Junior Maths Mastery Challenge Sample

Paper E

Section A

Questions 1 to 5 carry 3 marks each.

1. Find the value of the following.

$$1 - 2 + 3 - 4 + 5 - 6 + \ldots + 2023 - 2024 + 2025$$

(A) 1012 (B) 1013 (C) 1014

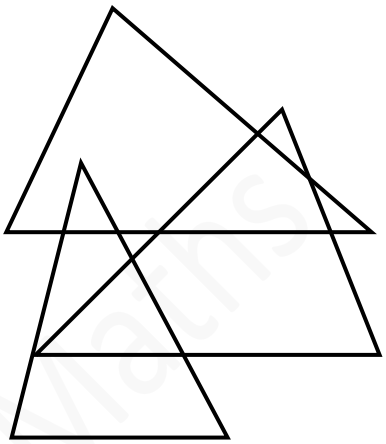
(D) 1015 (E) None of the above

2. Leon's watch slowed at a constant rate of 10 minutes every hour. At 10 a.m., he adjusted his watch to the correct time. What was the correct time when his watch showed 2 p.m. on the same day?

(A) 1.20 p.m. (B) 2:20 p.m. (C) 2.40 p.m.

(D) 2.48 p.m. (E) 2.50 p.m.

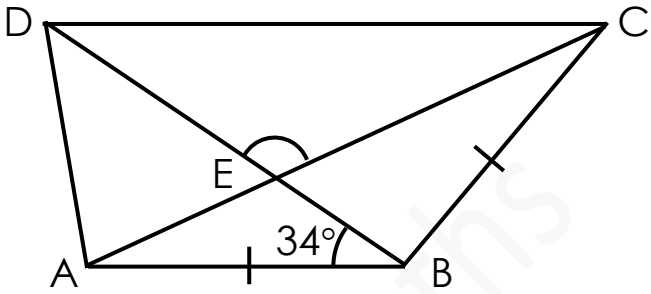
3. The figure is made up of three overlapping triangles. How many triangles are there in the figure?



(A) 12 (B) 13 (C) 14

(D) 15 (E) None of the above

4. In the figure, AB is parallel to DC and AB = BC.
The difference in angle size between ∠ABC and ∠DCB is 80°.
Find ∠DEC.



(A) 116° (B) 121° (C) 126°

(D) 131° (E) None of the above

5. Tim and Paul had some marbles in the ratio 3 : 4.
After Paul gave some marbles to Tim, the ratio of the number of Paul's marbles to that of Tim's marbles became 1 : 2. What was the smallest possible number of marbles Paul gave Tim?

(A) 3 (B) 5 (C) 7

(D) 10 (E) None of the above

Questions 6 to 10 carry 4 marks each.

6. Square tiles are used to form some figures. The figures follow the pattern below.

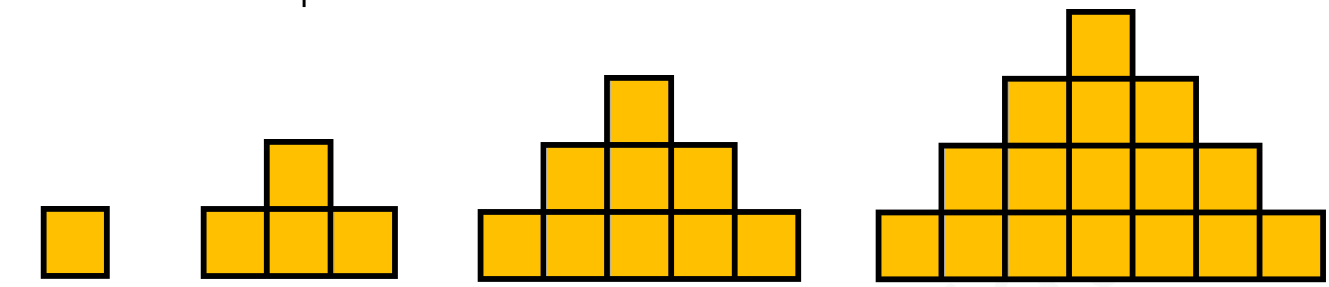


Figure 1 Figure 2 Figure 3 Figure 4

How many square tiles are used to form Figure 99?

