# Junior Maths Mastery Challenge Sample

## Paper B

### Section A

*Questions 1 to 5 carry 3 marks each.*

1. Find the value of the following.

$$1 + 2 + 3 + \ldots + 7 + 8 + 9 + 8 + 7 + \ldots + 3 + 2 + 1$$

$1 + 2 + 3 + \ldots + 8 + 9 + 8 + \ldots + 3 + 2 + 1 = 2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 9$
$2 + 16 = 18$
$4 + 14 + 18$
$6 + 12 = 18$
$8 + 10 = 18$
$18 + 18 + 18 + 18 + 9 = 81$

[Addition and Subtraction Within 1000 / Arithmetic]

(A) 72 (B) 81 (C) 99
(D) 109 (E) None of the above

2. Each shape below represents a different number.

△ × □ = 15 [Multiplication and Division of 2, 5 and 10 / Arithmetic]

□ × ○ = 35

What is the value of △ × ○ ?

$5 \times 3 = 15$ and $5 \times 7 = 35$

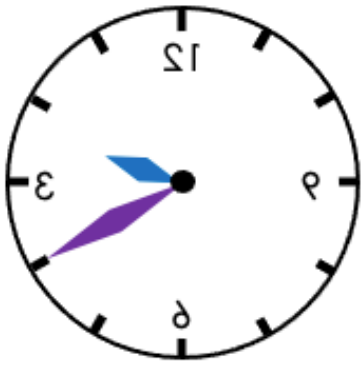
So, □ = 5, △ = 3 and ○ = 7.

△ × ○ = $3 \times 7 = 21$

(A) 10 (B) 14 (C) 20
(D) 21 (E) None of the above

3. Lina started doing her homework at 11:30 am. When she finished, she saw the reflection of her wall clock through a mirror as shown. How many minutes did she spend on her homework?

[Time / Spatial Visualisation]




The time shown on the clock was 2:20 pm.

From 11:30 am to 2:20 pm, the duration is 2 h 50 min.

(A) 150 min (B) 160 min (C) 170 min

(D) 250 min (E) None of the above

4. Study the pattern below.

1, 10, 2, 20, 4, 40, ...

What number comes next?

[Multiplication and Division of 2, 5 and 10 / Look for Patterns]

$1 \times 10 = 10$
$10 \div 5 = 2$
$2 \times 10 = 20$
$20 \div 5 = 4$
$4 \times 10 = 40$
$40 \div 5 = 8$

(A) 7 (B) 8 (C) 16
(D) 22 (E) 35

5. There are 8 lights placed every 10 metres apart along a path in a garden. There is a light at each end of the path. What is the length of the path?

[Length / Draw a Diagram]

There are 7 intervals of 10 m from one end of the path to the other.

$7 \times 10 = 70$
The length of the path is 70 m.

(A) 50 m (B) 60 m (C) 70 m
(D) 80 m (E) None of the above

*Questions 6 to 10 carry 4 marks each.*

6. A bus left the terminal with passengers.

At the 1st bus stop, 16 passengers got off and 5 passengers got on.

At the 2nd bus stop, 7 passengers got off and 12 passengers got on.

There were 46 passengers on the bus when it left the 2nd bus stop. How many passengers were on the bus when it left the terminal?

[Addition and Subtraction Within 1000 / Work Backwards]

46 – 12 = 34
34 + 7 = 41
There were 41 passengers on the bus when it left the 1st bus stop for the 2nd bus stop.

41 – 5 = 36
36 + 16 = 52
There were 52 passengers on the bus when it left the terminal.

(A) 40 (B) 42 (C) 44
(D) 46 (E) None of the above

7. Ella packs 40 cupcakes equally into boxes. Each box has the same number of rows of cupcakes. Each row has 5 cupcakes. What is the possible number of boxes she uses?

[Multiplication and Division of 2, 5 and 10 / Logical Reasoning]

40 ÷ 5 = 8
She packs 8 rows of 5 cupcakes into the boxes.
Since each box has an equal number of rows of cupcakes, the number of boxes used must be able to divide 8.

The number that can divide 8 is 4.
The possible number of boxes she uses is 4.

