Mathematica Centrum

Together, let's shape the mathematicians of the future

NEWTON PREPARATORY TEST 2018

1. How many of the following: 1, 3, 15, 7, and 48 yield a perfect square when you add 1 to them?

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

2. The largest possible sum, less than 10, of two consecutive prime numbers is

A) 3 B) 5 C) 7 D) 8 E) 9

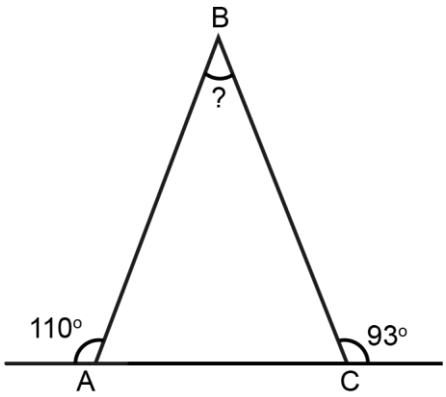
3. If 3/4 of a number is equal to 8, then 9/4 of the same number is equal to

A) 20 B) 21 C) 22
D) 23 E) 24

4. If n ÷ 1/6 = 18, then n x 2 = ?

A) 10 B) 6 C) 12
D) 8 E) 108

5. What is the value of angle B?



A) 19º B) 20º C) 21º
D) 22º E) 23º

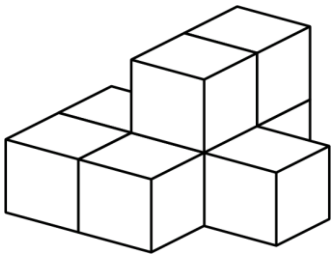
6. Which fraction is equal to (50% of 50%)%?

A) 1/400 B) 1/10 C) 1/200 D) 1/100 E) 1/20

7. Starting with -9, all integers are written in increasing order: -9, -8, -7, -6, -5, -4, -3, -2, … .The 20th digit that will be written is a

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

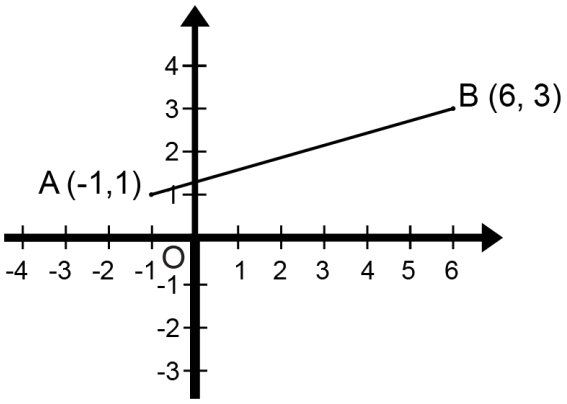
8. Eight blocks have been glued together, as shown in the diagram. How many faces of these blocks have glue on them?



A) 18 B) 20 C) 24 D) 26 E) 28

9. The price of a 100$ dress increases by 40%. The price of a 150$ shirt decreases by 30%. When bought together, the price of the two items

A) increases by 10%
B) decreases by 10%
C) increases by 2%
D) decreases by 2%
E) stays the same

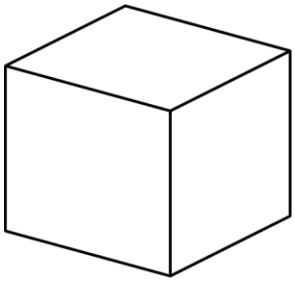


10. In the equation P + Q = 12, P and Q are natural numbers. What is the greatest possible value of the expression P x Q?

A) 27 B) 32 C) 36
D) 35 E) 39

11. Line segment AB is reflected in the y-axis. The coordinates of the images of points A and B, after the reflection, are respectively,

A) (-1, 1) and (6, 3)
B) (1, -1) and (6, 3)
C) (-1, -1) and (6, 3)
D) (-1, -1) and (3, 6)
E) (1, 1) and (-6, 3)



12. The result of the number of faces of a cube plus the number of edges of a cube plus the number of vertices of a cube minus the number of angles of a cube is equal to

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

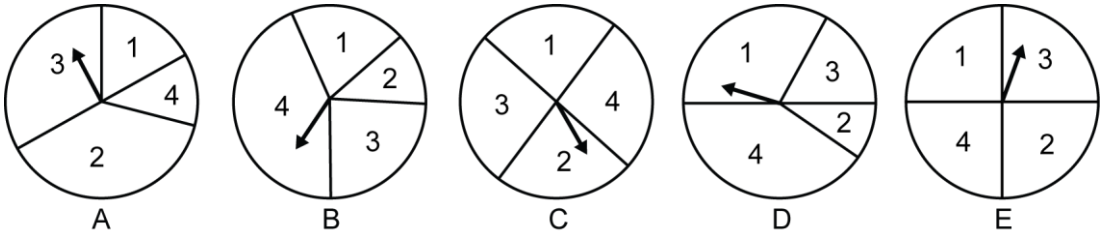
13. The LCM (3, 4, 5) = ?

A) 12 B) 120 C) 30 D) 60 E) 30

14. 20 cm^2 = ? mm^2

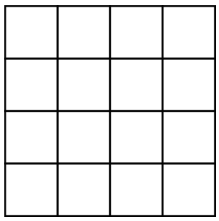
A) 2 000 B) 1 000 C) 4 000 D) 20 E) 200

15. Which spinner should you choose to increase your chances of getting a 2 or a 4?



16. How many squares can you count in the diagram shown on the right?

A) 28 B) 29
C) 30 D) 31 E) 32



17. The base and height of a triangle are twice as long as the base and height of another triangle. The area of the small triangle is what fraction of the area of the large triangle?

A) 3/4 B) 1/2 C) 1/3 D) 1/4 E) 1/16

18. A, B, and C are the 3 angles of a triangle. A is 10º more than B and B is 10º more than C. The sum of angle B + angle C is equal to

A) 130º B) 110º C) 120º D) 100º E) 105º

19. The sum of 3 prime numbers is 19. One of these prime numbers must be

A) 13 B) 17 C) 2 D) 11 E) 7

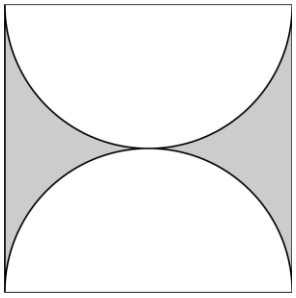
20. What is the sum of all the 3-digit natural numbers that can be formed using the digits 2, 3, and 4, if each digit can appear more than once in the same number?

A) 8 991 B) 8 992 C) 8 993 D) 8 994 E) 8 995

21. What is the value of m x n in the equation below?

$$\sqrt[2]{\frac{2}{1} \times \frac{3}{2} \times \frac{4}{3} \times \frac{5}{4} \times \bullet\bullet\bullet \times \frac{n}{m}} = 10$$

A) 8 000 B) 8 900 C) 9 900
D) 6 000 E) 10 000



22. The side of the square on the right measures 8 cm. What is the area of the shaded surface, if all arcs in the diagram are circular?

A) 32 - 4π cm^2 B) 64 - 4π cm^2
C) 64 - 8π cm^2 D) 64 - 2π cm^2
E) 64 - 16π cm^2

23. Two straight lines, y = -3x + 15 and y = 2x, intersect at point A. What are the coordinates of point A?

A) (3 , 6) B) (2 , 4)
C) (5 , 10) D) (4, 8)
E) (1 , 2)