Junior Maths Mastery Challenge Sample

Paper F

Section A

Questions 1 to 5 carry 3 marks each.

1. Find the value of $\dfrac{1}{\dfrac{2}{\dfrac{3}{4}}}$.

(A) $\frac{3}{8}$ (B) $\frac{2}{3}$ (C) $2\frac{2}{3}$

(D) 6 (E) None of the above

2. Helen wants to cut a 5-metre ribbon into shorter pieces of length 0.3 metre or 0.8 metre without any length of ribbon left over. How many ways can she cut the ribbon?

(A) 1 (B) 2 (C) 3

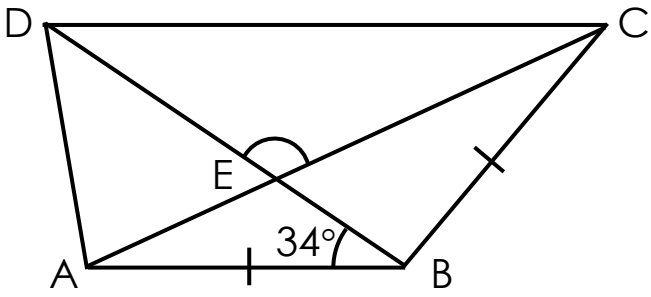
(D) 4 (E) 5

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

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

(D) 10 (E) None of the above

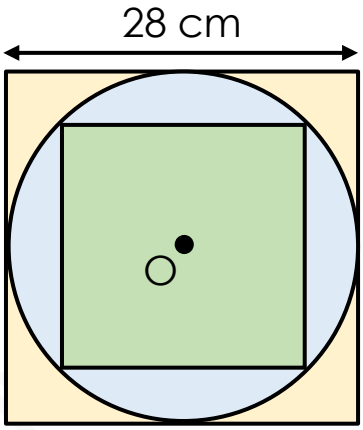
4. In the figure, AB is parallel to DC and AB = BC.
The difference in angle size between ∠ABC and ∠DCB is 80°.
Find ∠DEC.



(A) 116° (B) 121° (C) 126°

(D) 131° (E) None of the above

5. 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.

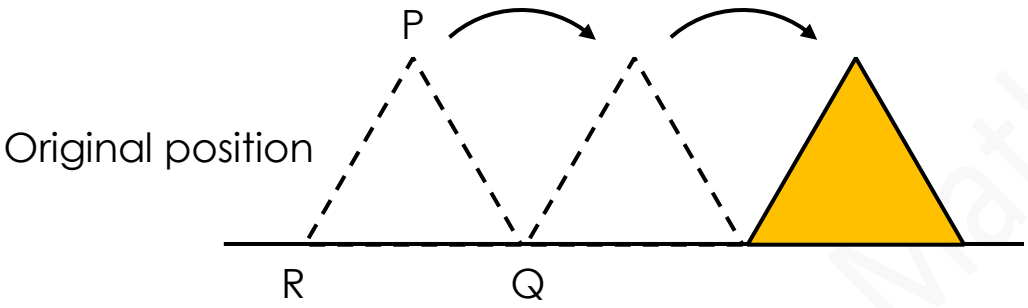
$$\begin{aligned} 1 &= 1 = \frac{1\times 2}{2} \\ 1+2 &= 3 = \frac{2\times 3}{2} \\ 1+2+3 &= 6 = \frac{3\times 4}{2} \\ 1+2+3+4 &= 10 = \frac{4\times 5}{2} \\ 1+2+3+4+5 &= 15 = \frac{5\times 6}{2} \\ &\vdots \end{aligned}$$

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

(A) 13 (B) 14 (C) 19

(D) 20 (E) None of the above

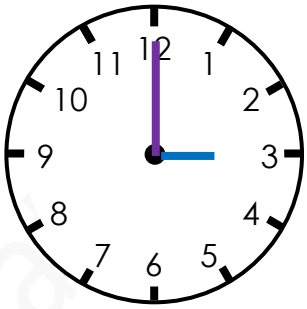
7. Ken placed the base of an equilateral triangular block PQR on flat ground. He rotated the block clockwise about a vertex twice as shown in the diagram. Find the total angle Point R rotated in the clockwise direction.



(A) 120° (B) 180° (C) 240°

(D) 360° (E) None of the above

8. The time on the clock shown is 3 o'clock. The minute hand and hour hand are perpendicular to each other. How many minutes will it take for the hands to be perpendicular again?



(A) 30 min (B) $32\frac{1}{2}$ min (C) $32\frac{7}{11}$ min

(D) $32\frac{8}{11}$ min (E) $33\frac{3}{11}$ min

9. A beaker contained a salt solution. 80% of the solution was water. After some time, 25% of the water evaporated. What percentage of the solution in the end was salt?

(A) 25% (B) 30% (C) 40%

(D) 60% (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. Roy has a scooter with brand new tyres.
The front tyre wears out at a distance of 3600 kilometres.
The back tyre wears out at a distance of 2400 kilometres.
He will stop if either tyre is worn out.
To travel the greatest possible distance, he will switch the tyres to ensure both tyres wear out at the same time.
What is the greatest distance he can travel?

12. Four pupils, Amy, Ben, Cheryl and Don took a quiz.

There were only 8 questions with answers either True (T) or False (F). Each question is worth 1 mark.

The table below represents their answers and scores.

	Question number								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total marks**
Amy	T	T	F	T	F	T	F	F	5
Ben	F	F	F	T	T	T	F	T	7
Cheryl	T	F	T	F	T	F	T	T	4
Don	F	F	F	T	T	F	T	F	4

Which questions were answered correctly by only two pupils?