Mathematica Centrum

Together, let's shape the mathematicians of the future

NEWTON PREPARATORY TEST 2019

1. The average value of an angle in a triangle is

A) 60º B) 90º C) 45º D) 100º E) 75º

2. The largest prime factor of 777 is

A) 37 B) 3 C) 7 D) 11 E) 2

3. 200% x 1/2 -(-1 + 5) = ?

A) -2 B) -3 C) -6 D) 7 E) -7

4. The product of two natural numbers is 20. The largest possible sum of these two numbers is

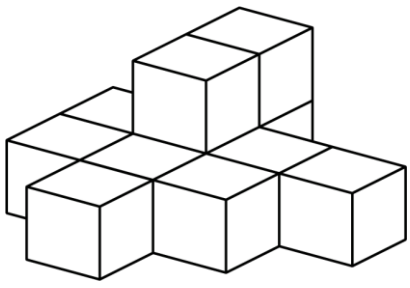
A) 10 B) 12 C) 21 D) 9 E) 13

5. 2! = 1 x 2 = 2, 3! = 1 x 2 x 3 = 6, 3!! = 6! = 720. Which of the following is the smallest?

A) 4!! B) 3! C) 3!! D) 2!!!! E) 4!

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

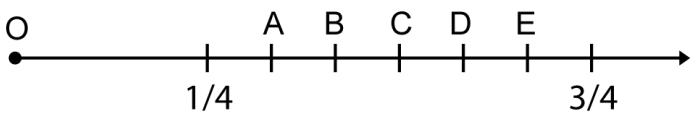
A) 20 B) 22 C) 24
D) 25 E) 26



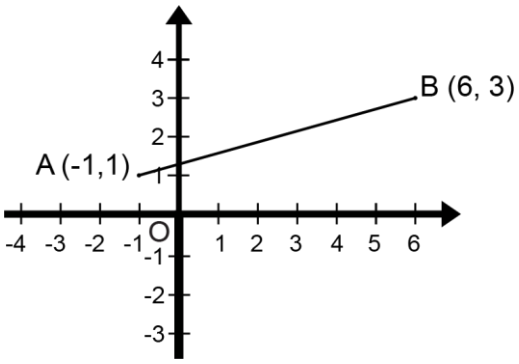
7. The average of 5 different integers smaller than 0 is -5. The smallest of these 5 integers is

A) -19 B) -17 C) -18
D) -15 E) -16

8. The fractions 1/4 and 3/4 are represented on the number line below. If the origin of the number line is 0, which letter represents the fraction 7/12?



9. 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 (6, -3)
E) (1, 1) and (-6, 3)

10. The result of 10% of 20 + 20% of 50 + 30% of 30 is

A) 19 B) 20 C) 21
D) 22 E) 23

11. How many diagonals can be drawn in a polygon with 10 sides?

A) 36 B) 20 C) 27 D) 35 E) 44

12. 10 dm^3 = ? cm^3

A) 10 B) 1 C) 100 D) 10 000 E) 1 000

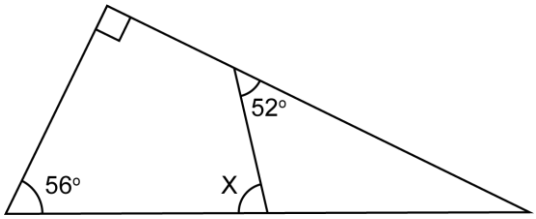
13. A car performs a sequence of five displacements: N2, W4, S6, E4, N1. These five displacements are equivalent to the displacement

A) S3 B) N3 C) E4 D) S4 E) W3

14. The product of all the prime numbers smaller than 10 is not divisible by

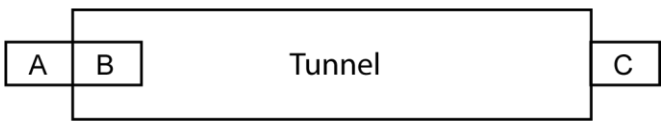
A) 5 B) 6 C) 9
D) 7 E) 10

15. What is the measure of angle X?



A) 70º B) 86º C) 78º
D) 84º E) 82º

16. A train moving at 120 km/h takes 15 s to completely enter a tunnel (to pass from position A to position B) and 3 minutes more to pass from position B to position C. How long is the train?



