Mathematica Centrum

Together, let's shape the mathematicians of the future

EULER PREPARATORY TEST 2012

1. The value of (7 + 3) - (-8 + 2) is

A) 15 B) 16 C) 12 D) 13 E) 14

2. -5 x 2 - (-5) = ?

A) -5 B) -6 C) -8 D) 12 E) 5

3. The closest integer to the value of -3/4 x 6/12 + 3/8 is

A) -2 B) 2 C) -1 D) 0 E) 1

4. What fraction of 45 is 30?

A) 2/3 B) 0.7 C) 0.8 D) 3/5 E) 3/4

5. The sum of all the factors of 30 is

A) 70 B) 66 C) 72 D) 74 E) 68

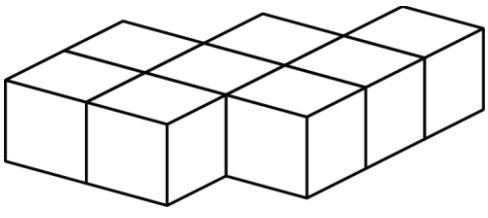
6. The result of 5/4 of 20% of 0.2 is equal to

A) 8% B) 5% C) 10% D) 0.1 E) 6%

7. The ratio of 0.08 to 0.2 is the same as the ratio of 10 to

A) 26 B) 22 C) 24 D) 23 E) 25

8. Eight blocks have been glued together. How many faces of these blocks have no glue on them?



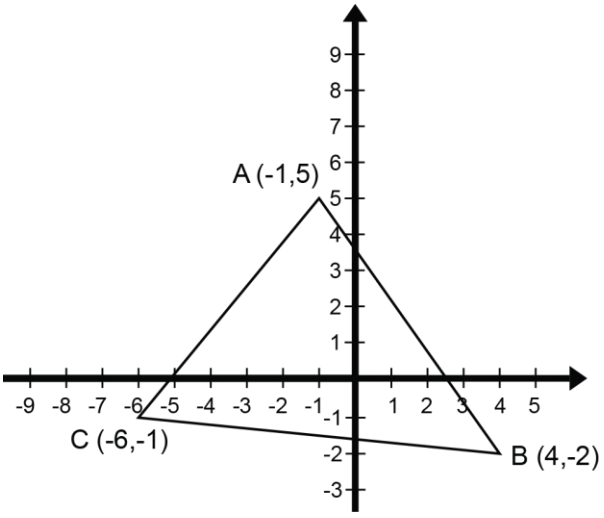
A) 26
B) 32
C) 30
D) 28
E) 34

9. What is the value of N in the equation:
9 x 8 x 7 x 6 = 18 x N x 8 x 21?

A) 8 B) 6 C) 3 D) 1 E) 4

10. What are the coordinates of the points corresponding to the vertices of Δ ABC under the translation t:(-1, 6)?

A) A'(-3, 13), B'(2, 5), C'(-7, 7)
B) A'(-2, 11), B'(3, 5), C'(-8, 6)
C) A'(-3, 11), B'(3, 7), C'(-8, 8)
D) A'(-3, 12), B'(2, 6), C'(-7, 6)
E) A'(-2, 11), B'(3, 4), C'(-7, 5)



11. The measures of the acute angles in a right triangle are in the ratio 2:3. Three times the value of the smaller one is equal to

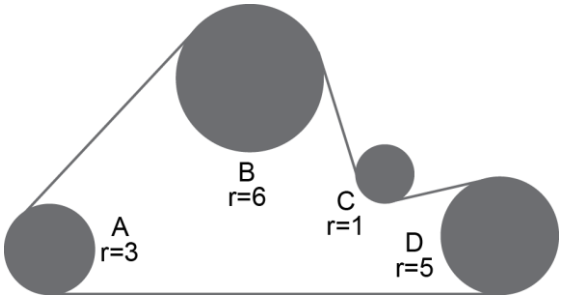
A) 162º B) 108º
C) 120º D) 96º
E) 136º

12. Mathew went from his house to Mathilda's house. He did 1/3 of the distance by car, 3/4 of the remaining distance by bus and the final part on foot. What fraction of the total distance did he walk?

A) 1/6 B) 1/8 C) 2/9 D) 1/4 E) 1/9

13. Four (4) wheels A, B, C, and D are connected by a belt. The radius of each wheel is written beside the circle representing the wheel. If wheel B turns at 20 revolutions per minute, how many revolutions does wheel D do in 1 minute?

