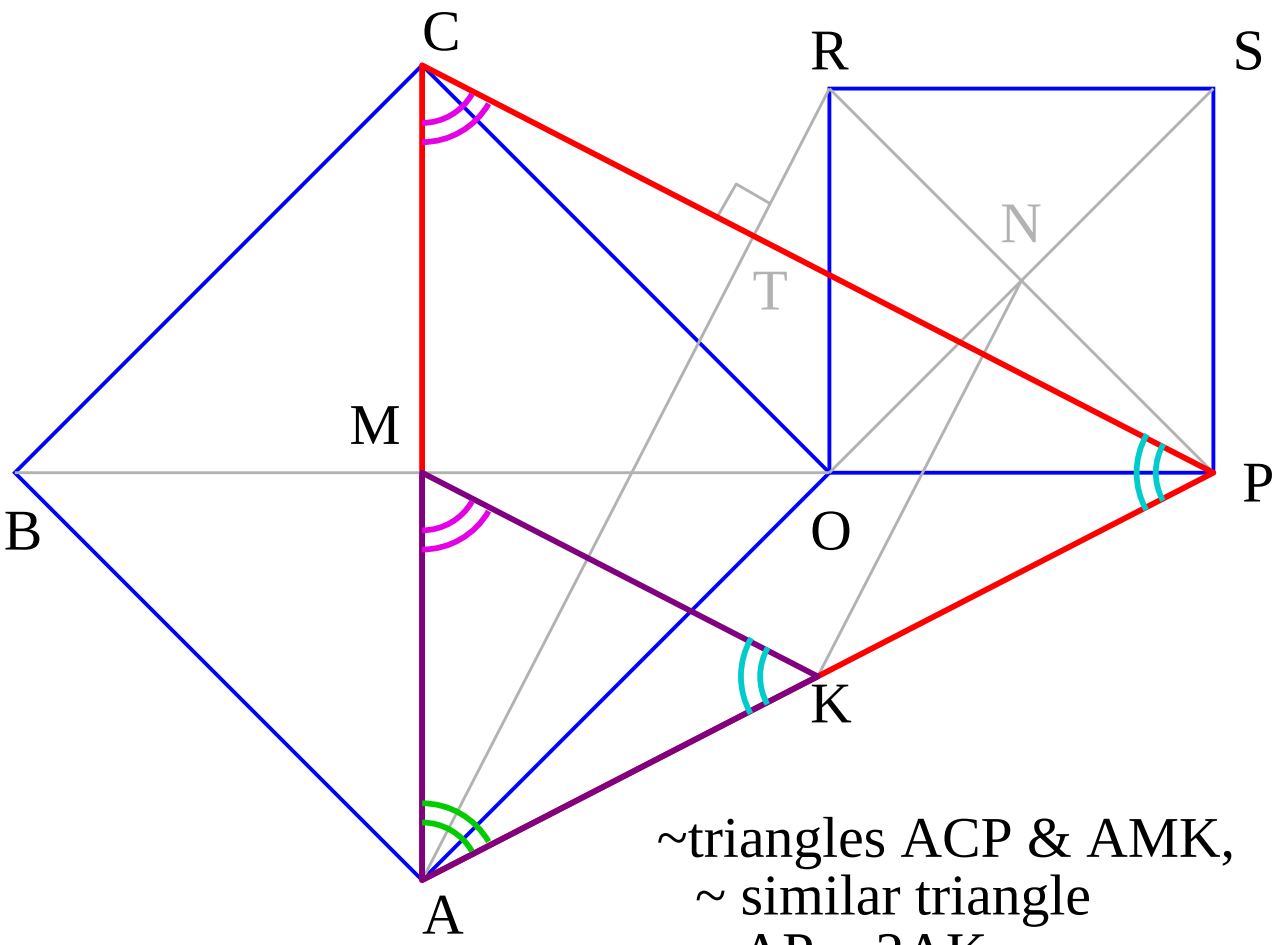
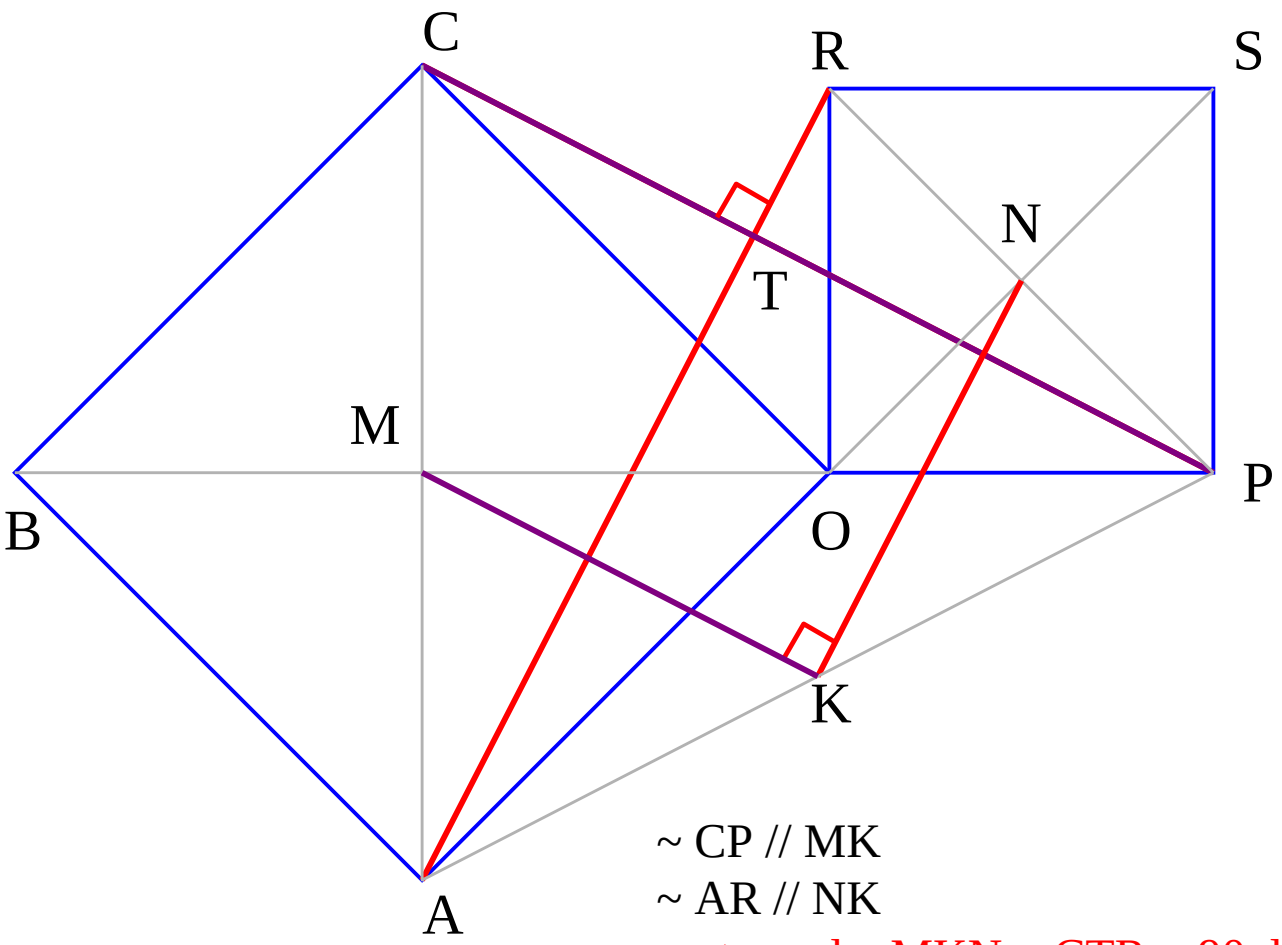


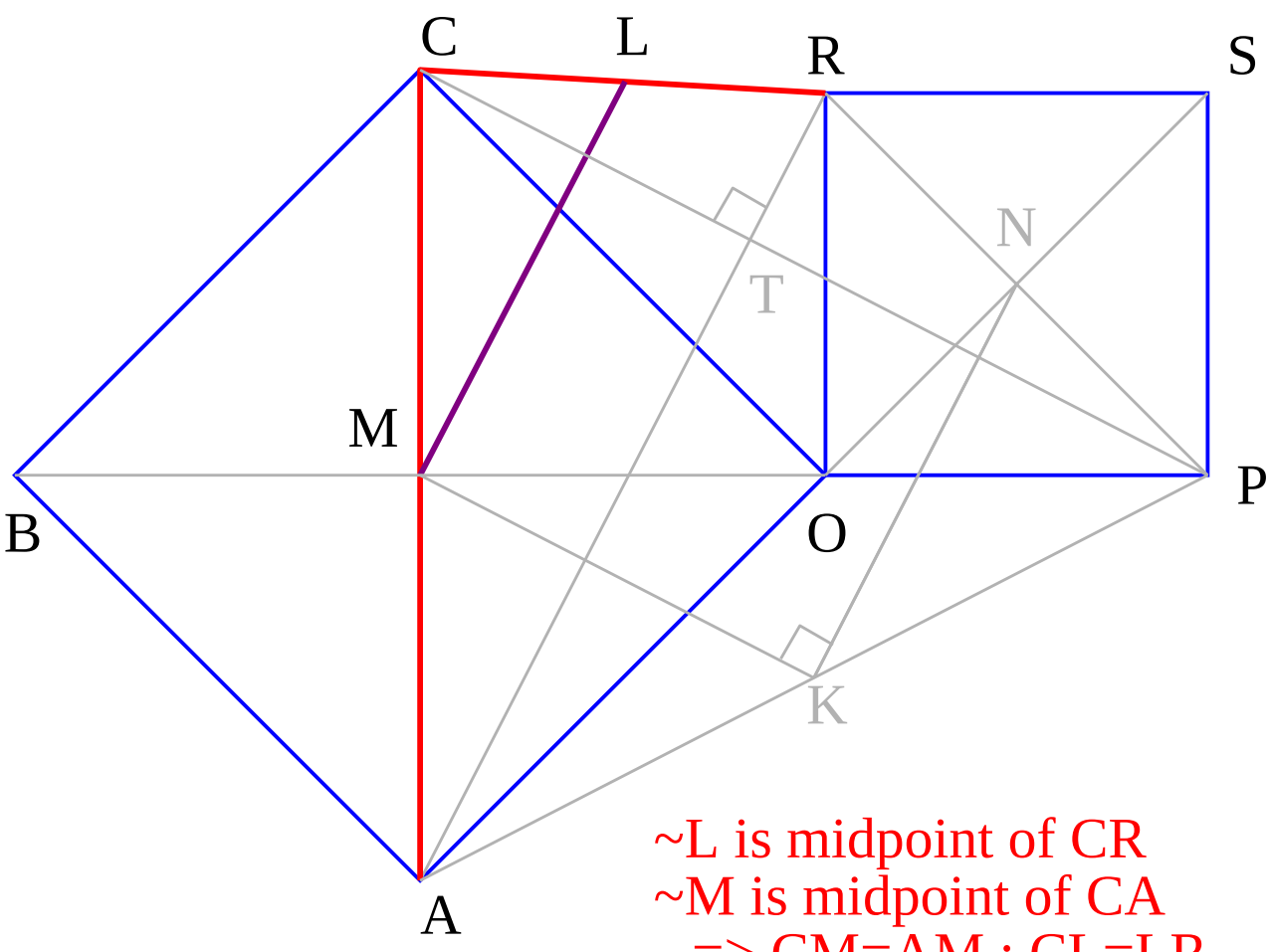
~triangles ACP & AMK,
~ similar triangle
~ AP = 2AK
~ AC = 2AM

