PRIMARY 6

NAME OF PARTICIPANT: _____ **DATE**: _____

SCHOOL NAME: _____

GENERAL INSTRUCTIONS:

1. Do not open the booklet until you are told to do so.
2. You are given 90 minutes to attempt all 25 questions.
3. Ensure to enter the necessary information asked in the Answer Sheet such as your name, participant number, country, and year level.
4. Record your answers neatly on the Answer Sheet provided.
5. Marks are awarded for correct answers only. There is no penalty for incorrect answers.
6. Calculators are not allowed.
7. All figures are not drawn to scale. They are intended only as aids.
8. Start answering when the proctor gives the signal.

Part 1 (Questions 1 to 10):
   There are 10 multiple-choice questions. Choose the best answer from the four possible choices
   Each question carries 2 marks

Part 2 (Questions 11 to 25):
   There are 20 open-ended questions, each requiring a single answer. Write your answer on the box provided in the Answer Sheet
   Questions 11 to 20, each carries 3 marks
   Questions 21 to 25, each carries 5 marks

1.   Which of the following numbers is odd for any integer x?

   (a) $2021 + x^3 + 2x$

   (b) $2021 + 7x^2$

   (c) $2021 + 6x^2$

   (d) $2021 + 2021x$

2.   What is the distance covered by a jogger who run around 6 times in a circular park with an area of 121π meters?
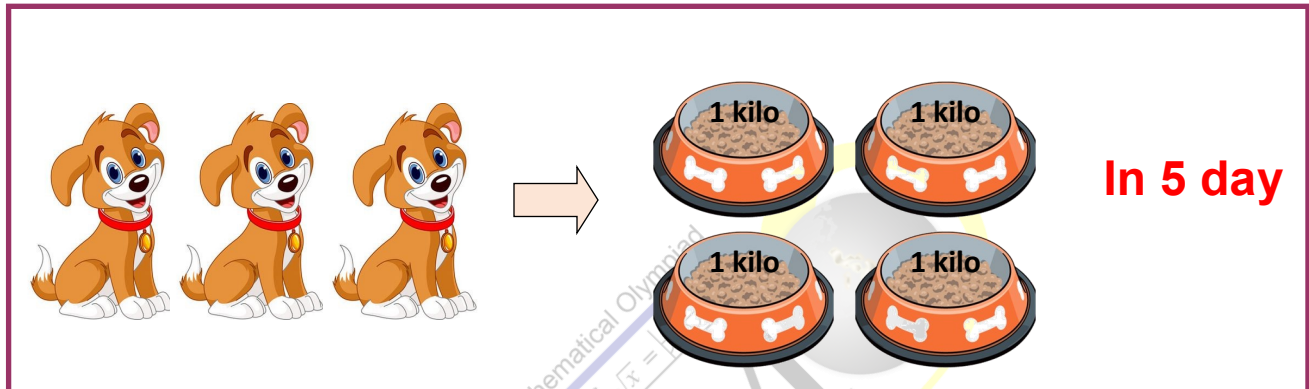

   (a) 22π meters

   (b) 122π meters

   (c) 132π meters

   (d) 121π meters

3. Let a, b and c be nonnegative integers such that $a + b = 20$ and $b + c = 36$. Find the sum of the minimum and maximum value of $a + c$.

