Selective High School Placement Test

Mathematical Reasoning Question Paper

March 2022   **40 minutes**

INSTRUCTIONS FOR CANDIDATES

Please read this page carefully.

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.

A separate answer sheet is provided for this test. Please fill in the following information on your answer sheet and on this question paper:

- Student application number
- First name(s)
- Family name

There are **35** questions in this paper. For each question there are five possible answers, **A**, **B**, **C**, **D**, and **E**. Choose the **one** correct answer and record your choice on the separate answer sheet. If you make a mistake, erase thoroughly and try again.

You will **not** lose marks for incorrect answers, so you should attempt **all 35** questions.

You **must** complete the answer sheet within the time limit. There will **not** be any extra time at the end of the exam to record your answers on the answer sheet.

You can use the question paper for working out, but no extra paper is allowed.

Calculators and dictionaries are **NOT** allowed.
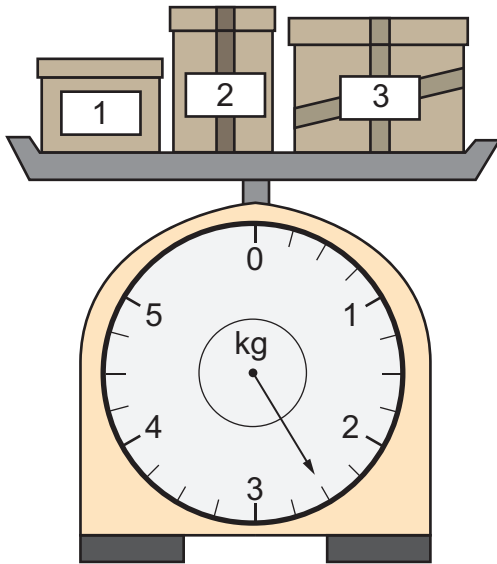
Cambridge Assessment
Admissions Testing

PV5

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1

Three packages are weighed together. Their total mass is shown on the scale.

Package 1 has a mass of 850 g.
Package 2 has a mass of 225 g.

What is the mass of package 3?

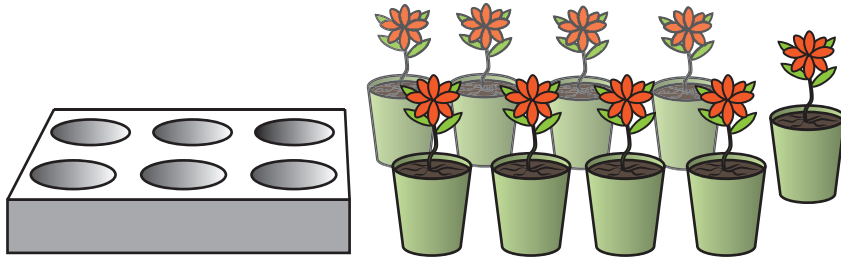**A**   975 g

B   1175 g

C   1425 g

D   1525 g

E   2425 g

2

At a garden shop, Claire is packing plants into boxes.

Each box holds 6 plants.

She has 149 plants.

She wants to fill 27 boxes.

How many more plants does she need?
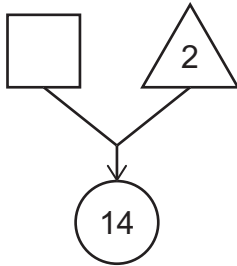
A   1

B   5

C   7

D   13

E   17

3   The diagram below follows these rules:

- Multiply the number in the square by 4.
- Multiply the number in the triangle by 3.
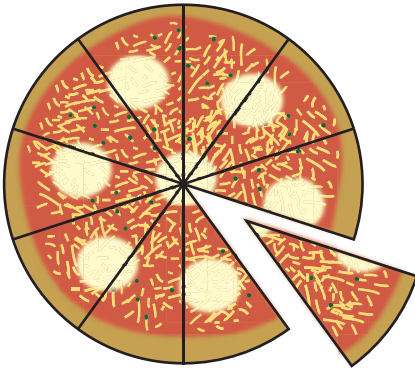- Find the difference between these two results and write it in the circle.