=> CP = 2MK

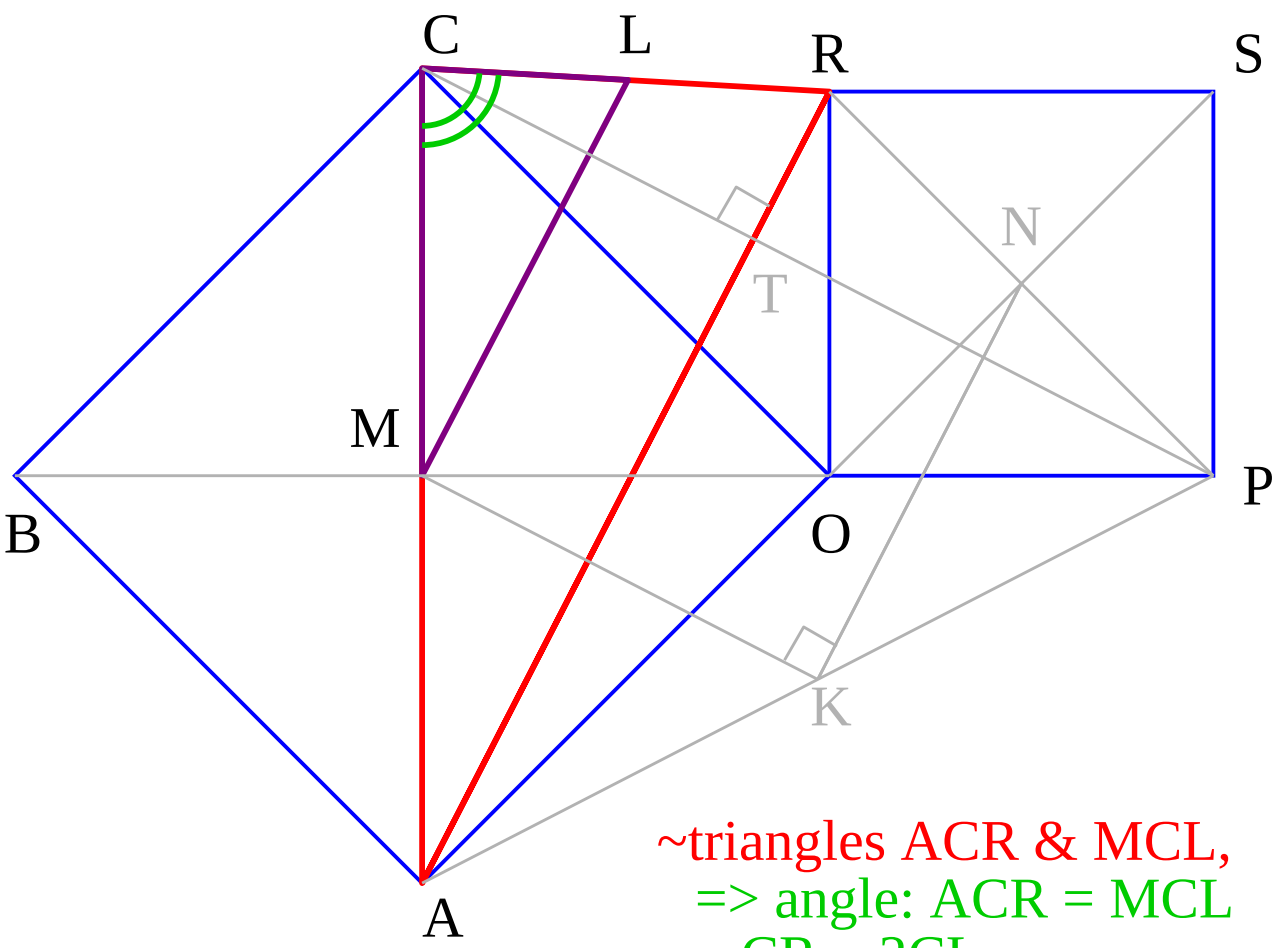


~ CP // MK
~ AR // NK
=> angle: MKN = CTR = 90 degree

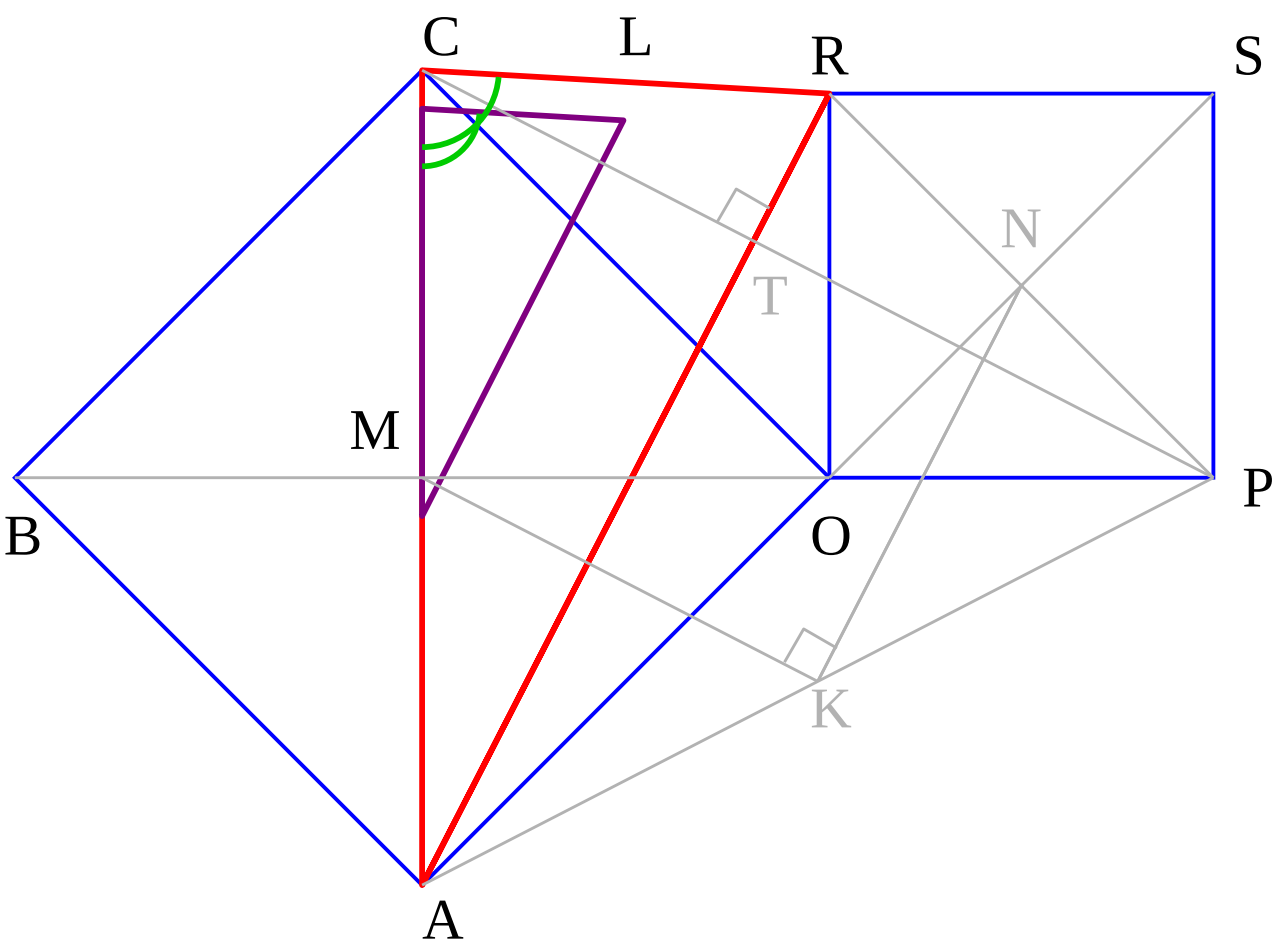
~ CP = AR
=> MK=(1/2)CP=(1/2)AR=KN
=> MK = KN