    (a)   56   (b)   60   (c)   66   (d)   72

4. If three dogs eat 4 kilograms of dog food in 5 days, how long will it take for 12 dogs to consume 48 kilos of dog food?
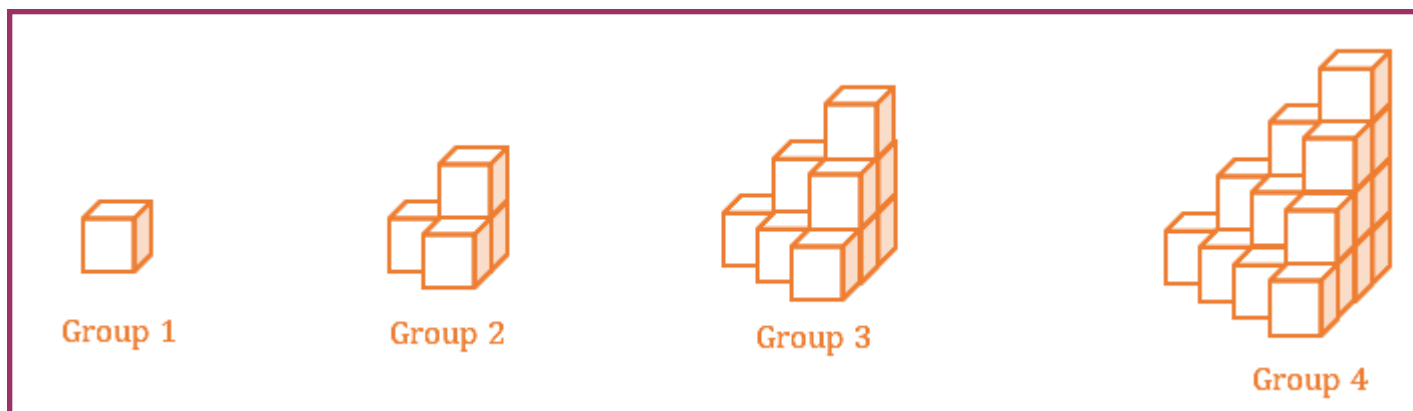

    (a)   12 days   (b)   15 days   (c)   18 days   (d)   20 days

5. Jackson needs to set up 180 chairs in rows such that each row must have an equal number of chairs and there must be more than 5 rows. How many ways can Jackson arrange the chair?

    (a)   18   (b)   16   (c)   15   (d)   13

6. A group of students were asked what kind of ball games they usually play. 55 play basketball, 52 play baseball, 48 play volleyball, 30 play basketball and baseball, 16 play basketball and volleyball, 18 play baseball and volleyball and 9 play all three games. If there were 105 students who were asked, how many of them do not play any of the three ball games?

(a)   5   (b) 7   (c) 11   (d) 20

7. Given that $\sqrt{x^2 - 16} + \sqrt{2x + y} = 0$.

Find the value of $y - x$

(a) 8   (b) -8 or 8   (c) -12 or 12   (d) None of the above

8. Find the value of

$$\frac{1}{128} + \frac{1}{64} + \frac{1}{32} + \frac{1}{16} + \cdots + \frac{1}{2} + 1 + 2 + 4 + \cdots + 32 + 64 + 128 - 255$$

(a) 129/128   (b) 127/128   (c) 128/129   (d) 63/64

9. On a six-sided die, each face is numbered from 1 to 6. What is the probability of throwing a 2 or a 4?

(a) 1/12   (b) 1/6   (c) 1/3   (d) 2/5

10. Find the number of 1×1×1 cubes in the 7th group

Group 1   Group 2   Group 3   Group 4

(a) 74   (b) 80   (c) 84   (d) 90

Part 2: 11th to 30th Open-ended Questions

11. Two numbers A and B have an LCM of 2,760 and an HCF of 46. If A = 184 what is B?

12. A rectangular ceiling has a length and width of 8 meters and 6 meters, respectively. The ceiling needs 4 coats of paints. If each can covers 24 m2, how many cans of paints are needed?