The number in the square is greater than one.

What is the number in the square?

A   2

B   4

C   5

D   8

E   20

4   Rana, Penny and Joshua share a pizza.

Rana eats $\dfrac{2}{10}$ of the pizza.

Penny eats $\dfrac{4}{10}$ of the pizza.

Joshua eats $\dfrac{2}{5}$ of the pizza.

Which of these statements is/are correct?

1   They eat the whole pizza.

2   Joshua eats the least pizza.

3   Penny eats twice as much pizza as Joshua.

A   statement 1 only

B   statement 2 only

C   statements 1 and 2 only

D   statements 1 and 3 only

E   statements 2 and 3 only

5 Which of the following calculations shows how to work out the number of seconds in 24 days?
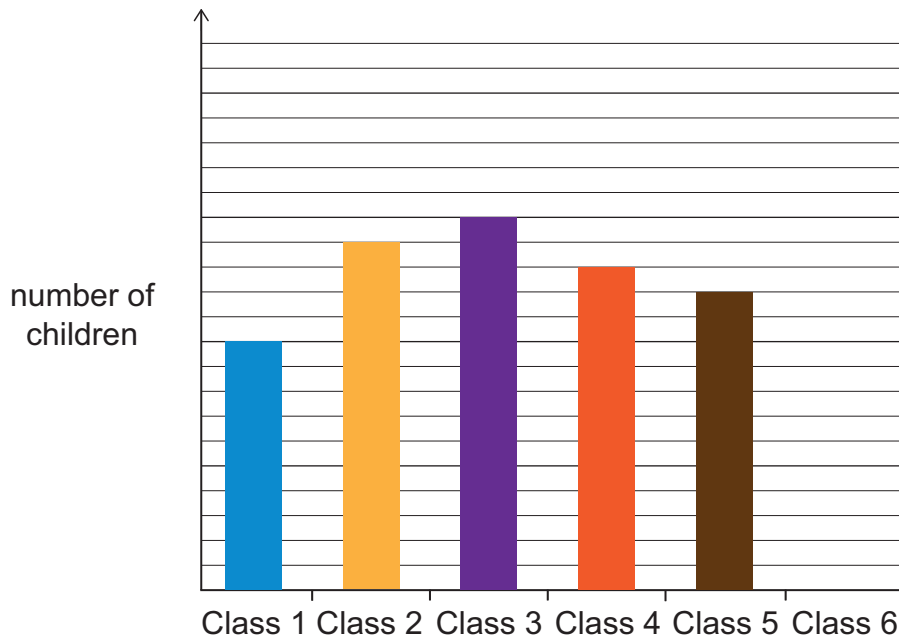
A 24 × 24

B 24 × 60

C 24 × 24 × 60

D 24 × 60 × 60

E 24 × 24 × 60 × 60

6 There are a total of 160 children in six classes in a school.

The column graph shows the number of children in classes 1 to 5. The column for Class 6 has not been drawn.

There are 30 children in Class 3.

How many children are in Class 6?

A 21

B 26

C 32

D 41

E 42

The total mass of the objects on the left side of the balancing scales is the same as the total mass of the objects on the right.

Every △ has equal mass.

Every ■ has equal mass.

If the mass of △ is 6 grams, what is the mass of ■?

A   3 g

B $7\frac{1}{2}$ g

C   8 g

D   9 g

E   18 g

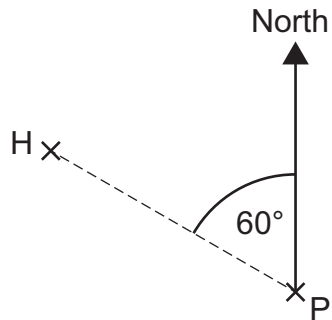**8** The table shows the exact times taken by five racing drivers to complete one lap of a motor racing circuit.

name	time (seconds)
Smith	58.117
Cruz	58.208
Adams	58.046
Batra	58.2
Evans	58.31

Who were the fastest three drivers, in order, starting with the fastest?