A) 36 B) 16 C) 30
D) 24 E) 28



14. The number of 2-digit prime numbers less than 50 that have digits which add up to 5 is

A) 0 B) 1 C) 2 D) 3 E) 4

15. The next number in the sequence: 12, 7, 35, 40, 8, 3, ?, … is

A) 16 B) 14 C) 5 D) 15 E) 10

16. The average of -1/3 and 2/3 is equal to

A) -2/3 B) -1/6 C) -1/3 D) -1/2 E) 1/6

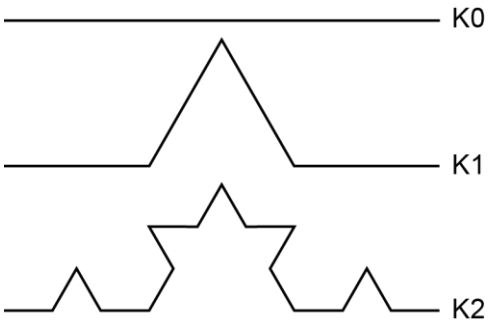
17. How many positive integers less than 125 are cubic numbers?

A) 5 B) 42 C) 4 D) 6 E) 7

18. What percent of X is Y, if 30% of X is equal to 10% of Y?

A) 300% B) 30% C) 20% D) 150% E) 50%

19. What is the length of the fractal Von Koch line K4, if K0 is 1 unit long?



A) 1 024/243 B) 256/81
C) 64/27 D) 256/27
E) 256/243

20. A, B, C, and D are all natural numbers. We know that A x B = 21, B x C = 35, and C x D = 60. What is the value of D x A?

A) 32 B) 37 C) 38
D) 35 E) 36

21. A triangular prism has been cut away (as shown in fig.1) from a cube with edges that are 6 cm long. Which of the following is closest to the area of the new solid shown in fig.2? (the base of the prism is an isosceles right triangle whose perpendicular sides are 2 cm long and segment AB = 2.83 cm).

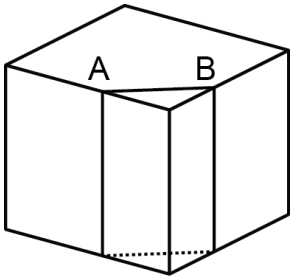


fig. 1

A) 217 cm^2 B) 180 cm^2
C) 205 cm^2 D) 188 cm^2
E) 195 cm^2

22. In a tennis tournament, any player that loses a game is automatically eliminated. If there are 32 players participating, the champion plays exactly 5 games. What is the maximum number of games played by the champion in a tournament where there are 20 players?

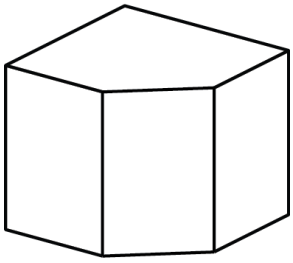
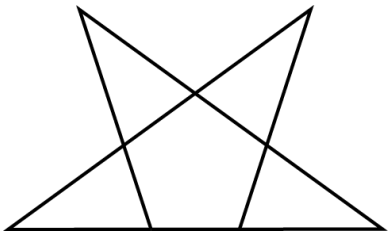


fig. 2

A) 5 B) 6 C) 7
D) 4 E) 3

23. How many different triangles can you count in the diagram below?



A) 4 B) 5 C) 6
D) 7 E) 8

24. A letter is drawn at random from the name ''EULER''. What is the probability of drawing a consonant?

A) 3/5 B) 2/5 C) 1/5
D) 1/3 E) 2/3

25. If the value of $2^4 \times 2 = 2^5$ and the value of $2^3 \times 2^9 = 2^{12}$, what is the value of $2^{10} + 2^{10} + 2^{10} + 2^{10}$?

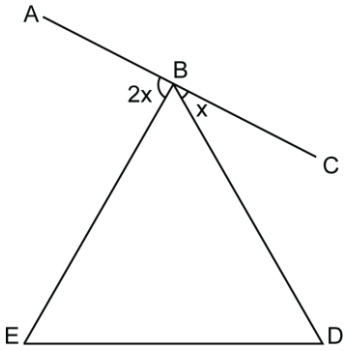
A) 8^{10} B) 2^{11} C) 2^{40} D) 80 E) 2^{12}

26. Each of the 6 different letters in the diagram represents one of the following digits: 0, 1, 2, 3, 5, and 6. This problem has more than one solution. How many different digits can the letter C represent?

$$\begin{array}{r} A\ B \\ \times\quad C \\ \hline F\ E\ D \end{array}$$

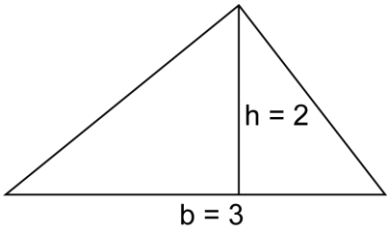
A) 1 B) 2
C) 3 D) 4
E) 5

27. In the diagram opposite, BDE is an equilateral triangle and AC is a line segment that passes through point B. What is the value of angle ABE?



A) 90° B) 110°
C) 88° D) 80°
E) 70°

28. The base of the triangle shown is tripled and its height is doubled. The area of the new triangle is how many times greater than the area of the triangle shown?



A) 6 times B) 3 times
C) 2 times D) 8 times
E) 5 times