13. The figure below shows a road map connecting two Shopping Centres A and B in a certain city. Regions VYVY represents a large residential estate in the city. Find the number of shortest routes to travel from A to B along the roads shown in the figure.
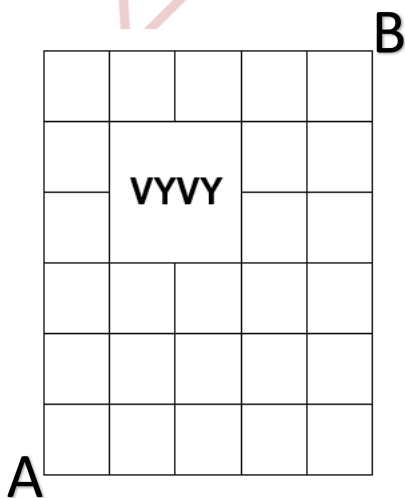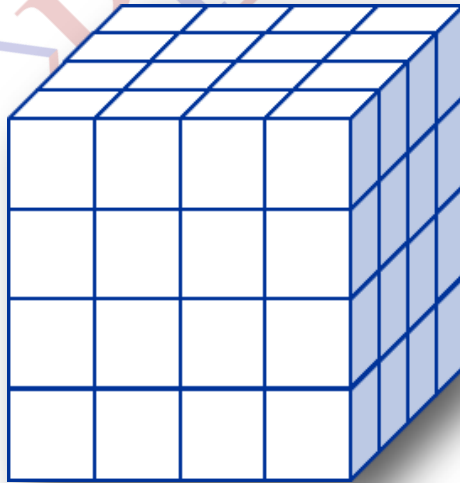

14. Determine the maximum value of n such that

$$2 + 4 + 6 + \cdots + n \leq 120$$

15. A horse was tied to a peg at one corner of a square fenced field by means of a 12-meter rope. The square field is 10 meters long. Assuming that the horse is outside the square field, what is area in which the horse can graze? (write your answer in terms of π)
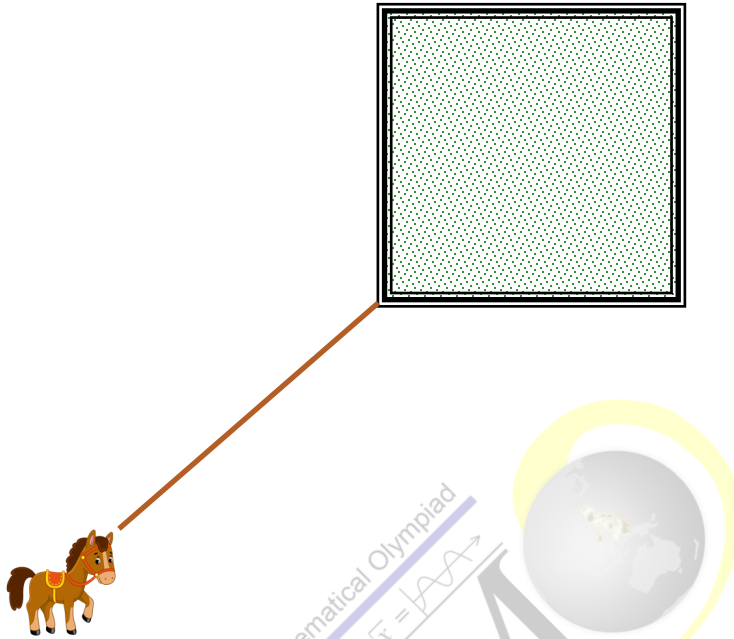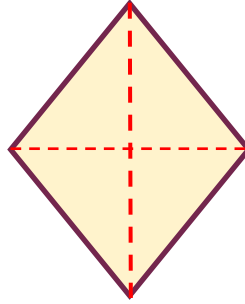
16. How many cubes are in the figure below?

17. The supplement of an angle is 6 more than seven times its complement. Determine the angle.

18. What is the area of a rhombus whose diagonals are 15 cm and 23 cm?

19. A committee of 3 people is to be formed randomly from a group of 5 women and 4 men. Find the probability that the committee has 2 women and 1 man?

20. The sum of a number and its reciprocal is 164/18 . Determine the number.

21. Factor completely:

$$x^8 - y^{16}$$

22. The average of three numbers is 24. If two numbers A and B are added, the average decreases by 4. If A is three times the value of B, determine the value of A.

23. The length of a rectangle is 8 units more than its width. If the length is decreased by 9 and the width is tripled, the area is increased by 50%. What is the area of the original rectangle?

24. ABCD is a square. X is the midpoint of side AB and Y is the midpoint of side BC. A point G is chosen inside square ABCD, what is the probability that point G is inside triangle XYB?

25. The average of 20 numbers is 13 and the average of 30 numbers is 28. What is the average of all 50 numbers?