
MATH CHALLENGERS

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Regional Competition
Face-off Round 2013

A question always follows a blue page. The next page is blue!

1. What is the cube root of 100, rounded to the nearest integer?

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Answer: 5

2. What common fraction is halfway between $\frac{1}{6}$ and $\frac{1}{8}$?

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Answer: $\frac{7}{48}$

3. Call a prime p *additive* if the sum of the decimal digits of p is also prime. What is the smallest additive prime greater than 30?

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Answer: 41

4. Let $A = 0.84$, let $B = \dfrac{9}{11}$ and let $C = \dfrac{16}{19}$. Which is largest, A, B, or C?

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Which is largest, A, B, or C?

Answer: C or $\dfrac{16}{19}$

5. The restaurant meal cost \$25.25, plus 12% tax. How many dollars did the meal cost, including tax? Give the answer in dollars, to the nearest cent.

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Answer: 28.28 (dollars)

6. On April 1, 2013, sunrise in Kelowna is at 7:00 AM, and sunset is at 7:36 PM. At what time is it exactly halfway between sunrise and sunset?

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Answer: $1:18$ (PM) or $13:18$

7. The sum of three consecutive even integers is 30. What is the product of the three integers?

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Answer: 960

8. If $5x - 4x + 3x - 2x + x = 180$, what is the value of x?

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Answer: 60

9. Evaluate 0.128×125.

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Answer: 16

10. Suppose that $A_1 = 11$ and $A_{n+1} = A_n + 7$ for any integer n. What is the value of A_{10}?

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Answer: 74

11. One dozen scarlet splendor roses cost $98. At the same price per rose, what the cost in dollars of two and a half dozen scarlet splendor roses?

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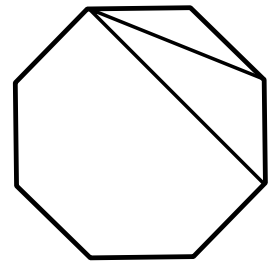
Answer: 245 (dollars)

12. The figure shown is a regular 8-sided polygon, with two of the diagonals drawn. Altogether, how many diagonals does a regular 8-sided polygon have?



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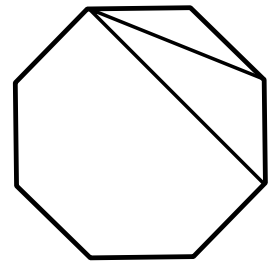

Answer: 20 (diagonals)

13. What is the largest integer N such that $N^3 < 2013$?

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Answer: 12

14. Rounded to the nearest integer, 4 out of every 9 students who participate in the Regional advance to the Provincial. If 500 students participate in the Regional, how many will participate in the Provincial?

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Answer: 222 (students)

15. A circle has radius 10 cm. To the nearest cm, what is the circumference of the circle?

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Answer: 63 (cm)

16. What is the value of $\frac{111111}{3}$?

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Answer: 37037

17. 21% of x is 105. What is the value of x?

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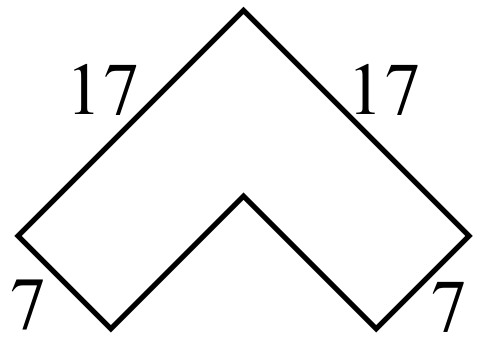
Answer: 500

18. In the region below, all angles that look like right-angles *are* right angles, and dimensions of four of the sides are 7, 17, 17, and 7 as shown. What is the area of the region?



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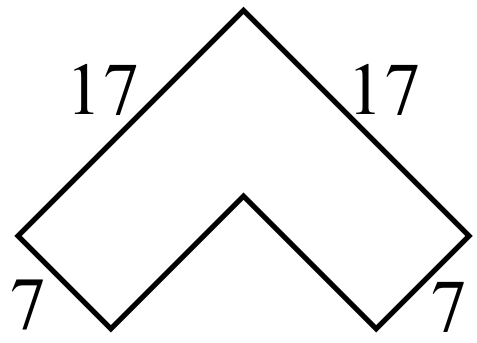

Answer: 189

19. A box contains 2 red balls and 2 blue balls. We remove 2 of the balls, chosen at random. What is the probability the 2 balls are of the same colour? Express the answer as a common fraction.

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Answer: $\frac{1}{3}$

20. What is the average of the numbers -20, -10, 0, 10, 20, and 30?

20. What is the average of the numbers -20, -10, 0, 10, 20, and 30?

Answer: 5

21. A *palindromic prime* is a prime that remains unchanged when its decimal digits are reversed. For example, 11 is a palindromic prime. What is the smallest palindromic prime which is greater than 11?

21. A *palindromic prime* is a prime that remains unchanged when its decimal digits are reversed. For example, 11 is a palindromic prime. What is the smallest palindromic prime which is greater than 11?

Answer: 101

22. Two standard dice are rolled. What is the probability that the sum of the numbers showing is equal to 10? Express the answer as a common fraction.

22. Two standard dice are rolled. What is the probability that the sum of the numbers showing is equal to 10? Express the answer as a common fraction.

Answer: $\frac{1}{12}$

23. Call a prime number p *lonely* if neither $p-6$ nor $p+6$ is prime. What is the smallest lonely prime which is greater than 50?

23. Call a prime number p *lonely* if neither $p-6$ nor $p+6$ is prime. What is the smallest lonely prime which is greater than 50?