A Evans, Cruz, Batra

B Evans, Cruz, Smith

C Batra, Evans, Adams

D Adams, Smith, Evans

E Adams, Smith, Batra

9 A boy is standing at point P, facing **east**.

He turns clockwise to face a house which is at point H.

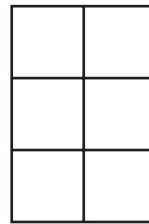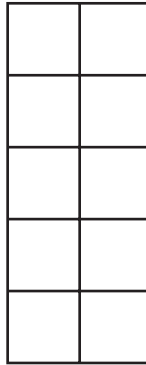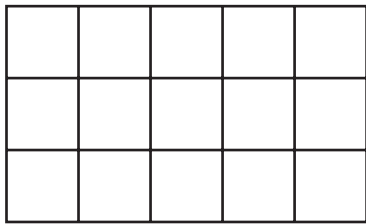

What is the angle of his turn?

A 30°

B 60°

C 150°

D 210°

E 300°

10 Alex had $76.

He spent some of it in a shop.

Then he gave half of what he had left to Charlie.

Charlie spent a quarter of what Alex gave him on lunch.

Charlie spent $9 on lunch.

How much did Alex spend in the shop?

A $4

B $12

C $14

D $36

E $40

11 A rectangular prism is made from identical small cubes.

Each small cube is solid and looks like this from the side:

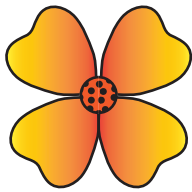The three diagrams below show three different faces of the rectangular prism.

How many small cubes is the rectangular prism made from?

A 20

B 30

C 31

D 62

E 900

12   Jennifer sells bunches of flowers. She wants to make a picture graph to show the data in the table.

day	number of bunches of flowers sold
Monday	24
Tuesday	28
Wednesday	36

She wants to use these pictures **only** in her picture graph:

whole flower   half flower

She will not draw any other fractions of a flower.

Which of these keys can she use to represent the data correctly?

key X: represents 4 bunches

key Y: represents 8 bunches

key Z: represents 12 bunches

A   none of them

B   key X or key Y only

C   key X or key Z only

D   key Y or key Z only

E   key X, Y or Z

13 Three different numbers are chosen from the numbers 3, 5, 6 and 8.
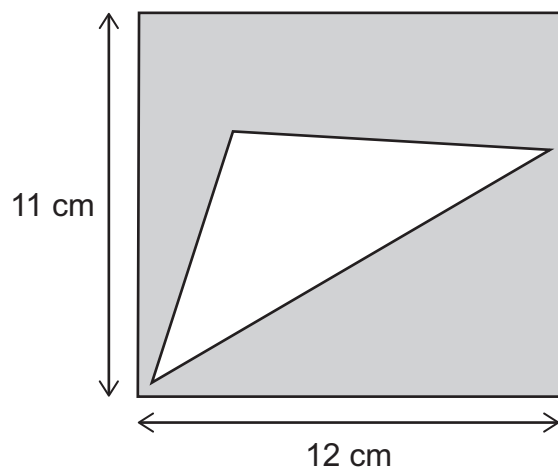
They are then added together.

Which of these statements is/are correct?

      1   The total cannot be a multiple of 8.

      2   The total can be a multiple of 3.

      3   The total is always odd.

A none of them

B statement 1 only

C statement 2 only

D statement 3 only

E statements 2 and 3 only

14 The diagram shows a triangle inside a rectangle.

The area shaded grey is 84 cm^2.