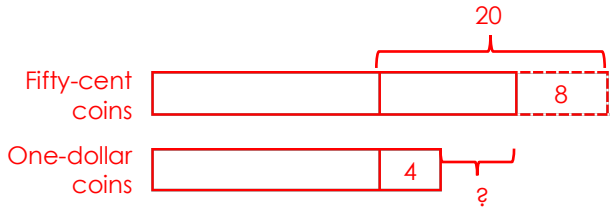
(A) 3 (B) 4 (C) 5
(D) 6 (E) 7

8. Ben has 20 more fifty-cent coins than one-dollar coins. He exchanges $4 worth of fifty-cent coins for one-dollar coins. How many more fifty-cent coins than one-dollar coins does he have in the end?

[Money / Draw a Bar Model]

2 fifty-cent coins make $1.
8 fifty-cent coins make $4.
Ben exchanges 8 fifty-cent coins for 4 one-dollar coins.

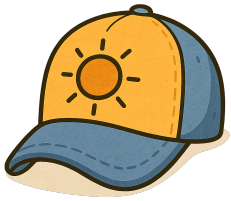
20 – 4 – 8 = 8
He has 8 more fifty-cent coins than one-dollar coins in the end.



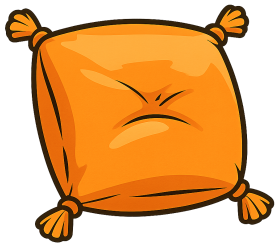

(A) 4 (B) 8 (C) 12
(D) 16 (E) None of the above

9. Ben has $100. He wants to buy 3 of the items shown below.

Soft toy
$39



Cap
$28



Cushion
$25

T-shirt
$32

Hoodie
$46

[Money / Make a List]

How many ways can he buy 3 of the items?

1) $25 + $28 + $32 = $85 (cushion, cap and T-shirt)
2) $25 + $28 + $39 = $92 (cushion, cap and soft toy)
3) $25 + $28 + $46 = $99 (cushion, cap and hoodie)
3) $28 + $32 + $39 = $99 (cap, soft toy and T-shirt)

(A) 3 (B) 4 (C) 5

(D) 6 (E) None of the above

10. Jane bought a blue, red, yellow and orange T-shirt. Ken, Lisa, Mandy and Tom took a T-shirt of their favourite colour.

- Ken dislikes yellow and red.
- Lisa dislikes red and orange.
- Mandy's favourite colour is orange.
- Tom's favourite colour is the colour both Ken and Lisa dislike.

[Logical Reasoning]

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

Ken and Lisa both dislike red.
Tom's favourite colour is red. He took the red T-shirt.

Mandy took the orange T-shirt.

Since Mandy took the orange T-shirt and Ken dislikes yellow and red, Ken took the blue T-shirt.

So, Lisa took the yellow T-shirt.

(A) Ken took the blue T-shirt.

(B) Lisa did not take the blue T-shirt.

(C) Lisa did not take the yellow T-shirt.

(D) Mandy took the orange T-shirt.

(E) Tom took the red T-shirt.

## Section B

*Questions 11 and 12 carry 6 marks each.*

11. Each letter represents a different digit.

$$\begin{array}{rccc} & A & B & C \\ & & B & C \\ + & & & C \\ \hline & D & E & F \end{array}$$

Find the greatest possible 3-digit number ABC can represent.

[Addition and Subtraction Within 1000 / Logical Reasoning]

Since A and D represent different digits, there must be renaming in B + B.
It is not possible for A to be 9 since ABC + BC + C is a 3-digit number.
So, we let A = 8. The next greatest digit is 7. We let B = 7.

$$\begin{array}{rccc} & {\scriptstyle 1}8 & 7 & C \\ & & 7 & C \\ + & & & C \\ \hline & 9 & 4 & F \end{array}$$

