



Junior Maths Mastery Challenge Sample

Paper F

Section A

Questions 1 to 5 carry 3 marks each.

1. Find the value of the following.

$$11 + 22 + 33 + \dots + 528 + 539 + 550$$

- (A) 13 750 (B) 14 025 (C) 15 455
(D) 28 050 (E) None of the above

2. How many numbers at most can we select from

1, 2, 3, 4, 5, ..., 46, 47, 48, 49 and 50

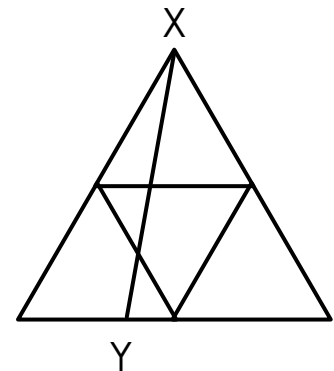
such that the sum of any two numbers is divisible by 5?

- (A) 5 (B) 10 (C) 15
(D) 20 (E) 25

3. Helen wants to cut a 500-centimetre ribbon into shorter pieces of length 30 centimetres or 80 centimetres without any length of ribbon left over. How many ways can she cut the ribbon?

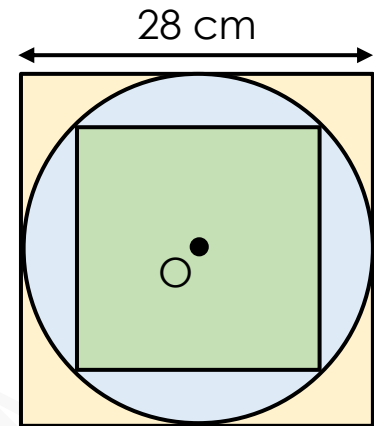
(A) 1 (B) 2 (C) 3
(D) 4 (E) 5

4. The figure shows a large triangle made up of 4 small equilateral triangles. Line XY is drawn across the figure. How many triangles are there in the figure?



(A) 6 (B) 8 (C) 10
(D) 12 (E) None of the above

5. The figure below shows two squares and a circle. Point O is the centre of the figure. Find the area of the smaller square.



- (A) 196 cm^2 (B) 392 cm^2 (C) 490 cm^2
(D) 588 cm^2 (E) None of the above



Questions 6 to 10 carry 4 marks each.

6. Study the number pattern.

$$\begin{array}{rclcl} 1 & = & 1 & = & \frac{1 \times 2}{2} \\ 1 + 2 & = & 3 & = & \frac{2 \times 3}{2} \\ 1 + 2 + 3 & = & 6 & = & \frac{3 \times 4}{2} \\ 1 + 2 + 3 + 4 & = & 10 & = & \frac{4 \times 5}{2} \\ 1 + 2 + 3 + 4 + 5 & = & 15 & = & \frac{5 \times 6}{2} \\ & & \vdots & & \end{array}$$

Find the largest possible value of n such that
 $1 + 2 + 3 + 4 + \dots + n < 200$.

(A) 13

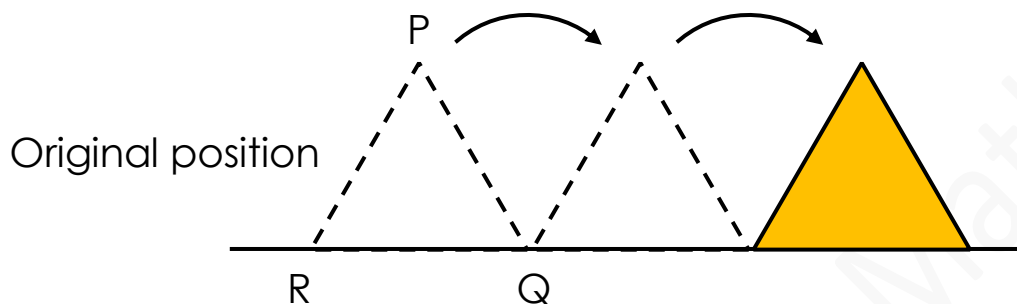
(B) 14

(C) 19

(D) 20

(E) None of the above

7. Ken placed the base of an equilateral triangular block PQR on flat ground. He rotated the block clockwise about a vertex twice as shown in the diagram. Find the total angle Point R rotated in the clockwise direction.



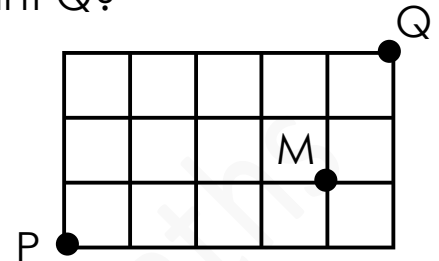
- (A) 120° (B) 180° (C) 240°
(D) 360° (E) None of the above



8. John is leaving his house to meet his friend at Town X. If he drives at an average speed of 80 km/h, he will be 20 minutes late. If he drives at an average speed of 100 km/h, he will be 10 minutes early. Find the distance between his house and Town X.

- (A) 160 km (B) 200 km (C) 240 km
(D) 250 km (E) None of the above

9. The lines in the diagram show the paths from Point P to Point Q. Joe wants to take the shortest path from Point P to Point Q passing through Point M. How many different ways can he move from Point P to Point Q?



- (A) 8 (B) 10 (C) 12
(D) 14 (E) None of the above

10. There were five teams A, B, C, D and E in a football competition. Each team must play exactly once against another team.

- a) Team A has played exactly 4 games.
- b) Team B has played exactly 3 games.
- c) Team C has played exactly 2 games.
- d) Team D has played exactly 1 game.

Which of the following statements is **false**?

- (A) Team A has played with each team exactly once.
- (B) Team B has played with Team E.
- (C) Team C has played with Team B.
- (D) Team D has played with Team A.
- (E) Team E has played with Team C.



Section B

Questions 11 and 12 carry 6 marks each.

11. In Mathematics, we have the following:

$$2^2 = 2 \times 2$$

$$2^3 = 2 \times 2 \times 2$$

$$2^4 = 2 \times 2 \times 2 \times 2$$

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2$$

Find the ones digit in the result of the following.

$$1^3 + 2^5 + 3^7 + 4^9 + 5^{11}$$

12. In the following cryptarithm, each letter represents a different digit.

$$\begin{array}{r} \text{M} \quad \text{A} \quad \text{T} \quad \text{H} \\ \times 4 \\ \hline \text{H} \quad \text{T} \quad \text{A} \quad \text{M} \end{array}$$

What 4-digit number does MATH represent?

**PLEASE NOTE THAT THE ACTUAL COMPETITION PAPER
WILL CONSIST TOTAL OF 25 QUESTIONS**