~L is midpoint of CR
~M is midpoint of CA
=> CM=AM ; CL=LR



~triangles ACR & MCL,
=> angle: ACR = MCL
~ CR = 2CL
~ AC = 2CM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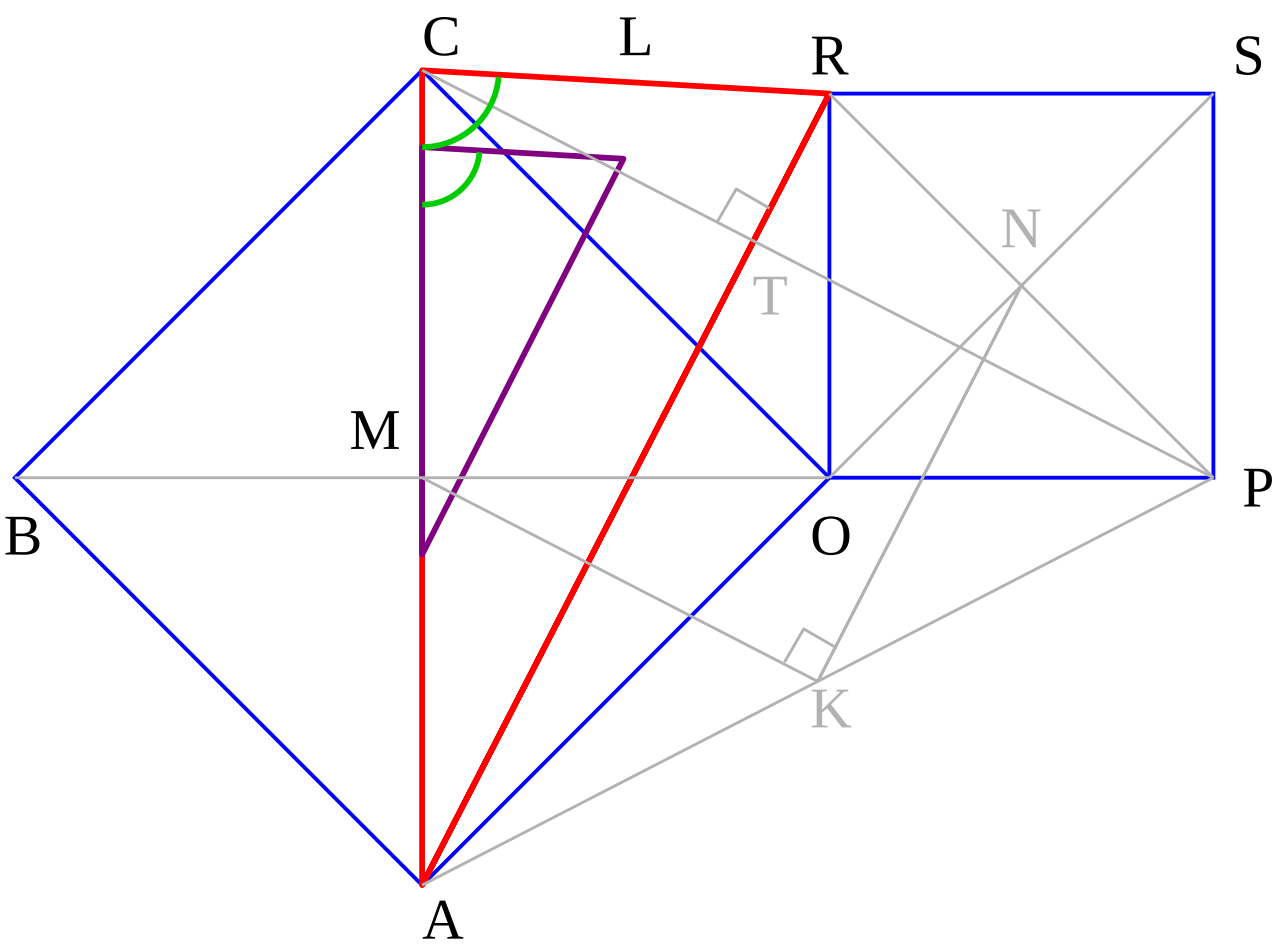
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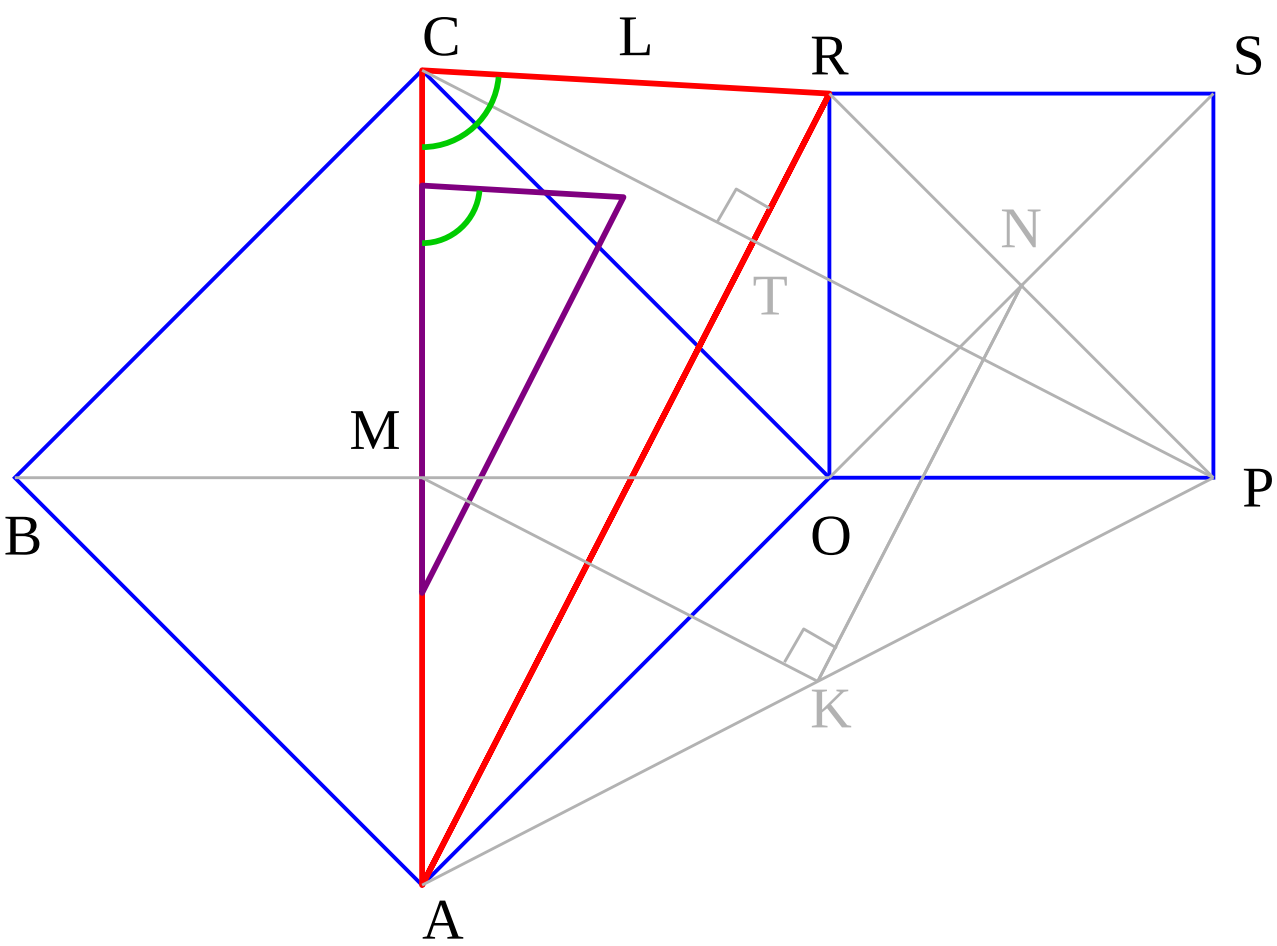
