Mathematics Contest Centre

PREPARATORY TEST 2007

EULER (Grade 7 – Sec I) – LAGRANGE (Grade 8 – Sec II)

1. Which of the following is not a perfect square?

A) 16 B) 9 C) 12 D) 64 E) 36

2. The closest integer to the product of 2.4 x 10.12 is

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

3. If 5 times a number is equal to 18, then 50 times the same number is equal to

A) 160 B) 150 C) 170 D) 190 E) 180

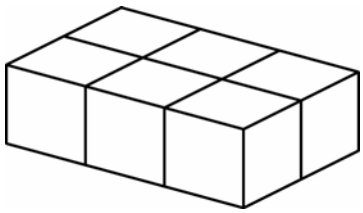
4. 720 minutes = ? hours

A) 15 hours B) 14 hours C) 11 hours D) 12 hours E) 13 hours

5. What is the value of N in the equation: 2 x 2 x 3 x 3 x 4 x 5 = 4 x 5 x N x N?

A) 4 B) 6 C) 2 D) 3 E) 5

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



A) 14 B) 12
C) 20 D) 16
E) 18

7. What is the average of all the natural numbers from 1 to 10?

A) 4 B) 4.5 C) 5.5 D) 5 E) 6

8. The 100th digit after the decimal point in the expansion of 1/7 is

A) 2 B) 5 C) 7 D) 1 E) 8

9. What is the minimum number of consecutive even numbers that you must multiply together to be sure that the ones digit of their product is a 0?

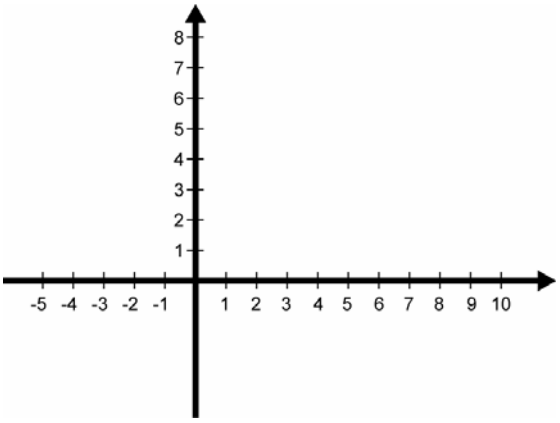
A) 4 B) 5 C) 3 D) 2 E) 6

10. What is the maximum number of points at which the sides of a triangle can intersect the sides of another triangle?

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

11. Join the points represented by the following set of ordered pairs: A (-3 , 3), B (-3 , 7), C (1 , 7), and D (1 , 3). Polygon ABCD is a

A) rhombus B) square
C) trapezium D) rectangle
E) parallelogram



12. One quarter of a number multiplied by 5 gives 20. Three times the same number divided by 8 gives

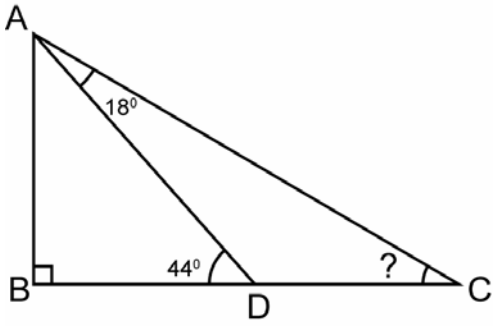
A) 7 B) 4 C) 9
D) 6 E) 5

13. In base 2 (binary system), which equation is false?

A) 11 + 1 = 101 B) 1 x 10 = 10 C) 11 x 11 = 1001 D) 100 ÷ 1 = 100 E) 1 + 1 + 1 = 11

14. The measure of angle ABC is 90°. What is the measure of angle ACD?

A) 24° B) 25° C) 26°
D) 27° E) 28°



15. A square sheet of paper is folded in half, 4 times. Two holes are punched through the folded sheet. How many holes will there be in the sheet of paper when it is unfolded?

A) 8 B) 16 C) 64
D) 24 E) 32

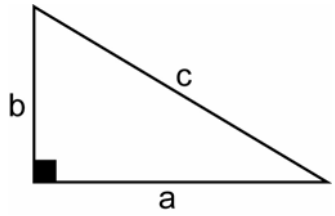
16. The smallest positive integer n for which the sum of n + 2n + 3n + 4n is a perfect square is

A) 4 B) 16 C) 2 D) 10 E) 5

17. Billy and Willy are 100 metre sprinters. They cross the finish line together if Willy starts the race 10 metres ahead of Billy. If Willy starts the race only 5 metres ahead of Billy and assuming that each sprinter runs at a constant speed, how many metres from the finish line will Billy catch up with Willy?

A) 50 B) 55 C) 45 D) 60 E) 95

18. Pythagoras' theorem states that, in a right triangle, if c is the length of the hypotenuse and a and b are the lengths of the other two sides, then $a^2 + b^2 = c^2$. If a = 6 and b = 8, then $c^2 = 6^2 + 8^2 = 100$ and $c = \sqrt{100} = 10$. What is the length of c if b = 1 and $a = \sqrt{2}$?