(A) 9604 (B) 9702 (C) 9801

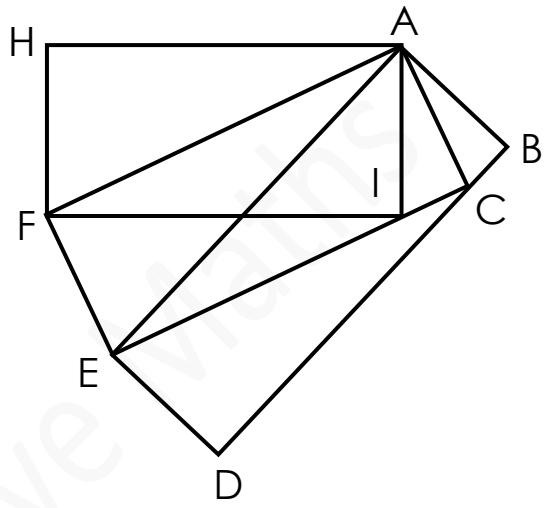
(D) 9900 (E) None of the above

7. 654 and 920 are examples of 3-digit numbers with their digits in descending order. How many such 3-digit numbers are there?

(A) 45 (B) 90 (C) 120

(D) 180 (E) None of the above

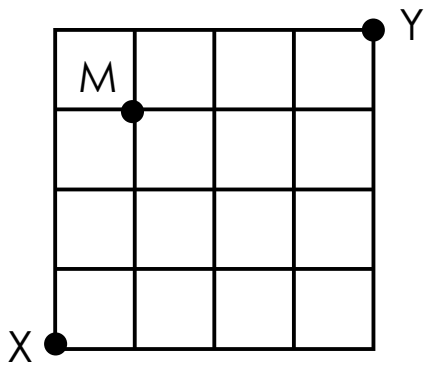
8. The figure is made up of rectangles ABDE, ACEF and AIFH. The length of HA is 30 centimetres and the length of HF is 15 centimetres. What is the area of Rectangle ABDE?



(A) 270 cm^2 (B) 225 cm^2 (C) 180 cm^2

(D) 150 cm^2 (E) None of the above

9. The lines in the diagram show the paths from Point X to Point Y. Ken wants to take the shortest path from Point X to Point Y, passing through Point M. How many different ways are there for him to walk from Point X to Point Y?



(A) 8 (B) 10 (C) 12

(D) 14 (E) None of the above

10. Ali, Ben, Cheryl and Don are playing a game 'Truth-teller and Liars'. The Truth-teller always speaks the truth and the Liars always lie.

    Each of them draws a card and is playing the role of either a Truth-teller or a Liar.

    Each of them made the following statement.

    Ali: Exactly one of us is a Liar.
    Ben: Exactly two of us are Liars.
    Cheryl: Exactly three of us are Liars.
    Don: All of us are Liars.

    At least one of them is a Truth-teller. Which of the following statements is **true**?

    (A) Don is the only Liar.
    (B) Ben is the only Liar.
    (C) Ali and Don are the only Liars.
    (D) Ben is the only Truth-teller.
    (E) Cheryl is the only Truth-teller.

Section B

Questions 11 and 12 carry 6 marks each.

11. In the following cryptarithm, each letter represents a different digit from 1 to 9.

$$\begin{array}{cccc} & A & B \\ & C & D \\ & E & F \\ + & & G \\ \hline 1 & 0 & 0 \end{array}$$

If AB is the largest possible 2-digit number that can be formed, what number does AB represent?

12. Jane writes down 20 different whole numbers. The sum of all these numbers is an even number.

    If any 8 numbers are picked from the numbers, the product of all these 8 numbers is an even number.

    Find the smallest possible sum of the 20 numbers.

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