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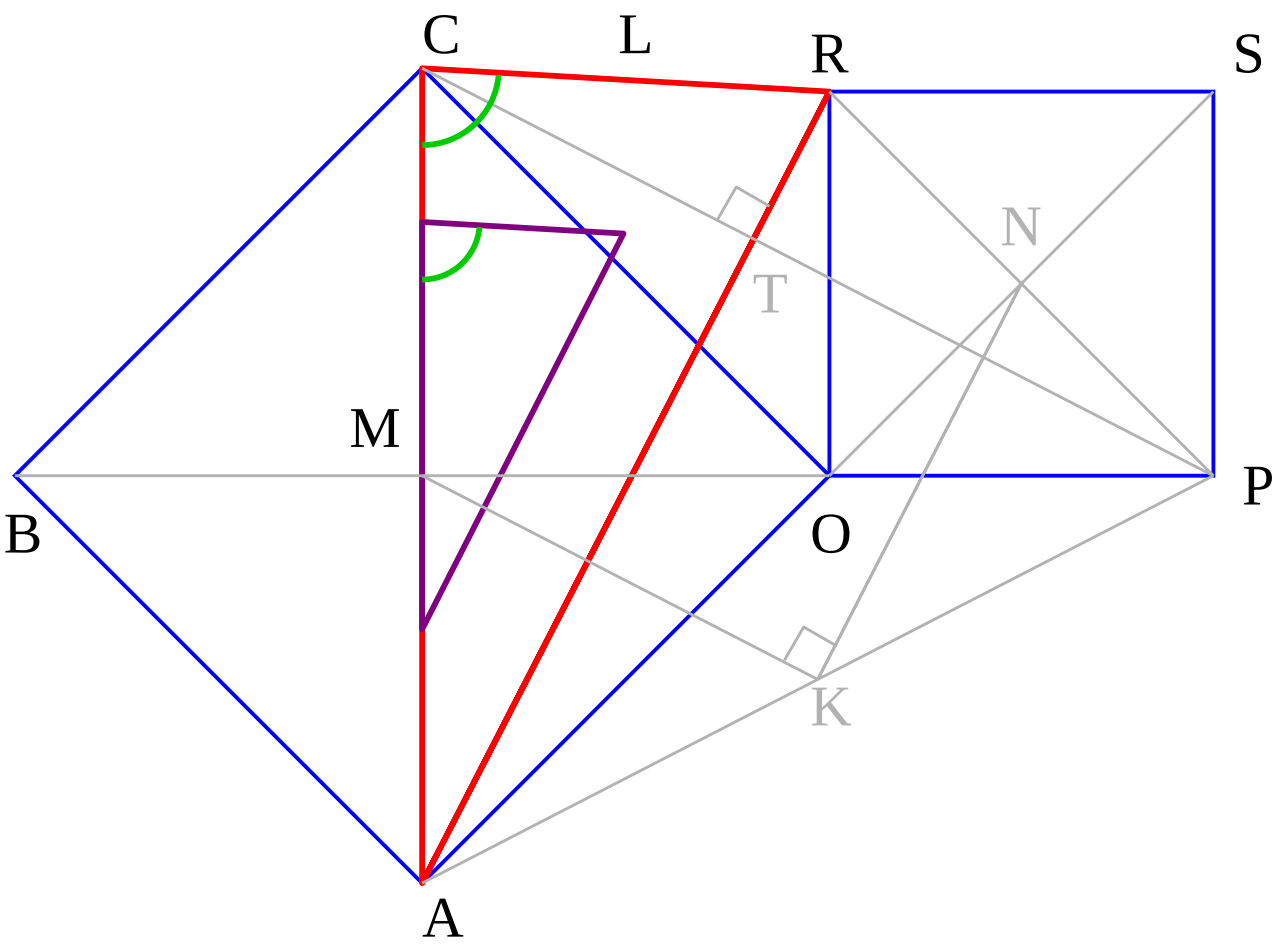
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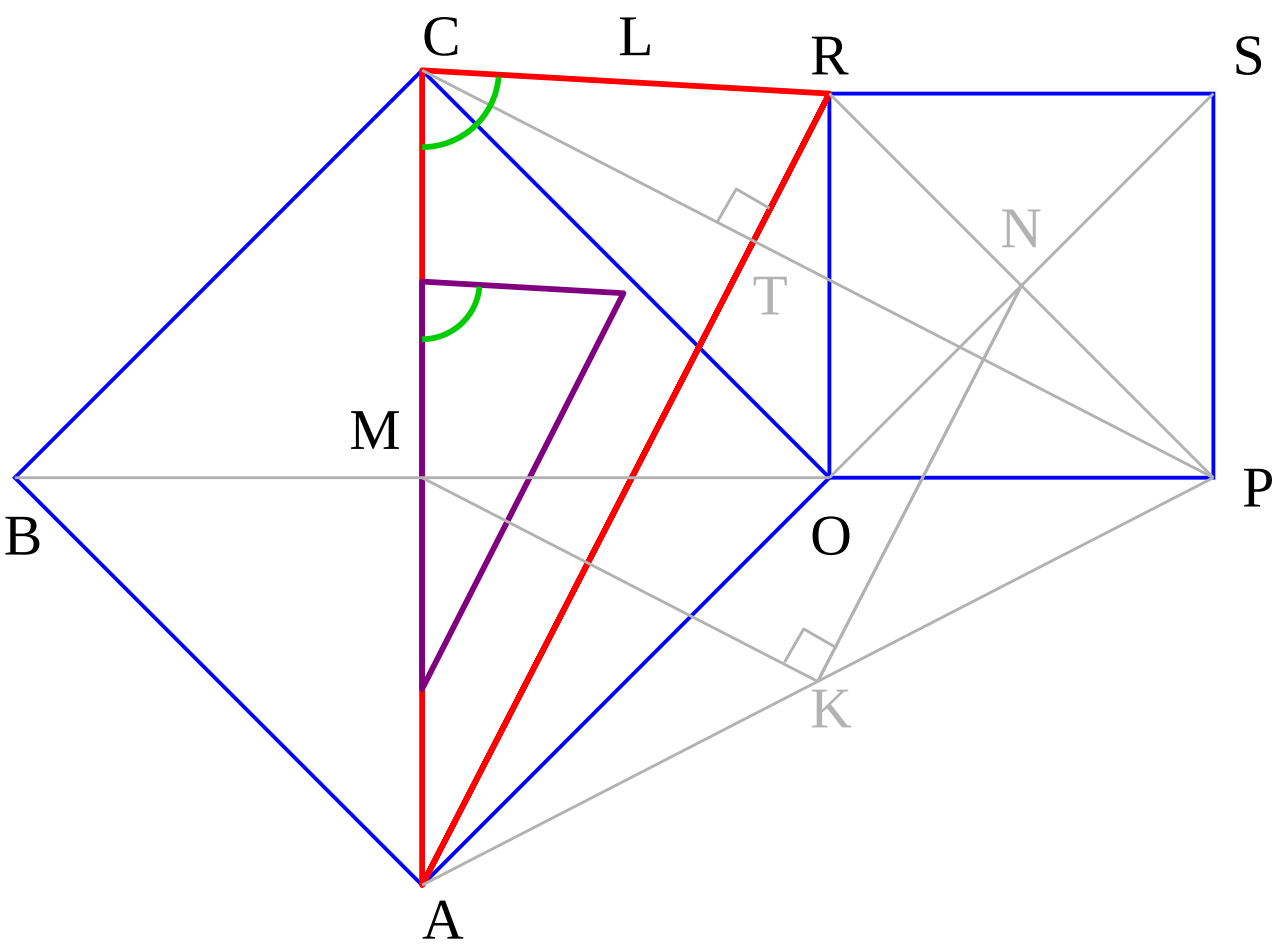
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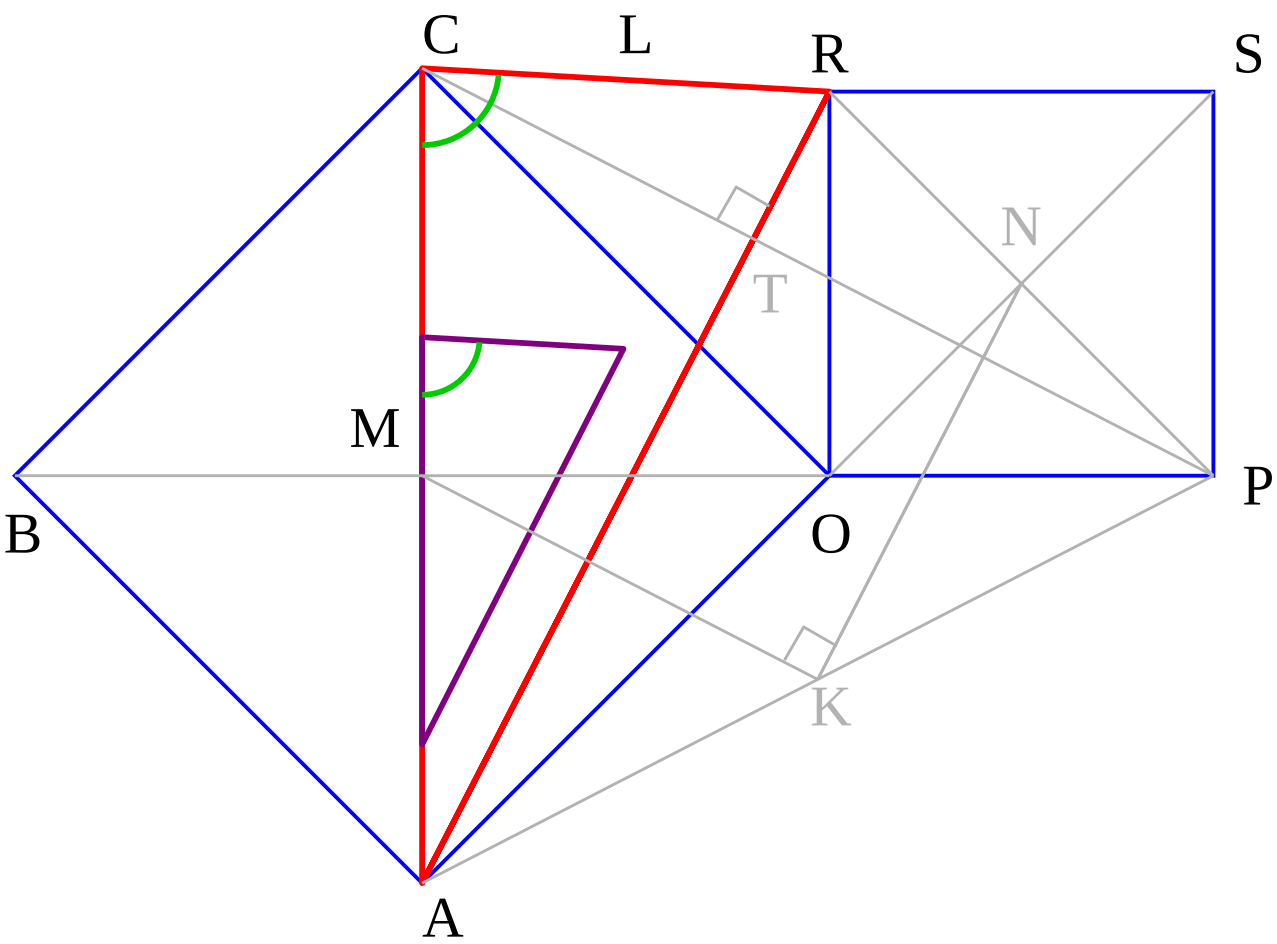
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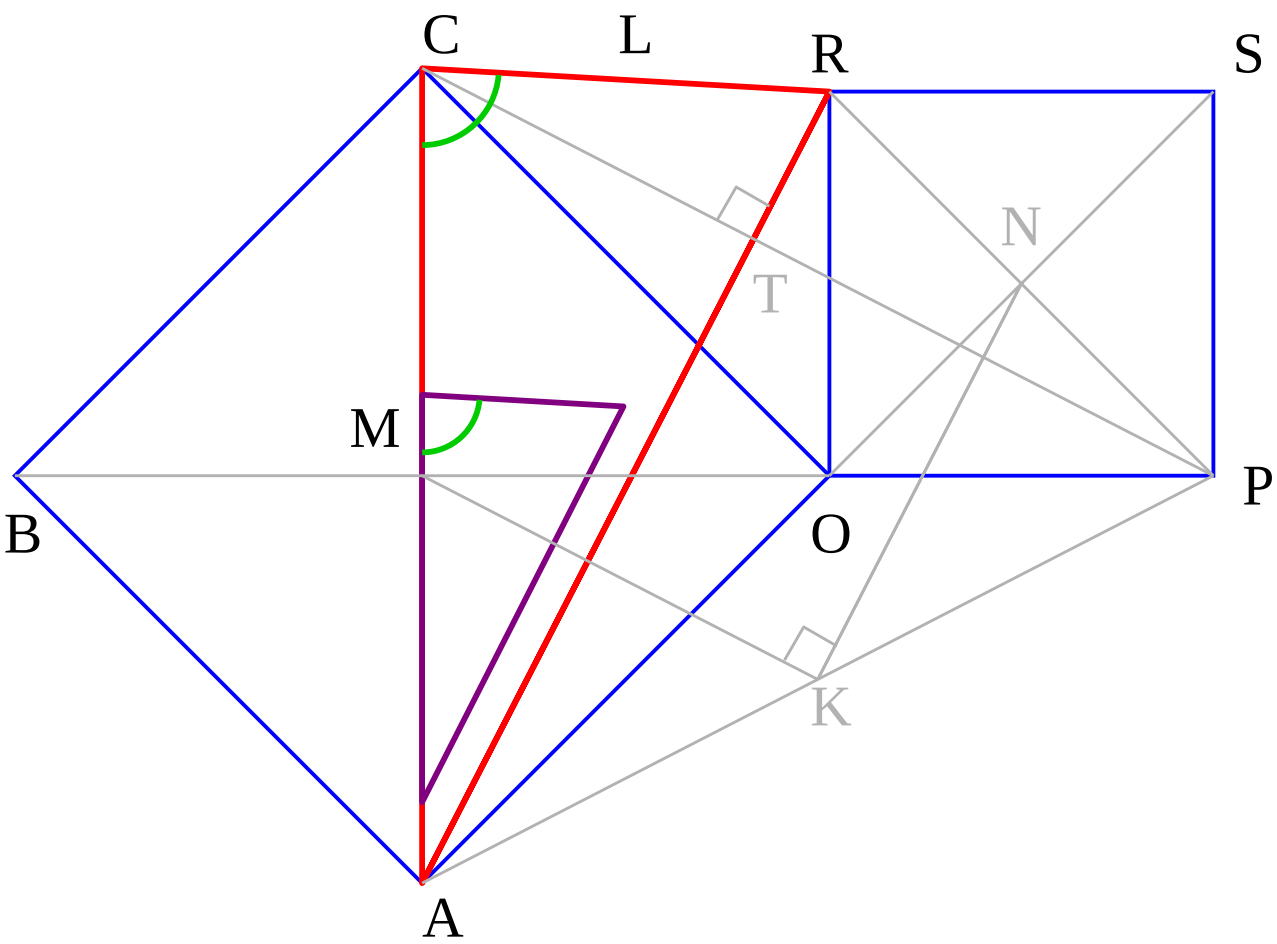
