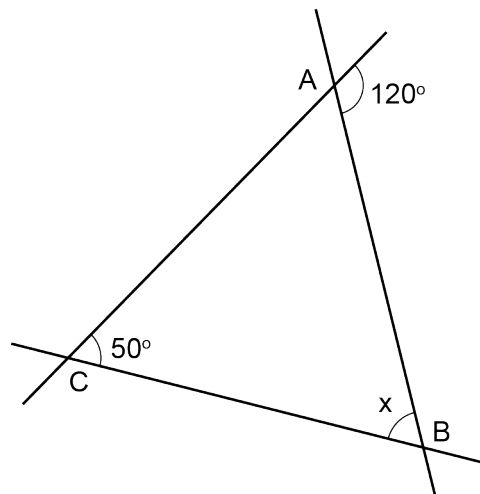


Mathematica Centrum

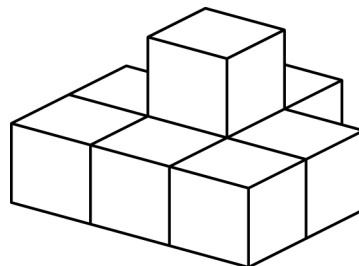
Together, let's shape the mathematicians of the future

NEWTON PREPARATORY TEST 2022

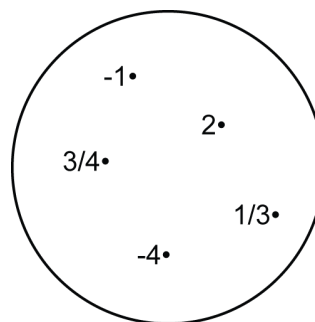
- The result of $100 + 10 - 1 + 0.2$ is
A) 109.1 B) 109.2 C) 118.9 D) 110 E) 108.1
- The closest integer to the value of $0.3 + 0.6 - 0.3 + 0.1$ is
A) 1 B) 0 C) -1 D) 2 E) -2
- $\frac{2}{5}$ of 25 = ?
A) 6 B) 8 C) 9 D) 10 E) 7
- The square root of the cube of 4 is equal to
A) 3 B) 4 C) 16 D) 8 E) 2
- The value of $(-3 + 7) - (-8 - 3)$ is
A) -11 B) 14 C) -10 D) 11 E) 15
- $-1 \times -2 \times 3 \times -4 = ?$
A) -24 B) 12 C) -12 D) 18 E) 24
- What is the product of the opposite of -2 and the opposite of 5?
A) 2 B) -10 C) -2 D) 3 E) 18
- $\frac{1}{2} + \frac{1}{4} - \frac{1}{8} = ?$
A) $\frac{15}{16}$ B) $\frac{1}{2}$ C) $\frac{5}{8}$
D) $\frac{9}{8}$ E) $\frac{3}{4}$
- $\frac{5}{4}$ of 10% of 0.8 is equal to
A) 10% B) 15% C) 16%
D) 0.2 E) 0.3
- The supplement of angle x minus the complement of angle x is equal to
A) 65° B) 60° C) 80°
D) 100° E) 90°



11. The largest prime factor of 170 is
- A) 13 B) 25 C) 2 D) 5 E) 17
12. $1\ 000\ \text{km} + 100\ \text{hm} + 10\ \text{dam} + 1\ \text{m}$ is equal to
- A) $1\ 010\ 110\ \text{m}$ B) $1\ 001\ 110\ \text{m}$ C) $1\ 010\ 101\ \text{m}$ D) $1\ 000\ 110\ \text{m}$ E) $100\ 100\ \text{m}$
13. Eight blocks have been glued together as shown in the diagram. How many faces of these blocks don't have glue on them?
- A) 14 B) 30 C) 22
D) 16 E) 28