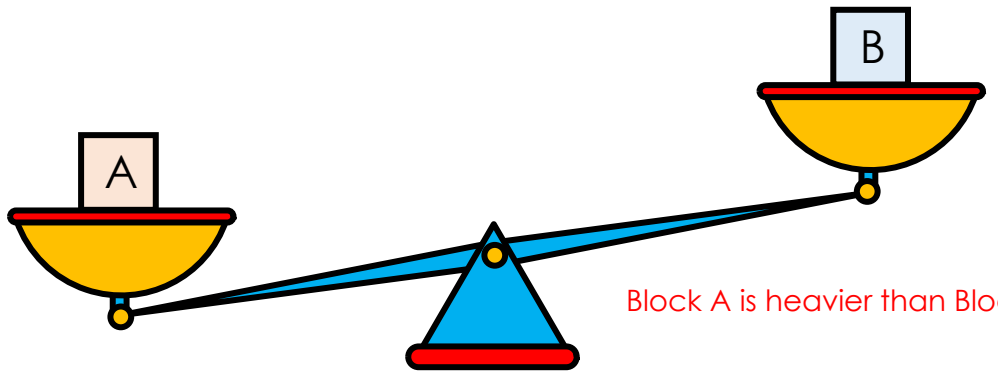
The remaining digits are 1, 2, 3, 5 and 6.
If C = 6, then 6 + 6 + 6 = 18 and F = 8 but it is not possible.
If C = 5, then 5 + 5 + 5 = 15 and F = 5 but it is not possible.
If C = 4, then 4 + 4 + 4 = 12 and F = 2 and E = 5. It is possible.
So, the greatest possible 3-digit number ABC can represent is 874.

$$\begin{array}{rccc} & {\scriptstyle 1}8 & {\scriptstyle 1}7 & 4 \\ & & 7 & 4 \\ + & & & 4 \\ \hline & 9 & 5 & 2 \end{array}$$

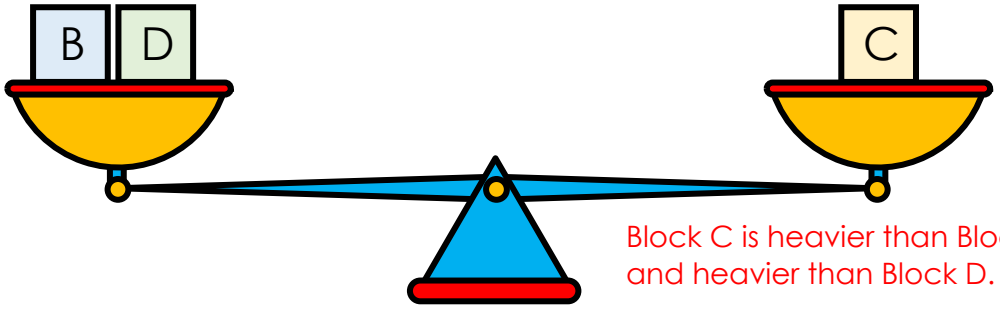
(A) 872 (B) 873 (C) 874

(D) 875 (E) None of the above

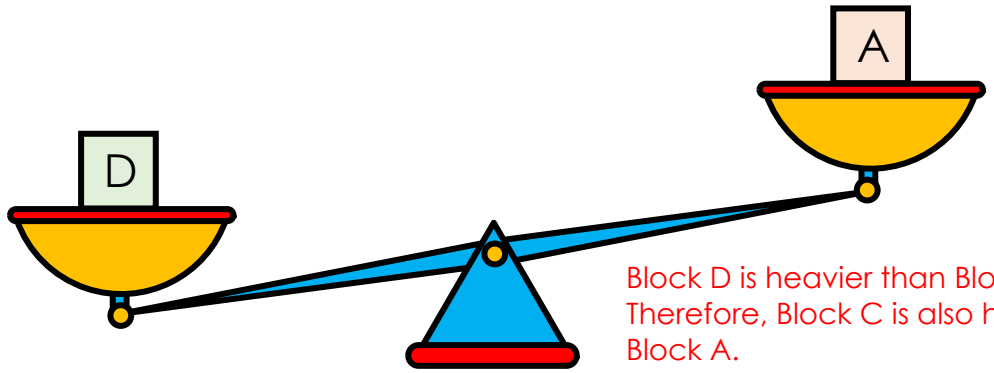
12. Study the diagram below.




Block A is heavier than Block B.




Block C is heavier than Block B and heavier than Block D.




Block D is heavier than Block A. Therefore, Block C is also heavier than Block A.

Arrange the blocks in order from the lightest to the heaviest. [Mass / Logical Reasoning]

Arranged from the lightest to the heaviest:
B, A, D, C

(A) B, A, C, D (B) B, A, D, C (C) B, C, A, D

(D) B, C, D, A (E) A, D, B, C