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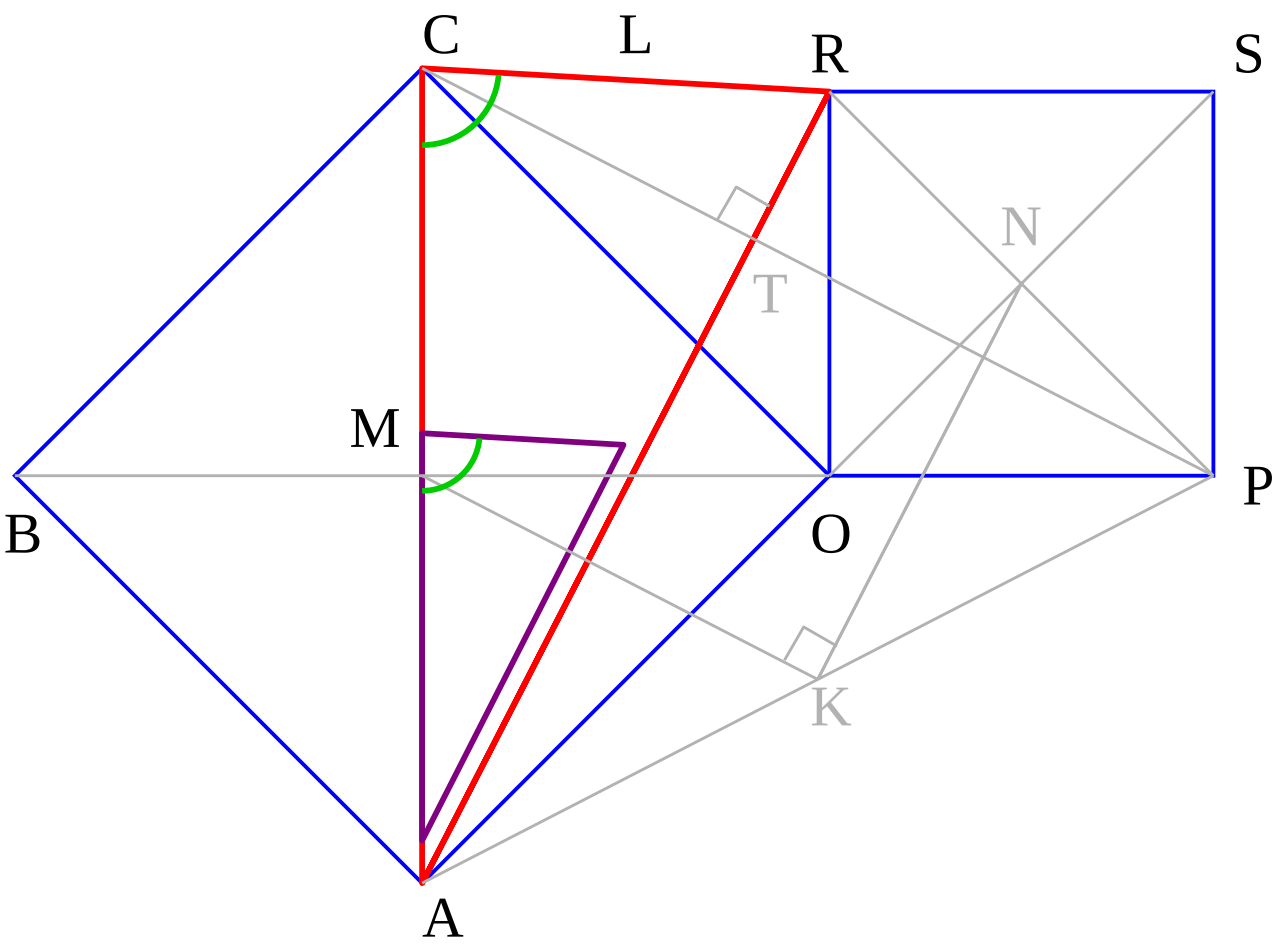
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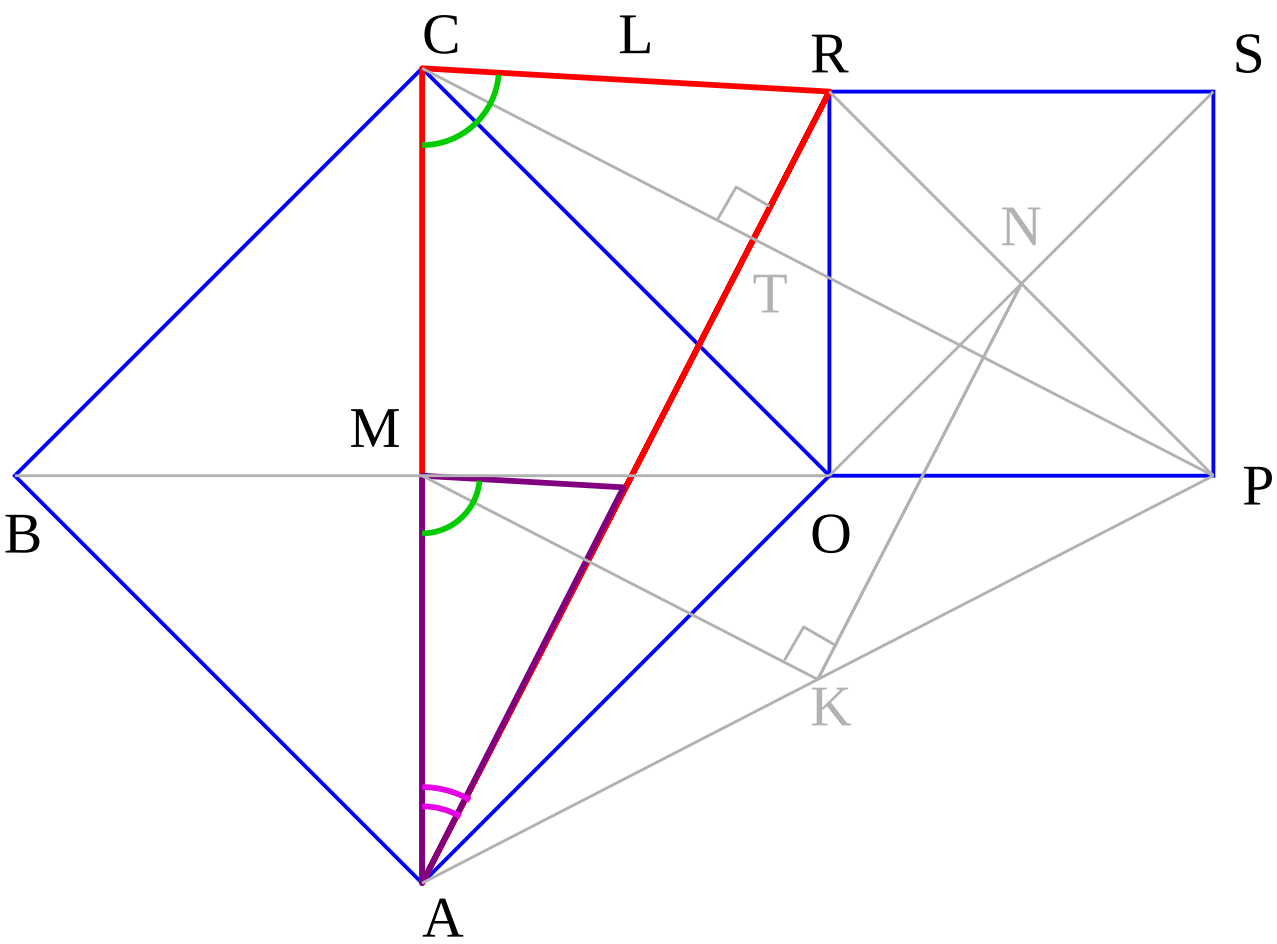
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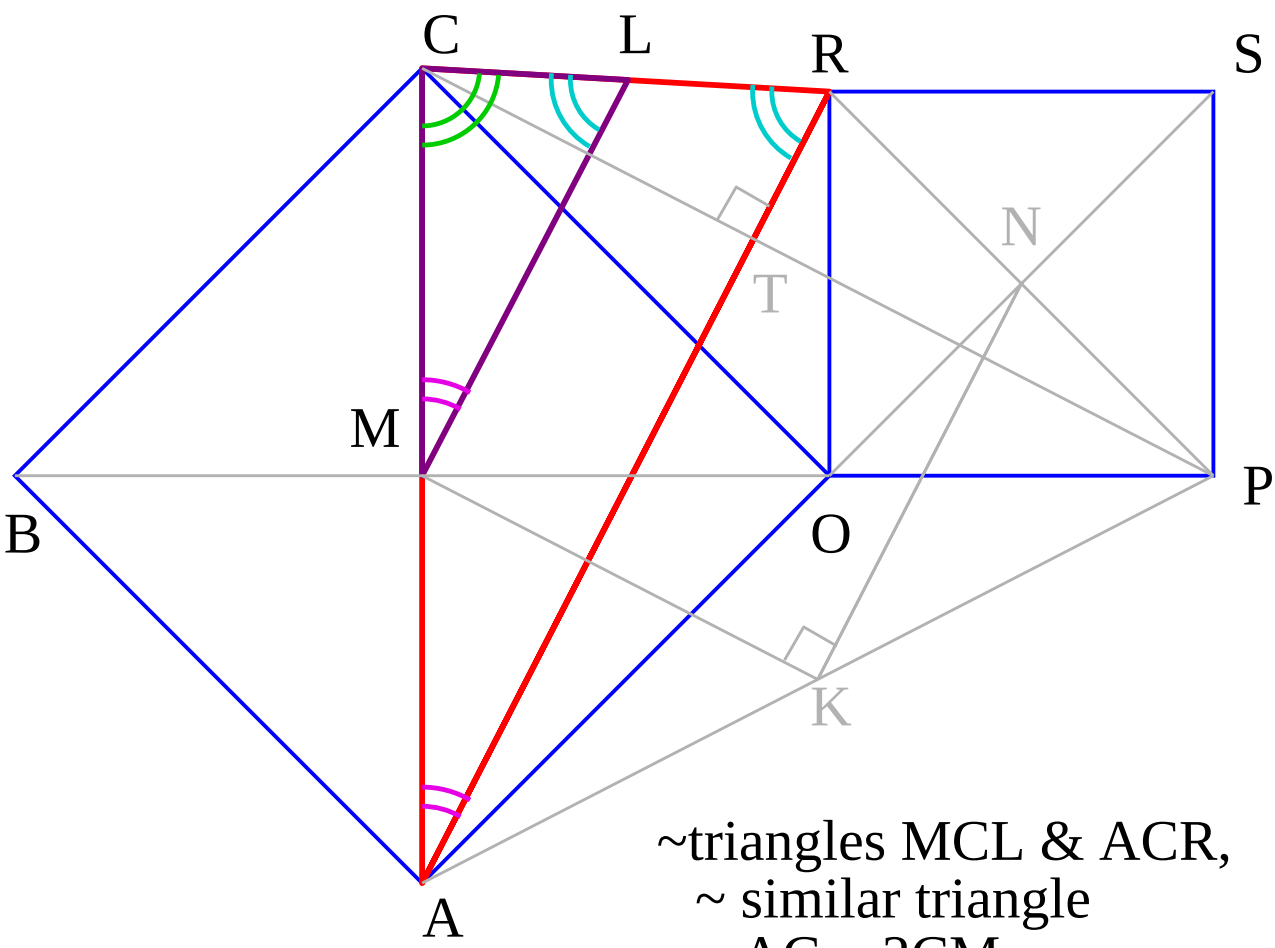
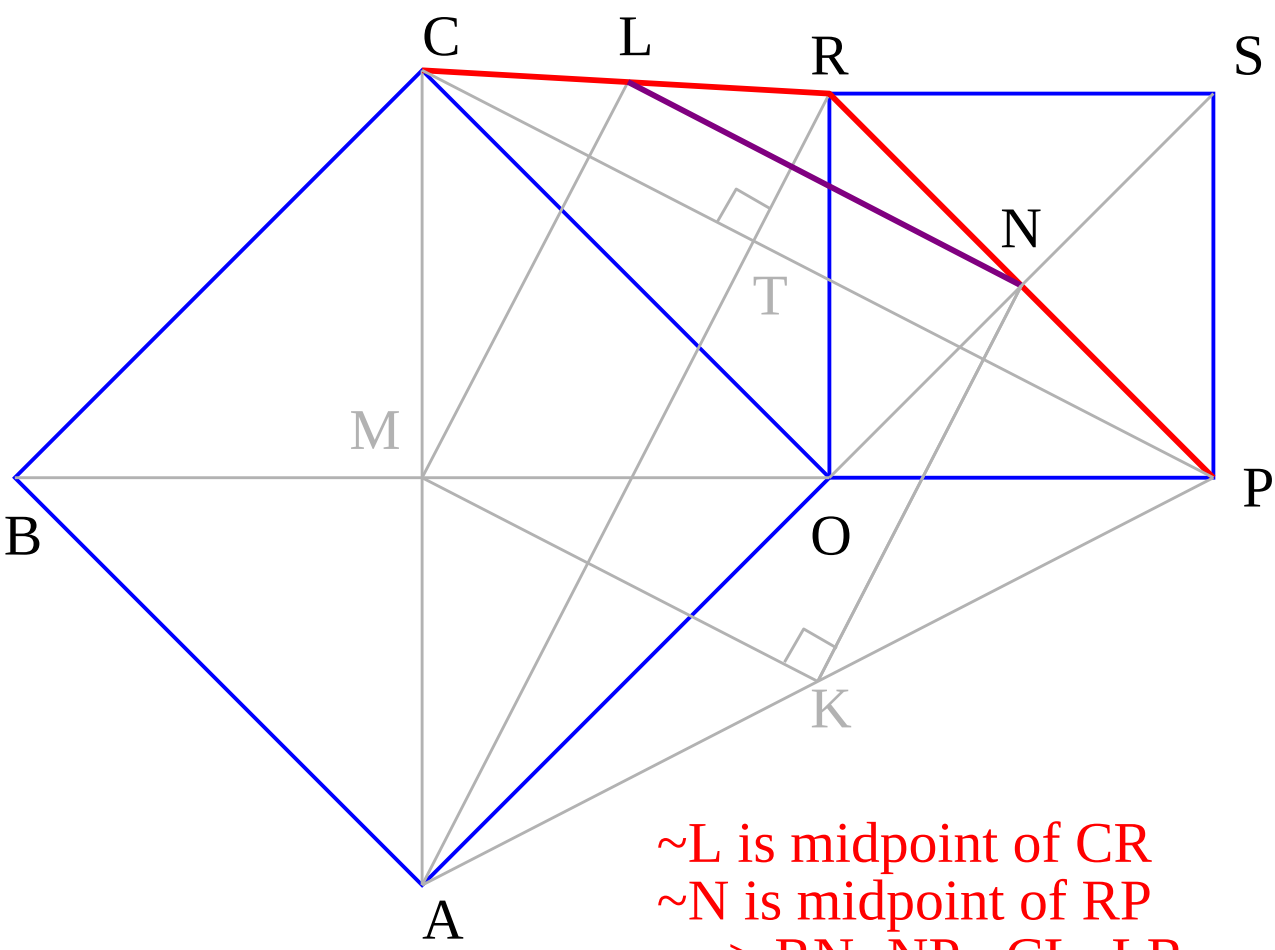
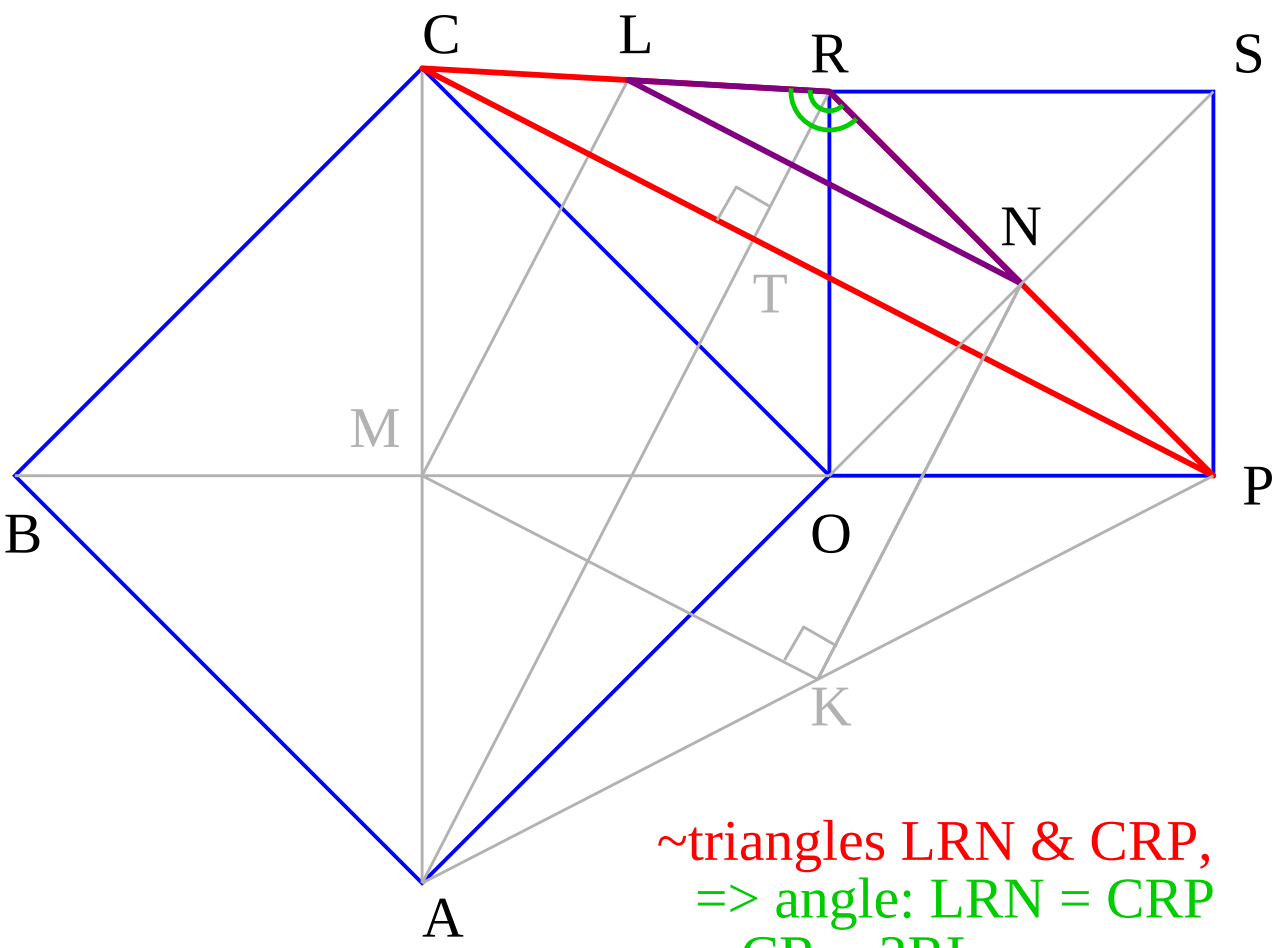


