Mathematica Centrum

Together, let's shape the mathematicians of the future

LAGRANGE PREPARATORY TEST 2022

1	The	result	٥f	100 .	+ 1∩	_ 1	+ (1 2	ic
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- A) 109.1
- B) 109.2
- C) 118.9
- D) 110
- E) 108.1

2. 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

- A) 6
- B) 8
- C) 9
- D) 10
- E) 7

- A) 3
- B) 4
- C) 16
- D) 8
- E) 2

5. The value of
$$(-3 + 7) - (-8 - 3)$$
 is

- A) -11
- B) 14
- C) -10
- D) 11
- E) 15

6.
$$-1 \times -2 \times 3 \times -4 = ?$$

- A) -24
- B) 12
- C) -12
- D) 18
- E) 24

7. What is the product of the opposite of -2 and the opposite of 5?

- A) 2
- B) -10
- C) -2
- D) 3
- E) 18

8.
$$1/2 + 1/4 - 1/8 = ?$$

- A) 15/16
- B) 1/2
- C) 5/8

- D) 9/8
- E) 3/4

9. 5/4 of 10% of 0.8 is equal to

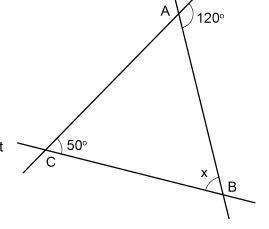
- A) 10%
- B) 15%
- C) 16%

- D) 0.2
- E) 0.3

10. The supplement of angle x minus the complement of angle x is equal to

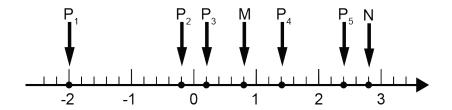
- A) 65°
- B) 60°
- C) 80°

- 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 km + 100 hm + 10 dam + 1 m is equal to									
	A) 1 010 110 m	B) 1 001 110 m	C) 1 010 101 m	D) 1 000 110 m	E) 100 100 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 D) 16	B) 30 E) 28	C) 22							
14.	. Which of the following is closest to the number of minutes in 60 days?									
	C) the number of D) the number of	seconds in 6 days seconds in 24 days seconds in 60 days seconds in 2 weeks seconds in 20 hours		-10						
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° D) 680°	B) 840° E) 900°	C) 720°	-4•	1/3•					
16.	For how many values of the set shown is $x^2 > -x$?									
	A) 4 D) 1	B) 3 E) 0	C) 2	61						
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, -2) B) A'(-2, 2), B'(-4, -2) C) A'(-3, 1), B'(1, -2) D) A'(4, -1), B'(2, -2) E) A'(-4, 1), B'(2, -2)	1) 4) -2)	-6	1	1 2 3 4 5					
18.	How many of the flave 6 factors?	ollowing numbers: 4	, 6, 10, 12, and 18	-3†						
	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) P₁
- B) P₃
- C) P2
- D) P₅
- E) P4

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) 2/5
- B) 3/5
- C) 1/5
- D) 4/5
- E) 5/5

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

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

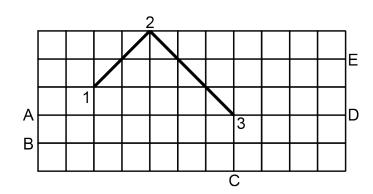
23. The perimeter of a rectangle is 30 cm. If its length were doubled, the perimeter would become 50 cm. What is the width of the rectangle?

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

24. How many 9's are used when 103 - 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?



26. The diagram shows the division of the earth's surface into a number of principal areas: the oceanic areas P(Pacific), A(Atlantic), I(Indian), AA(Arctic and Antarctic), and the Continental areas (C). Approximately what fraction of the earth's surface is covered by the Atlantic and Pacific oceans?



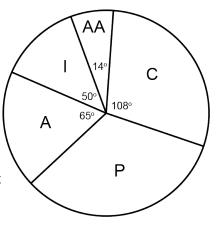
B) 9/25

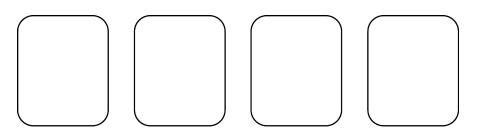
C) 48%



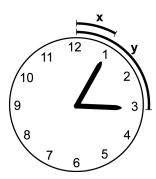
E) 0.54

27. Melissa and Andrea are at the airport. Each must put her personal belongings into one of the 4 empty available bins (see diagram). We know that there are 12 different ways to put these belongings into the 4 bins. What is the probability that they will place their belongings into two bins that are beside each other?



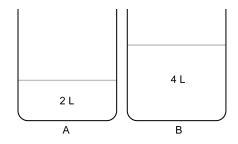


- A) 1/3
- B) 1/2
- C) 7/12
- D) 2/3
- E) 5/12
- **28.** The time on the clock is 3:05. When the 12 on the clock is taken as a reference position, we can say that the minute hand is at a distance x from the 12 and the hour hand is at a distance y. We can also say that the hour hand is a bit more than 3 times further from the 12 than the minute hand. Which of the following is closest to the exact time on the clock when the minute hand is 2 times further from the 12 than the hour hand?

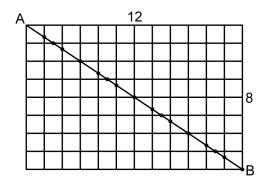


- A) 3:38
- B) 3:35
- C) 3:39
- D) 3:37
- E) 3:36

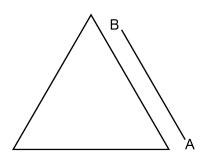
29. Container A holds 2 litres of water. Container B holds a homogeneous mixture of 3 litres of wine and 1 litre of water. One litre of mixture B is poured into container A. What fraction of the final mixture in container A does the wine represent?



- A) 3/8
- B) 5/16
- C) 1/2
- D) 1/4
- E) 1/3
- **30.** A 12 x 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 x 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 + 10π
- E) $300 + 15\pi$