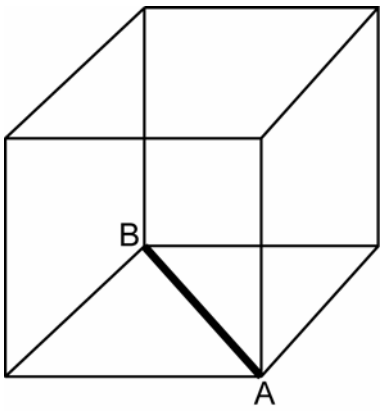


A) 2 B) 1.8 C) $\sqrt{3}$
D) 3 E) 2.5

19. Andrea, Melissa, and Carol are in a class of 27 girls. The teacher chooses students at random to make up teams of three. What is the probability that Andrea, Melissa and Carol end up being on the same team?

A) 1 B) 0 C) 1/2925 D) 1/27 E) 1/9

20. A cube has edges that measure 1 cm. What is the length of line segment AB shown in bold type in the diagram?



A) 1.5 cm B) $\sqrt{2}$ cm C) $\sqrt{3}$ cm
D) 1.3 cm E) 1.7 cm

21. $30 - 2^3 + 3 \times 2 = ?$

A) 26 B) 30 C) 27
D) 50 E) 28

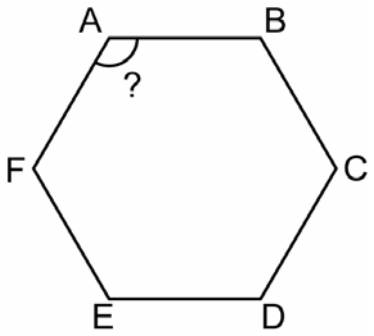
22. Hose A can fill a tank in 2 minutes, hose B can fill it in 4 minutes. How long will it take the two hoses to fill the tank together?

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

23. How many prime numbers are there between 90 and 100?

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

24. A regular polygon is a polygon whose sides are all of equal length and whose angles are all equal. What is the measure of one of the angles (for example, angle A) of the regular hexagon ABCDEF?



A) 105° B) 108° C) 120°
D) 135° E) 106°

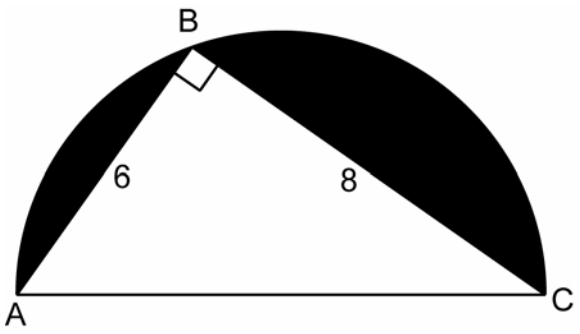
25. If x = -2, the value of $2x^2 - 2x + 7$ is

A) 3 B) 11 C) 19 D) -5 E) 27

26. There are an infinite number of rectangles whose areas are equal to 24 cm^2. How many of these rectangles have sides that are a whole number of centimetres long?

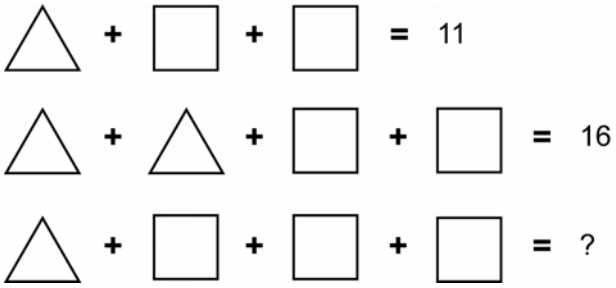
A) 2 B) 4 C) 6 D) 8 E) 10

27. AC is the diameter of the half-circle ABC. ABC is a right-angled triangle with AB = 6 cm and BC = 8 cm. The shaded area is approximately equal to



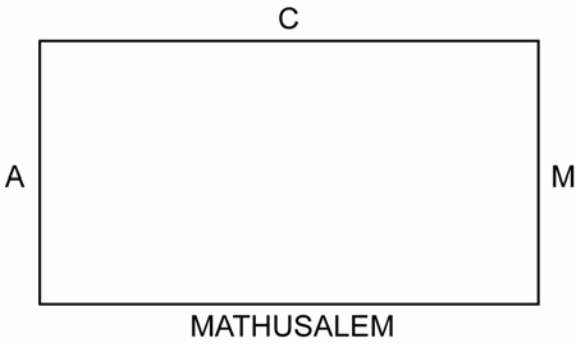
A) 15.3 cm^2 B) 54.5 cm^2
C) 290.2 cm^2 D) 30.5 cm^2
E) 266.2 cm^2

28. Each geometric figure has the same value in all three equations. In the first two, the total value of the geometric figures on the left side of the equation is given on the right. Using this information, find the missing value in the third equation?



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

29. Tonight, Mathusalem is having a Halloween party with his 3 daughters: Andrea (A), Melissa (M), and Carol (C). The diagram below shows the places where each girl usually sits. However tonight, none of the 3 girls is sitting at her usual place and neither has her own purse. The only thing we know for certain is that the girl who has Carol's purse is sitting in Melissa's place. Which of the following is true?



A) Carol is sitting in Melissa's place and has Andrea's purse.
B) Andrea is sitting in Melissa's place and has Melissa's purse.
C) Carol is sitting in Melissa's place and has Melissa's purse.
D) Melissa is sitting in Carol's place and has Carol's purse.
E) Andrea is sitting in Melissa's place and has Carol's purse.