~triangles MCL & ACR,
~ similar triangle
~ AC = 2CM
~ CR = 2CL

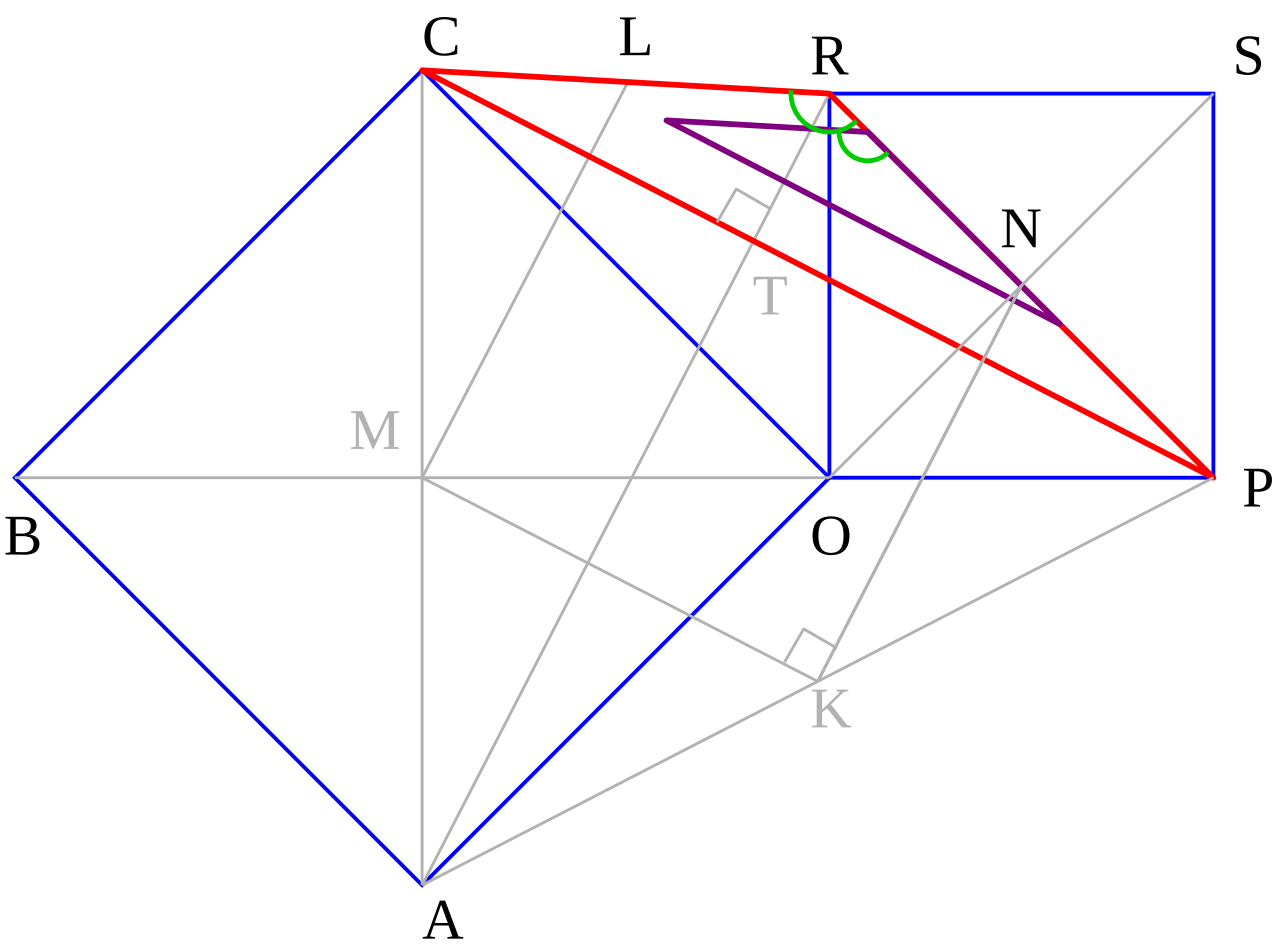
=> RA = 2ML



~L is midpoint of CR
~N is midpoint of RP
=> RN=NP ; CL=LR



~triangles LRN & CRP,
=> angle: LRN = CRP
~ CR = 2RL
~ RP = 2RN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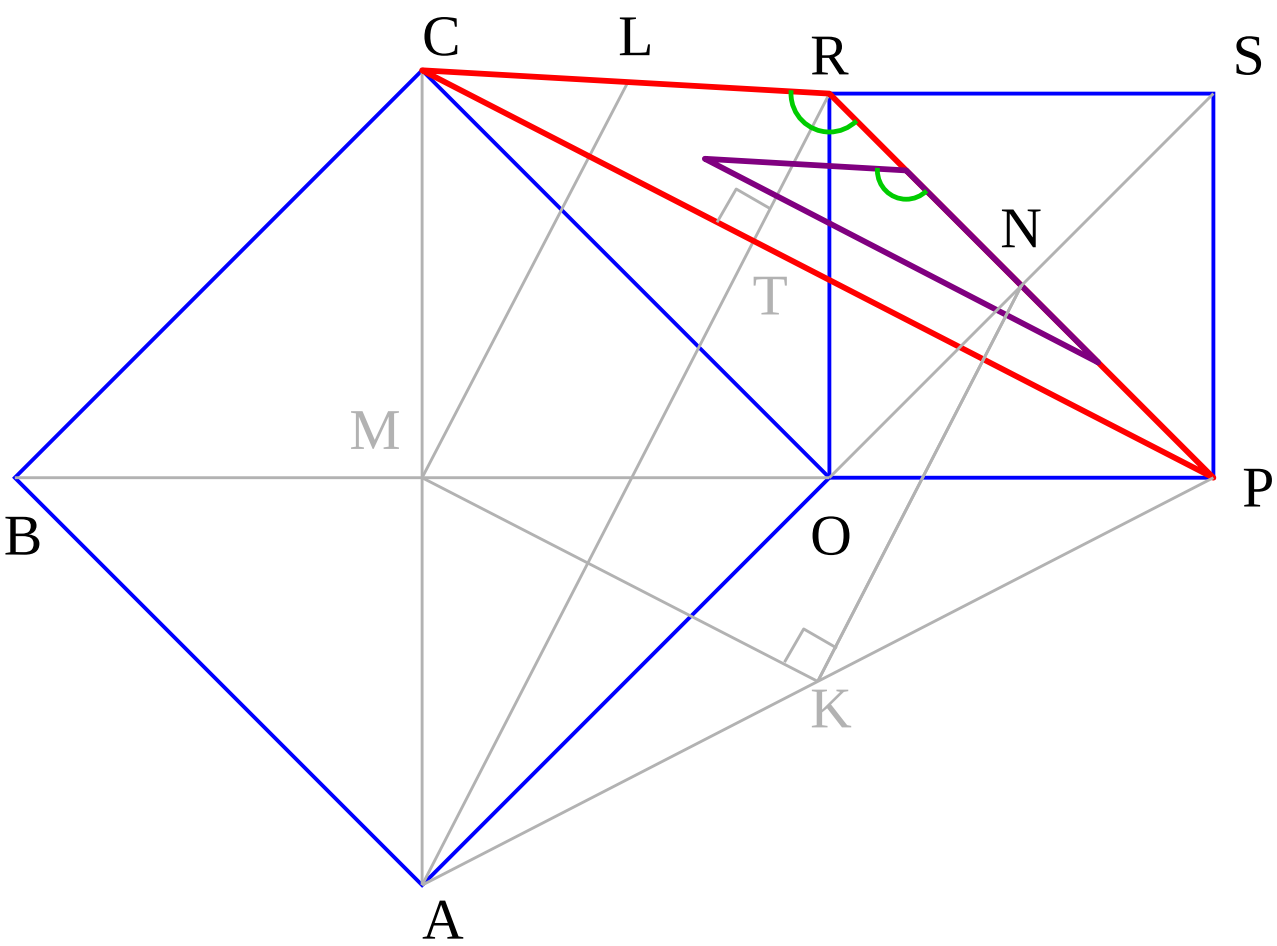