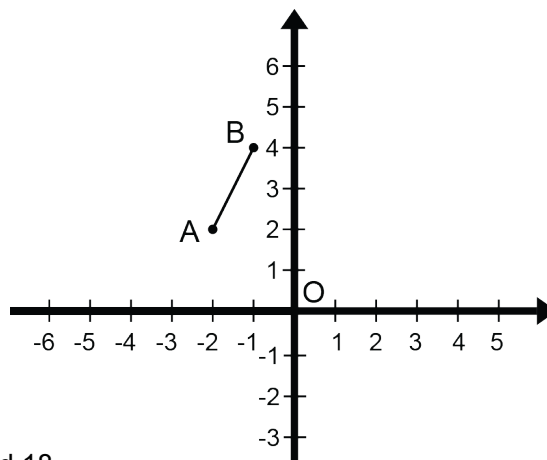
14. Which of the following is closest to the number of minutes in 60 days?
- A) the number of seconds in 6 days
B) the number of seconds in 24 days
C) the number of seconds in 60 days
D) the number of seconds in 2 weeks
E) the number of seconds in 20 hours



15. If the base of a pyramid is a triangle, what is the sum of all the angles of the faces of the pyramid?
- A) 600° B) 840° C) 720°
D) 680° E) 900°

16. For how many values of the set shown is $x^2 > -x$?
- A) 4 B) 3 C) 2
D) 1 E) 0

17. What are the coordinates of the images of points A and B, if line segment AB is first turned 90° clockwise around point O and then reflected in the x-axis?

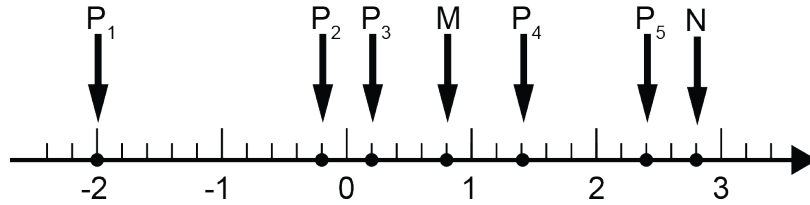


- A) $A'(2, -2), B'(4, -1)$
B) $A'(-2, 2), B'(-4, 1)$
C) $A'(-3, 1), B'(1, 4)$
D) $A'(4, -1), B'(2, -2)$
E) $A'(-4, 1), B'(2, -2)$

18. How many of the following numbers: 4, 6, 10, 12, and 18 have 6 factors?
- A) 0 B) 1 C) 2 D) 3 E) 4

19. The measures of the 3 angles of a triangle are in the ratio 2 : 3 : 4. What is the sum of the measures of the two largest angles?
- A) 100° B) 135° C) 120° D) 140° E) 130°

20. Which point on the number line is 4 times further from point M than from point N?



- A) P_1 B) P_3 C) P_2 D) P_5 E) P_4

21. The 5 letters of the name EULER are in a bag. If you draw, at random, one letter from the bag, what is the probability of drawing a consonant?

- A) $\frac{2}{5}$ B) $\frac{3}{5}$ C) $\frac{1}{5}$ D) $\frac{4}{5}$ E) $\frac{5}{5}$

22. A, B, C, and D are four natural numbers. We know that $A \times B = 20$, $B \times C = 35$, and $C \times D = 70$. What is the value of $A \times D$?

- A) 36 B) 32 C) 30 D) 35 E) 40

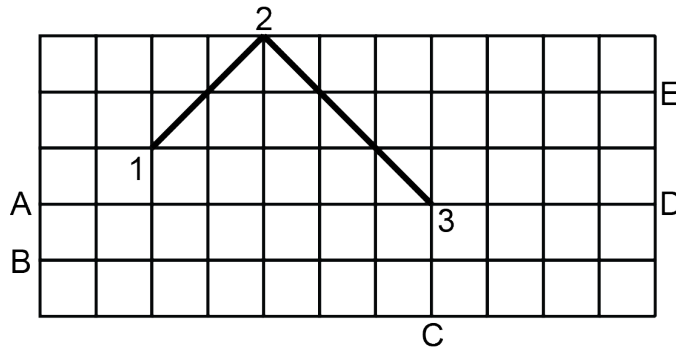
23. The perimeter of a rectangle is 30 cm. If its length were doubled, the perimeter would become 50 cm. What is the width of the rectangle?