A) 1.5 km B) 0.5 km C) 1 km D) 0.3 km E) 0.6 km

17. What is the LCM of 6, 8, and 10?

A) 120 B) 60 C) 40 D) 80 E) 240

18. If x = -3, what is the value of $x^2 - 5x$?

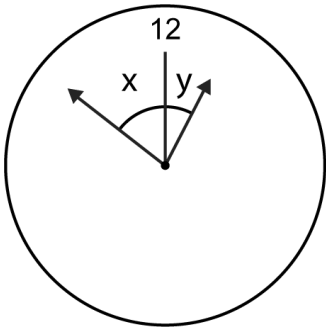
A) -24 B) 10 C) 6 D) -6 E) 24

19. What is the maximum number of Sundays that can occur in a period of 60 days?

A) 8 B) 9 C) 10
D) 11 E) 12

20. What is the next term in the sequence: 1, 3, 11, 43, …?

A) 169 B) 170 C) 171
D) 172 E) 173



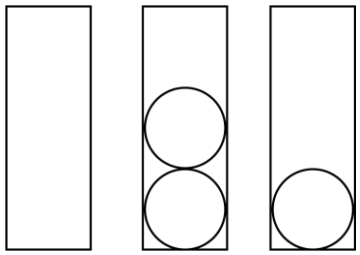
21. If you could spend $2 every 20 seconds, how much could you spend in 20 hours?

A) $8 200 B) $7 200 C) $8 000
D) $8 400 E) $7 400

22. There is a time on a clock between 12:00 and 1:00, when angle x is equal to twice angle y. Which of the following is closest to the value of angle y?

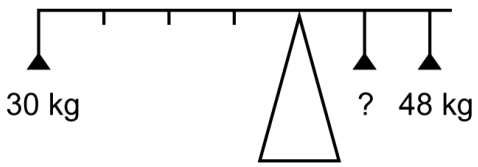
A) 26º B) 27º C) 25º D) 24º E) 23º

23. How many different ways can you put 3 tennis balls in the 3 cylindrical boxes shown below, if you must put at least one ball in the third box? The diagram shows one way to do this: none in the first, 2 in the second, and 1 in the third box.



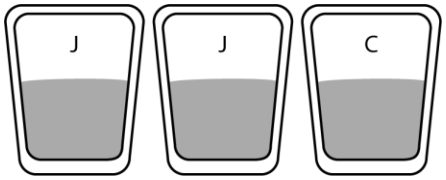
A) 4 B) 5 C) 8
D) 7 E) 6

24. What is the weight that will enable the system to be in equilibrium? The diagram is to scale.



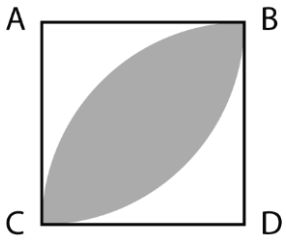
A) 22 kg B) 18 kg C) 24 kg
D) 20 kg E) 15 kg

25. Two of the three glasses on the right contain juice; the other contains coffee. If you randomly choose two of these glasses and drink a small amount of liquid from each one, what is the probability that you will drink some juice?



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

26. The diagram on the right shows a square whose side is 1 and also two arcs with centres at points A and D. What is the area of the shaded surface?

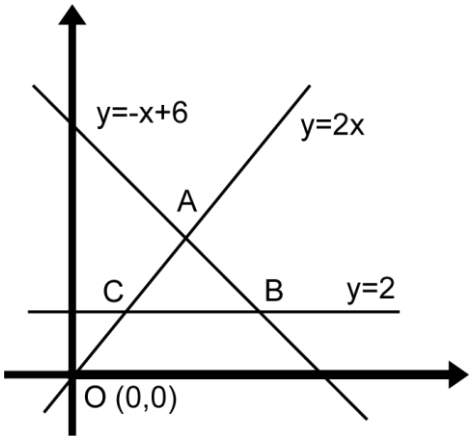


A) Π/3 - 1 B) Π/2 - 1
C) Π - √3/2 D) 2Π - 1
E) Π/3 - 1/2

27. Mathilda can finish a job in 2 hours. Mathew can finish the same job in 3 hours. How long will they take to finish the same job if they work together?

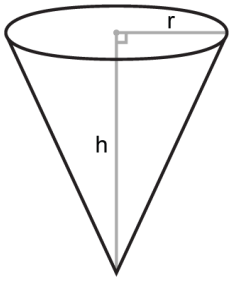
A) 6/5 h B) 5/2 h C) 2/3 h
D) 5/6 h E) 3/2

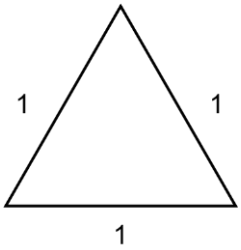
28. Three straight lines, y = 2x, y = -x + 6, and y = 2 intersect at points A, B, and C. What is the distance between points A and C?



A) 3√2 B) √3 C) √5
D) 2√2 E) √2

29. What is the volume of the cone below?





A) $\Pi r^2h/3$ B) Πr^2h C) $2\Pi r^2h$ D) r^2h E) $3r^2h$

30. What is the area of the equilateral triangle shown above?

A) 2√2 B) 2√3 C) √3/4 D) √3/2 E) √3