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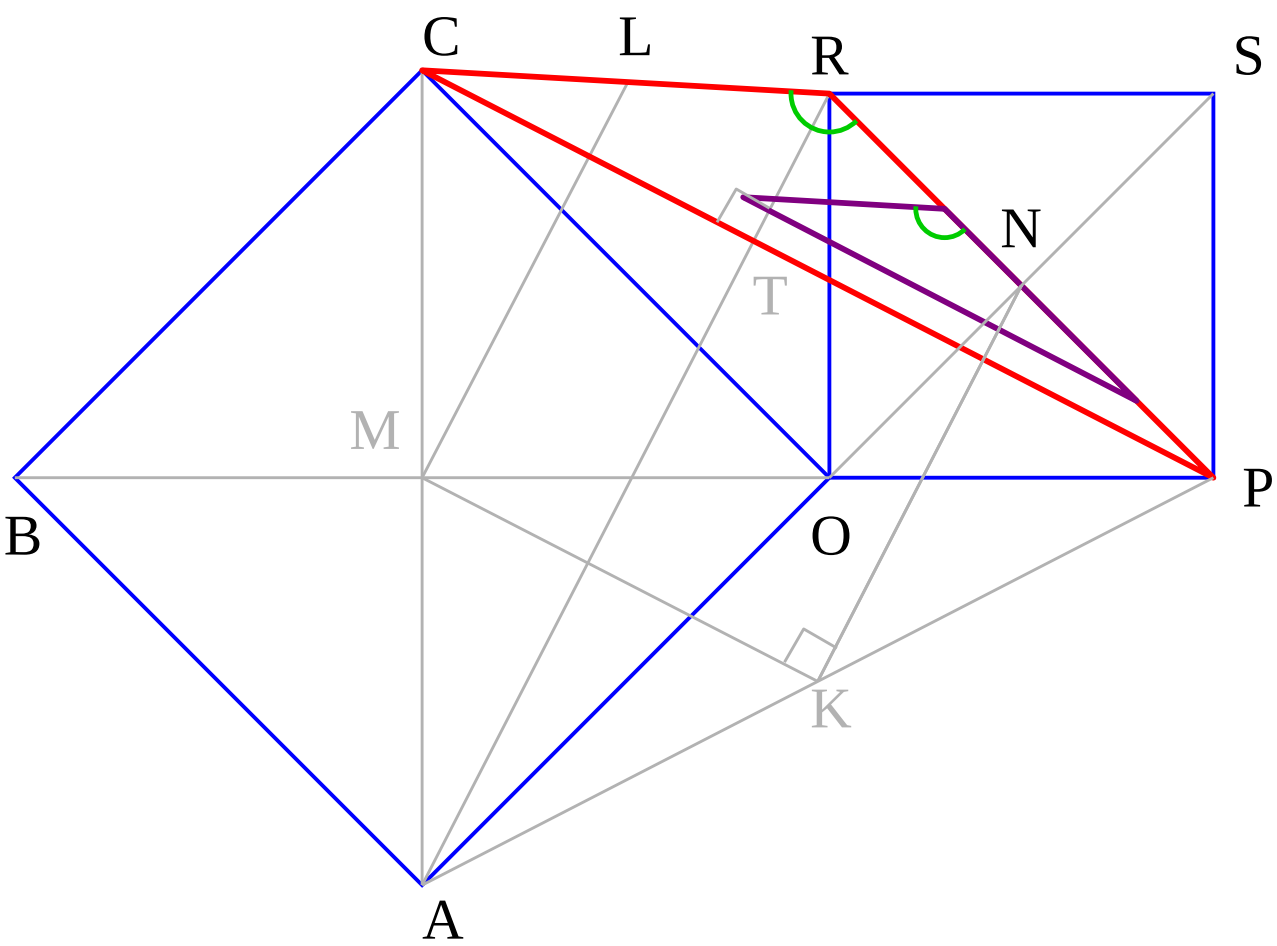
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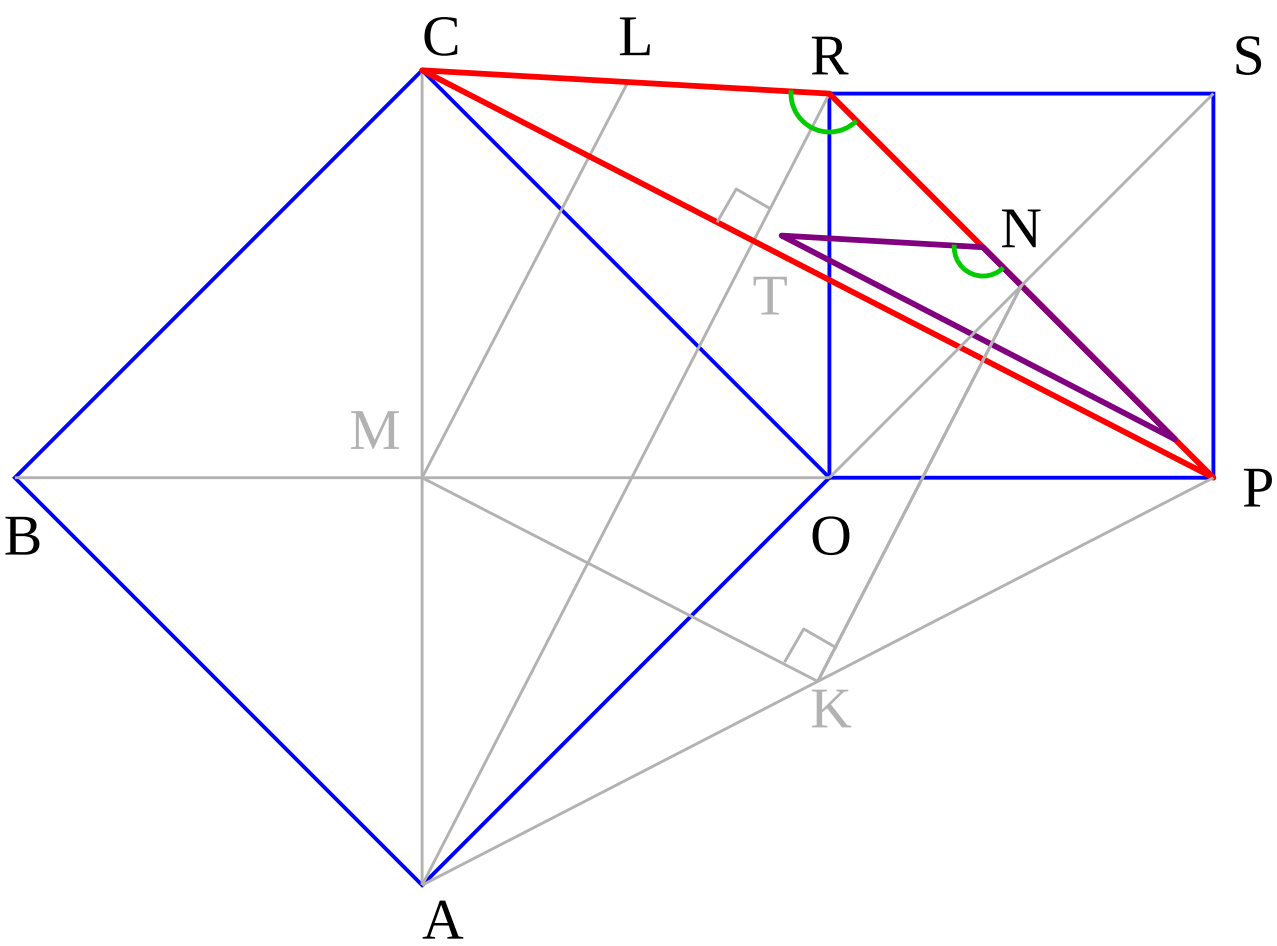
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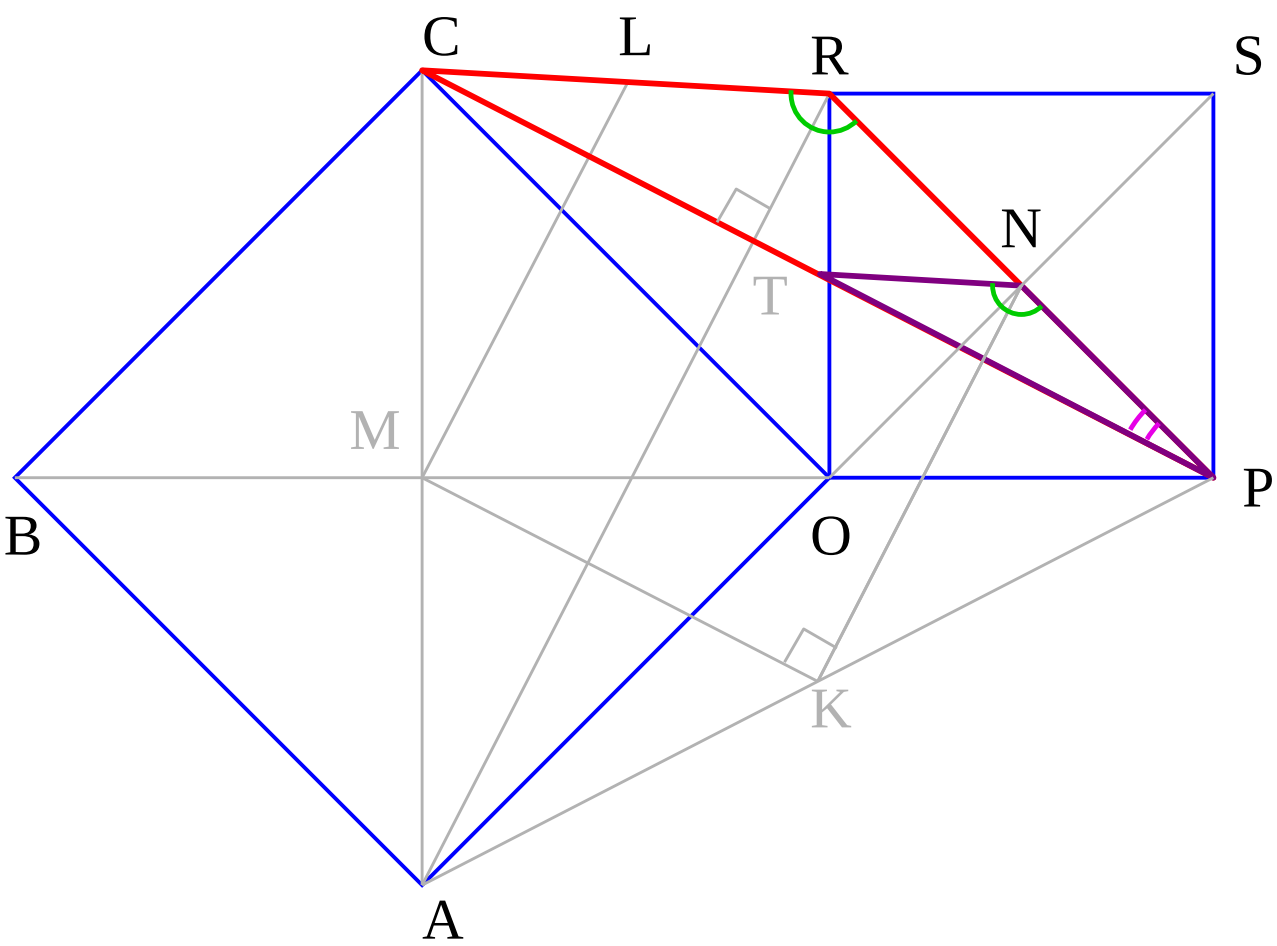
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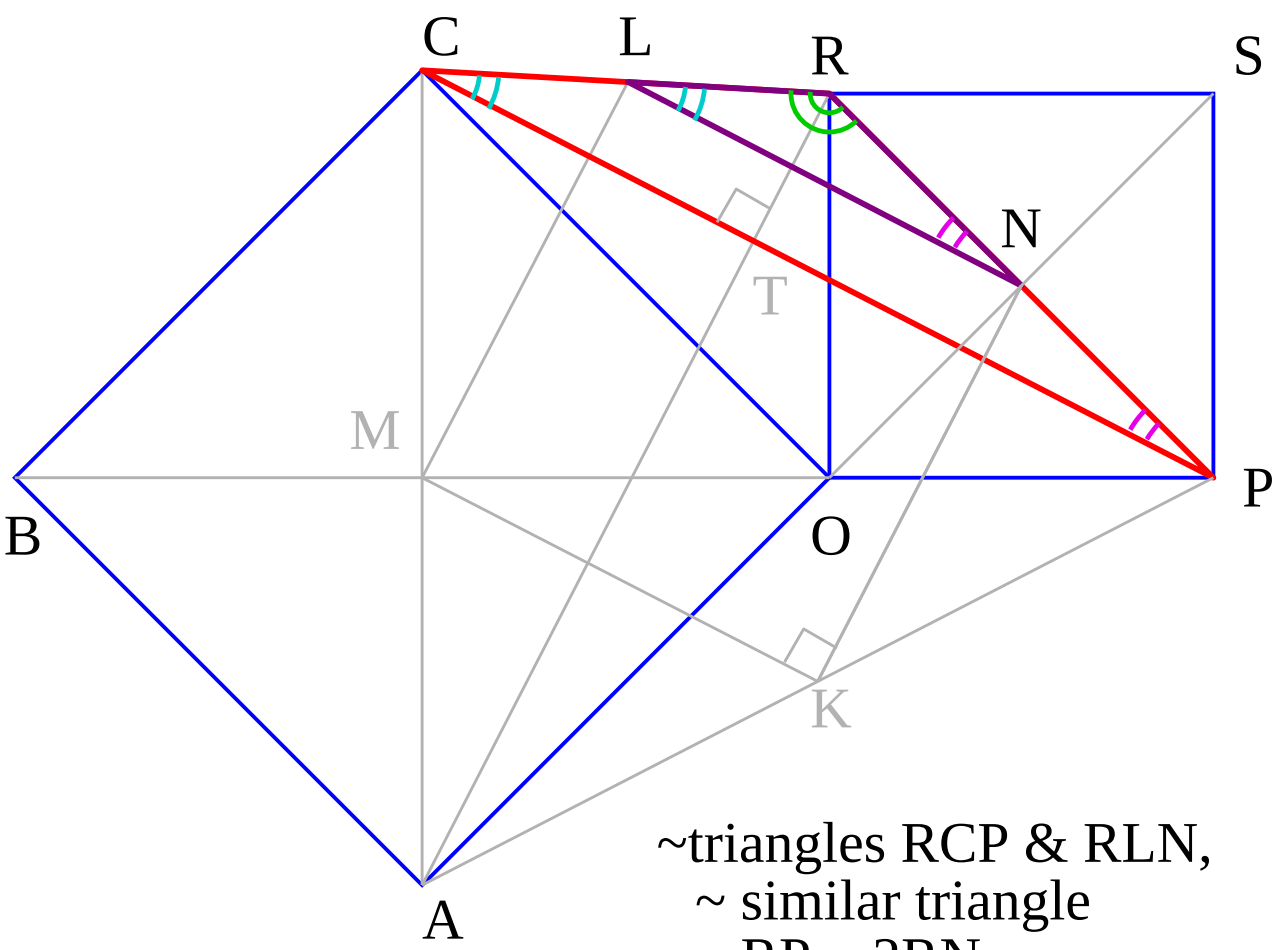
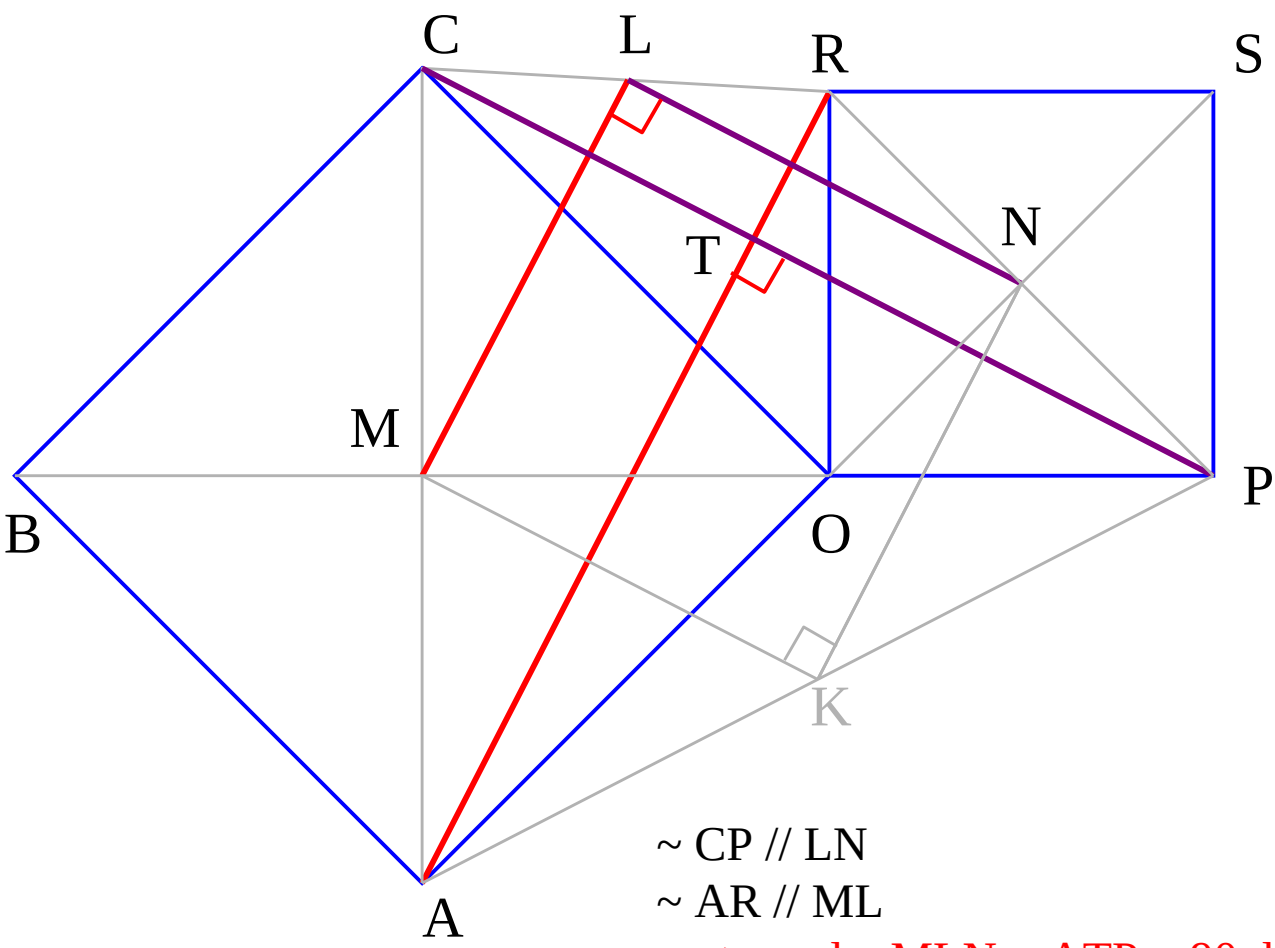