11 cm

12 cm

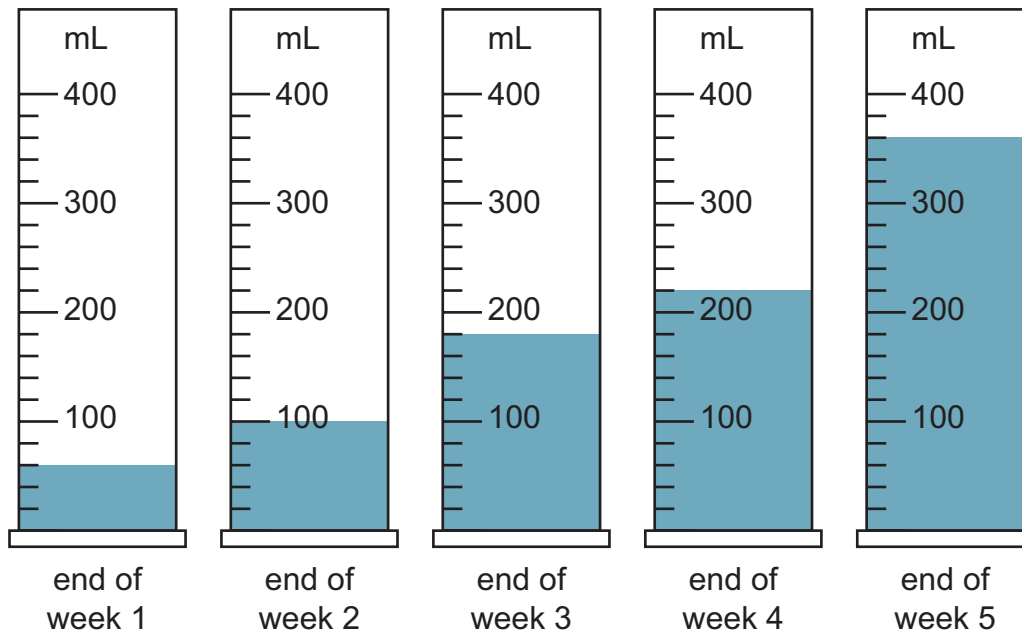[diagram not to scale]

What is the area of the triangle?

A 33 cm^2

B 37 cm^2

C 42 cm^2

D 48 cm^2

E 52 cm^2

15 Seo-Jung has been recording rainfall for the last 5 weeks by collecting it in a container.

The container was empty at the start of week 1.

Seo-Jung recorded the amount of rain in the container at the end of each week. No water was lost during the 5 weeks.

The diagrams show what he recorded.

During which two weeks was there exactly the same amount of rainfall?

A   week 1 and week 2

B   week 1 and week 4

C   week 2 and week 3

D   week 2 and week 4

E   week 3 and week 5

16 Brody is thinking of a quadrilateral.

The quadrilateral has:

    1 no parallel sides

    2 two sides of 5 cm and two sides of 8 cm

    3 exactly one right angle

How many lines of symmetry does Brody's quadrilateral have?

A 0

B 1

C 2

D 3

E 4

17 A gardener has a box of bulbs to plant in a garden. The garden has three sections.

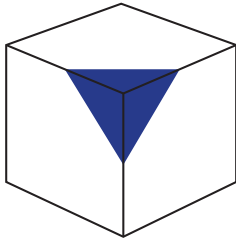She plants $\dfrac{1}{2}$ of the bulbs in the first section.

She plants $\dfrac{3}{4}$ of the remaining bulbs in the second section.

She has 6 bulbs left, which she plants in the third section.

How many bulbs were in the box at the start?

A 16

B 18

C 24

D 32

E 48

18 A cube has been painted around one vertex as shown.

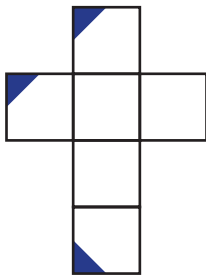Which of the following diagrams could be a net for this cube?

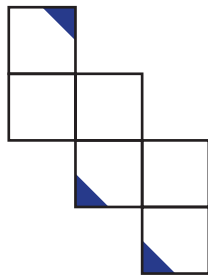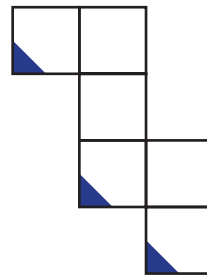diagram 1   diagram 2   diagram 3

A   diagram 1 only

B   diagram 2 only

C   diagram 3 only

D   diagrams 1 and 2 only

E   diagrams 1 and 3 only

19 A bag contains three colours of disc: red, blue and yellow.

There are an equal number of red discs and blue discs.

There are twice as many blue discs as yellow discs.