Answer: 71

24. The year 2013 has 365 days, and the first two months have a total of 59 days. How many days are there in the last 10 months of the year?

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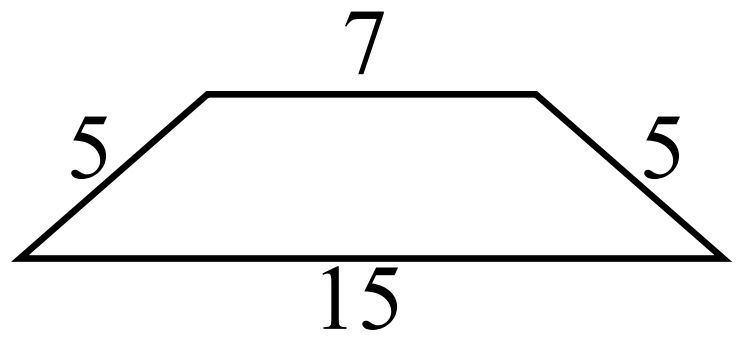
Answer: 306 (days)

25. A box has the shape of a *triangular prism*. The base of the box is a triangle with sides 6 inches, 8 inches, and 10 inches. The height of the box is 6 inches. What is the volume of the box, in cubic inches?

25. A box has the shape of a *triangular prism*. The base of the box is a triangle with sides 6 inches, 8 inches, and 10 inches. The height of the box is 6 inches. What is the volume of the box, in cubic inches?

Answer: 144 (cubic inches)

26. An isosceles trapezoid has sides 15, 5, 7, and 5 as shown. What is the area of the trapezoid?



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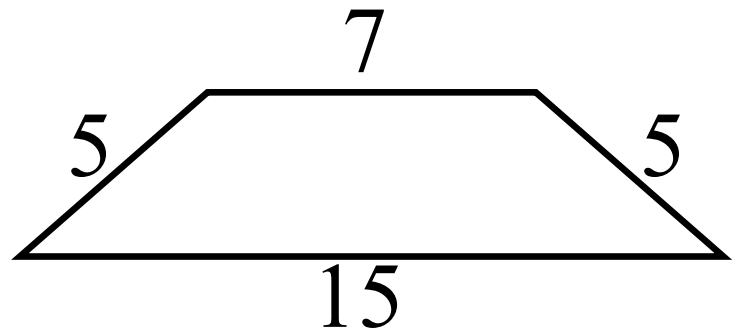

Answer: 33 (units^3)

27. What is the sum of the positive integers that divide 18?

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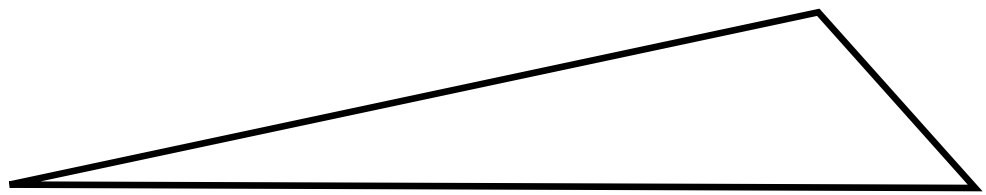
Answer: 39

28. The length of a narrow field is 6 times the width of the field. If the length of the field is 99 metres, what is the perimeter of the field?

28. The length of a narrow field is 6 times the width of the field. If the length of the field is 99 metres, what is the perimeter of the field?

Answer: 231 (metres)

29. One of the angles of a triangle is 120°. Of the other two angles, one has measure 4 times the measure of the other. What is the degree measure of the smallest angle of the triangle?



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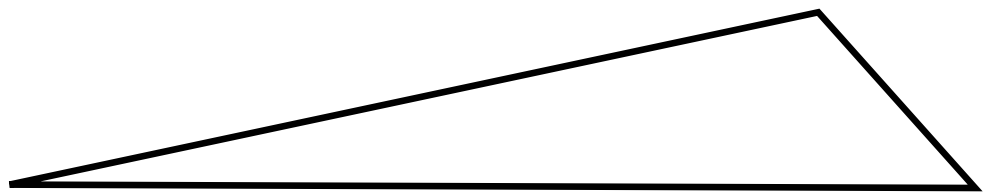

Answer: 12 (degrees)

30. What is the first year after 2013 that has digit sum equal to 13?

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Answer: 2029

31. What is the measure, in degrees, of the angle between the hour hand and the minute hand of a clock at 1:10?

31. What is the measure, in degrees, of the angle between the hour hand and the minute hand of a clock at 1:10?

Answer: 25

32. What is the smallest positive integer n such that $n! > n^3$?

32. What is the smallest positive integer n such that $n! > n^3$?

Answer: 6

33. What is the value of

$$999 - 997 + 995 - 993 + \cdots + 7 - 5 + 3 - 1?$$

33. What is the value of

$$999 - 997 + 995 - 993 + \cdots + 7 - 5 + 3 - 1?$$

Answer: 500

34. The surface area of a cube is $\frac{3}{2}$ square metres. What is the volume of the cube, in cubic metres? Express the answer as a common fraction.

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Answer: $\frac{1}{8}$ (cubic metres)

35. What is the value of $112^2 - 108^2$?

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Answer: 880

36. Suppose that n is a positive integer such that two-thirds of n^2 is a perfect cube. If $n < 100$, what is the value of n?

36. Suppose that n is a positive integer such that two-thirds of n^2 is a perfect cube. If $n < 100$, what is the value of n?

Answer: 18

37. The sides of a quadrilateral have length 9, 10, 11, and x. Given that x is an integer, what is the largest possible value of x?

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Answer: 29