~triangles RCP & RLN,
~ similar triangle
~ RP = 2RN
~ RC = 2RL

=> CP = 2LN



~ CP // LN

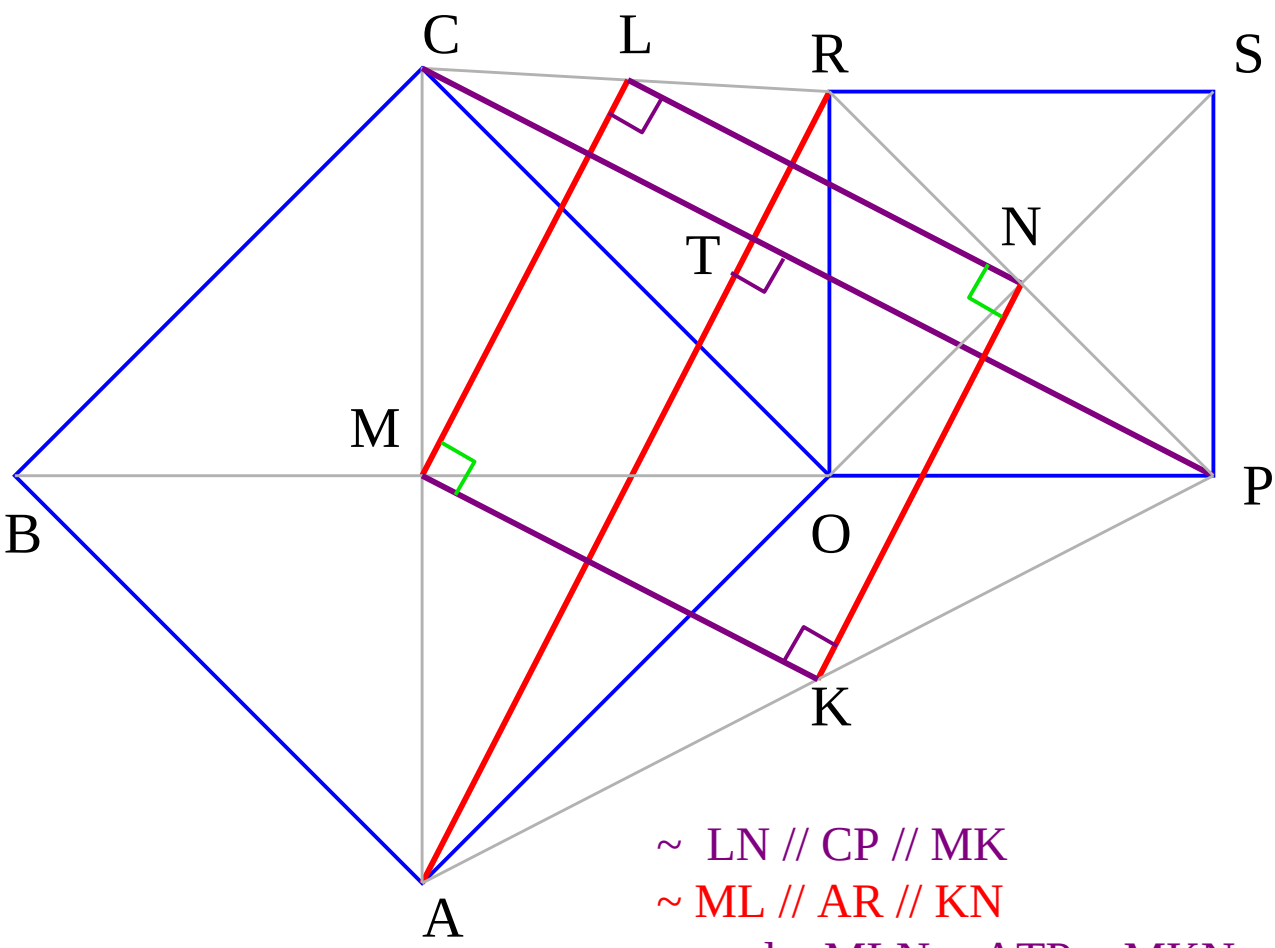
~ AR // ML

=> angle: MLN = ATP = 90 degree

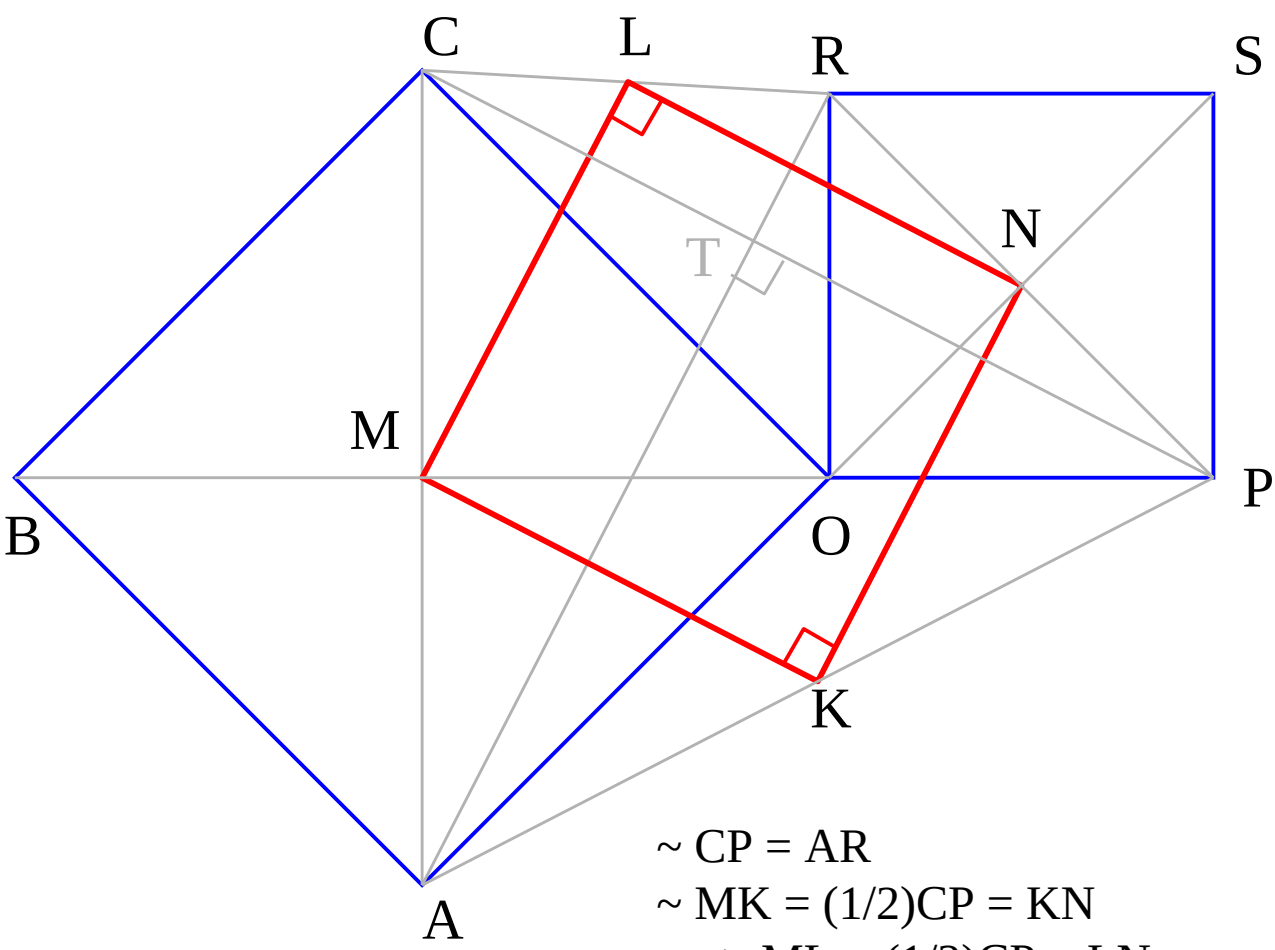
~ CP = AR

=> ML=(1/2)CP=(1/2)AR=LN

ML = LN



~ LN // CP // MK
~ ML // AR // KN
~ angle: MLN = ATP = MKN
= 90 degree
=> angle:LMK=LNK=90 degree

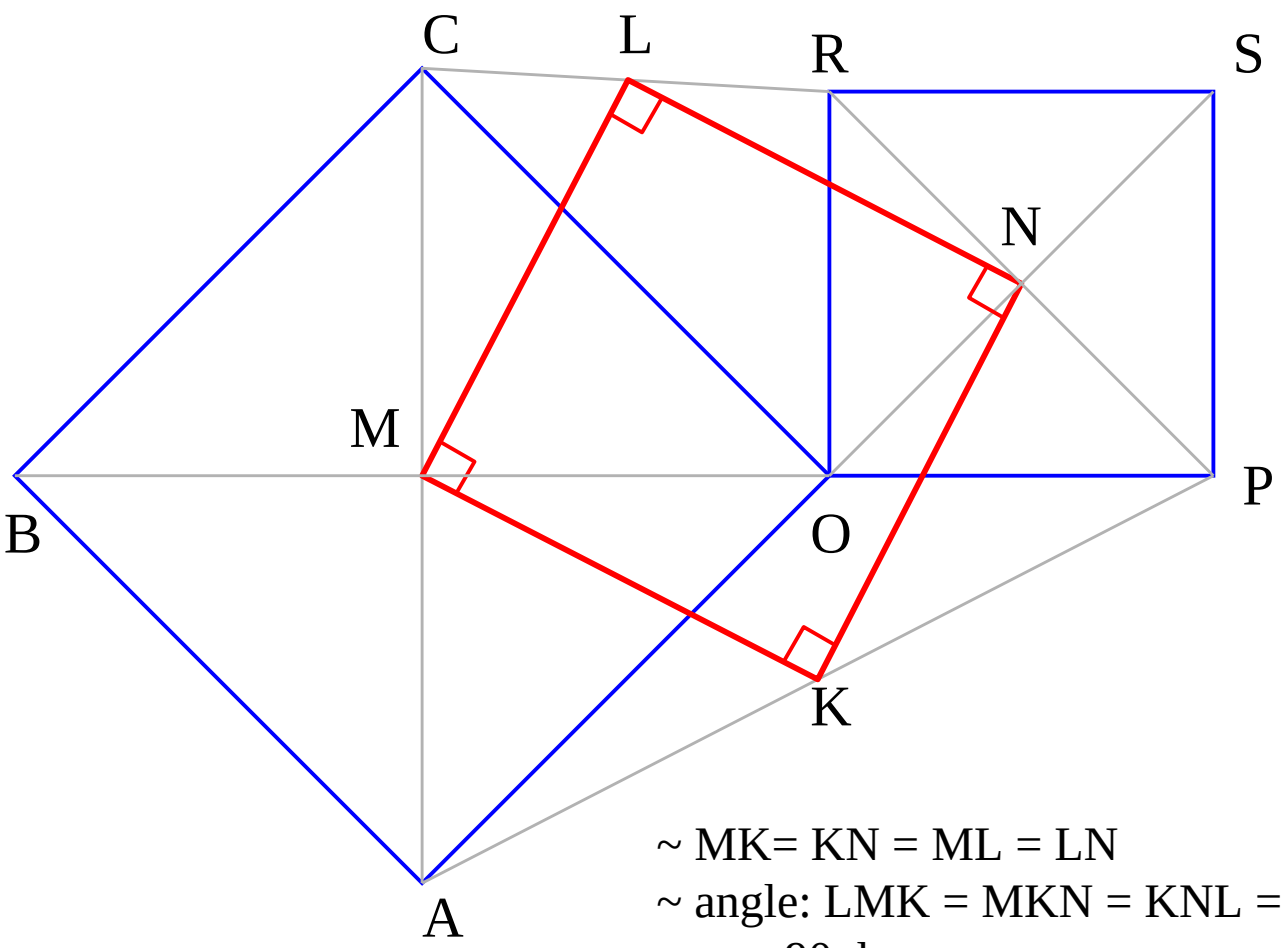


~ CP = AR

~ MK = (1/2)CP = KN

=> ML = (1/2)CP = LN

=> MK= KN = ML = LN



~ MK= KN = ML = LN

~ angle: LMK = MKN = KNL = NLM
= 90 degree

=>MKNL is a square