- A) 8 cm B) 10 cm C) 5 cm D) 6 cm E) 12 cm

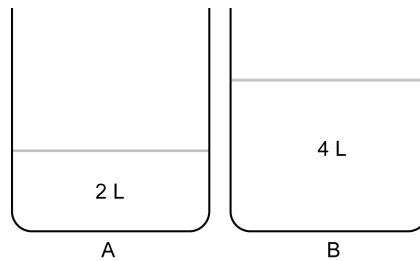
24. How many 9's are used when $10^3 - 9$ is written as a natural number?

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

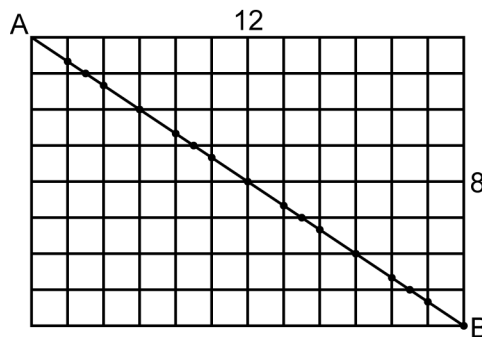
25. The diagram below shows a frictionless table covered by a chequered cloth. Mathilda releases a disc from point 1. The disc hits the side of the table at point 2, where it rebounds for the first time and then continues its way to point 3. At which point (A, B, C, D or E) will the disc hit the side of the table when it rebounds for the 8th time?



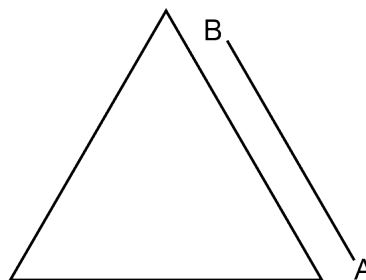
29. Container A holds 2 litres of water. Container B holds a homogeneous mixture of 3 litres of wine and 1 litre of water. One litre of mixture B is poured into container A. What fraction of the final mixture in container A does the wine represent?



- A) $3/8$ B) $5/16$ C) $1/2$ D) $1/4$ E) $1/3$
30. A 12×8 lined rectangular area is made of 13 vertical lines and 9 horizontal lines. Excluding point A, there are 16 points at which diagonal AB intersects these lines. Excluding point A, at how many points would diagonal AB intersect the lines of a 230×80 lined rectangular area?



- A) 312 points B) 287 points C) 302 points D) 310 points E) 300 points
31. The Delta is a large building shaped like an equilateral triangular prism. The sides of its base are 100 metres long. A carpenter must build a fence that stands at all points exactly 10 metres away from the perimeter of the building. The carpenter started working at point A and is now at point B. What is the total length of the fence (in metres) when it completely surrounds the building?

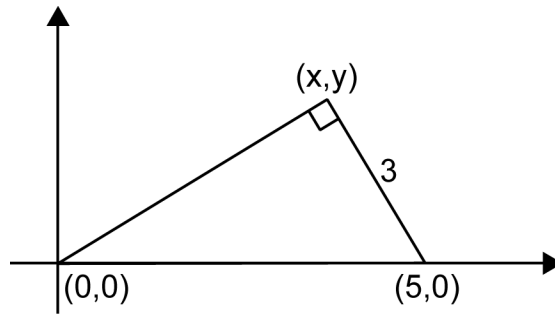


- A) $300 + 2\pi$ B) 300 C) $300 + 20\pi$ D) $300 + 10\pi$ E) $300 + 15\pi$

32. For the past d days, a small bicycle company has produced an average of 100 bicycles per day. Today's production of 64 bicycles lowers the average to 94 per day. What should the average production per day be for the next 2 days, so that the overall average is raised to 104 bicycles per day?

- A) 133/day B) 134/day C) 135/day D) 136/day E) 137/day

33. What is the value of x/y in the triangle below?



- A) $5/4$ B) $4/5$ C) $3/4$ D) $4/3$ E) $5/3$