One disc is selected without looking.

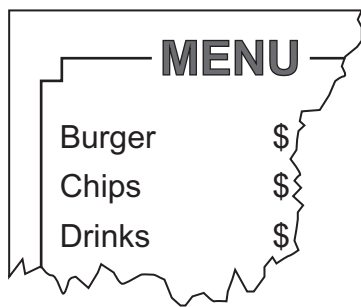What is the probability of selecting a blue disc?

A $\dfrac{1}{5}$

B $\dfrac{1}{4}$

C $\dfrac{1}{3}$

D $\dfrac{2}{5}$

E $\dfrac{2}{3}$

Here is part of a menu from a café. The prices have been torn off.

MENU

Burger $
Chips $
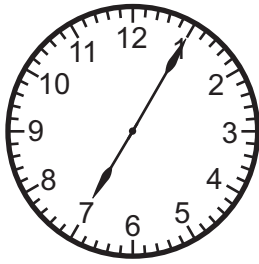Drinks $

A burger and a drink cost $6.00 in total.

Chips and a drink cost $3.75 in total.

A burger, chips and a drink cost $8.50 in total.
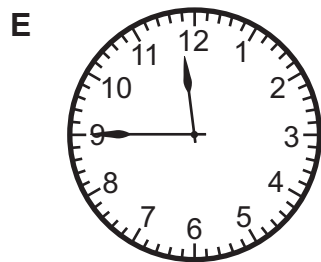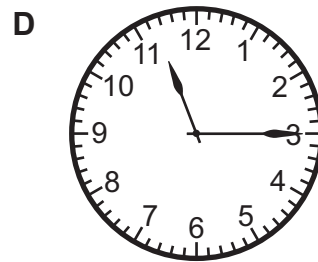
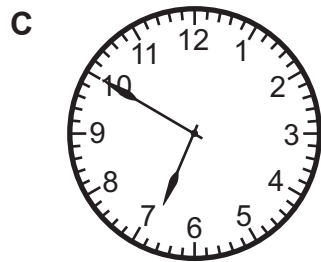How much does a burger and chips cost in total?

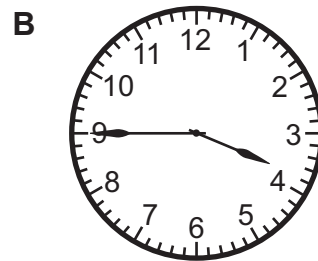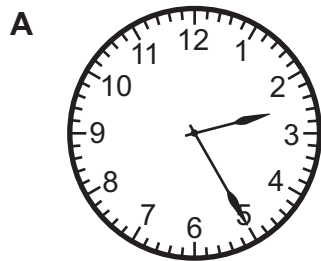**A** $2.25

B $4.75

C $7.25

D $7.75

E $9.75

21 Jason's clock was working normally until 7:05 am.

At 7:05 am, he dropped the clock. For the rest of the day, the clock's hands turned twice as fast as normal.

At 3:25 pm that day, what time did the clock show?

A

B

C

D

E

22 I have an equal number of $1 and $2 coins.

The total value of my coins is $54.

$1 coins weigh 9 grams and $2 coins weigh 7 grams.

What is the total weight of all my coins?

A   144 g

B   288 g

C   414 g

D   432 g

E   576 g

23 Two statues are 8 kilometres 23 metres apart.

A map-maker incorrectly labels the distance between the statues on a map. The incorrect distance is 23 km 8 m.

What is the difference between the correct and incorrect distances?
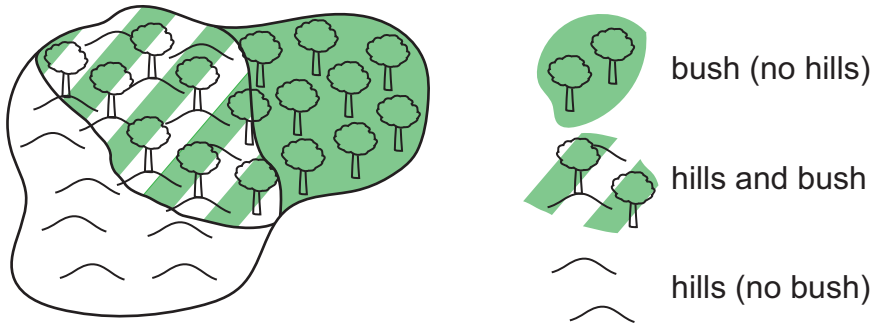
A   14 km 85 m

