



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

$$1, 2, 3, 4, 5, \dots, 46, 47, 48, 49 \text{ and } 50$$

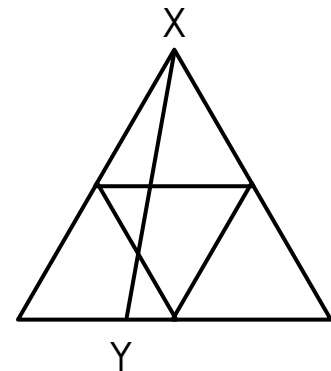
such that the sum of any two numbers is divisible by 5?

- (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?

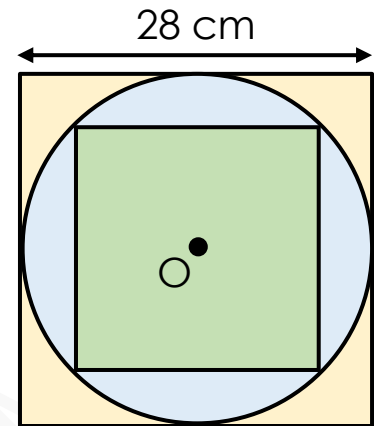
- (A) 1 (B) 2 (C) 3
(D) 4 (E) 5

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.

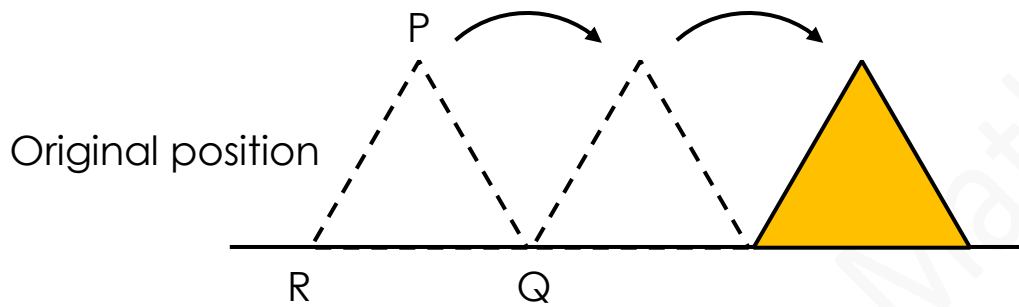
6. Study the number pattern.

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

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.



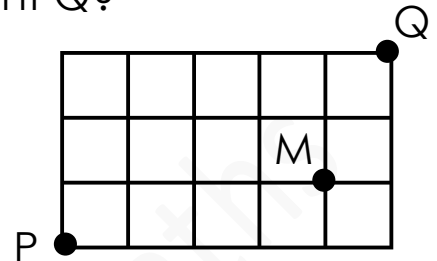
- (A) 120° (B) 180° (C) 240°
(D) 360° (E) None of the above



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.

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