B   14 km 985 m

C   15 km 15 m

D   15 km 85 m

E   15 km 985 m

24 Jedda draws a map of an island showing areas where there are only hills, only bush, or both. These three areas cover the whole island.

bush (no hills)

hills and bush

hills (no bush)

The total area of the island is 164 km^2.

The total area where there are hills is 132 km^2.

The total area where there is bush is 80 km^2.

What area of the island has both hills and bush?

A 24 km^2

B 32 km^2

C 48 km^2

D 52 km^2

E 84 km^2

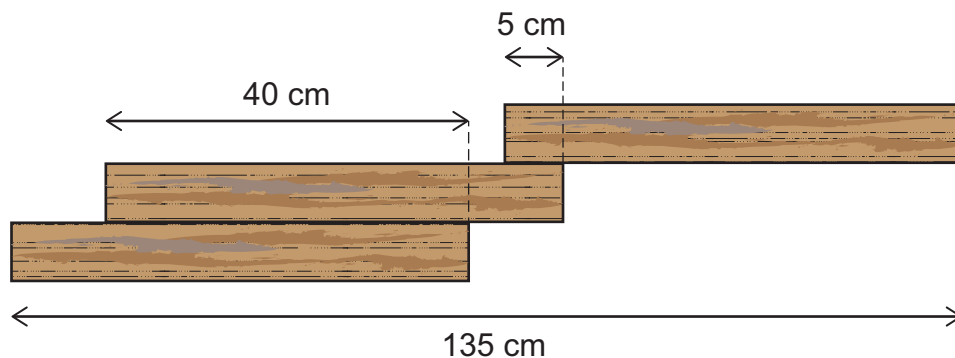**25** A display has three lights that flash at different intervals.

The red light flashes every 2 minutes.
The green light flashes every 3 minutes.
The blue light flashes every 5 minutes.

The lights all flash together at 7:00 am.

How many times between 7:01 am and 9:59 am the same morning do the green and blue lights flash together **without** the red light also flashing?

A   6

B   8

C   9

D   11

E   12

26 Three planks of wood all have the same length. They are placed next to each other as shown.

[diagram not to scale]

What is the length of one plank of wood?

A   45 cm

B   50 cm

C   60 cm

D   75 cm

E   85 cm

27 Alison shaded 3 small squares in the grid below.

She wants to shade extra squares to make a pattern with exactly four lines of symmetry.

What is the smallest number of extra squares she needs to shade?

A 3

B 5

C 7

D 9

E 13

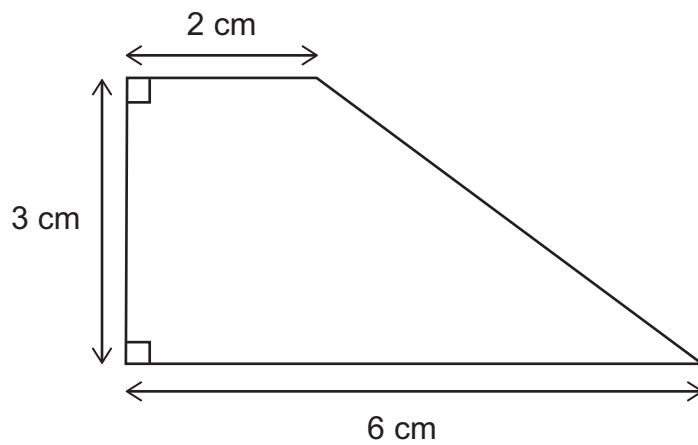**28** Merindah sold drinks at the class barbecue.

The drinks were orange or lemon.

She sold 33 drinks altogether.

Which of these statements **cannot** be correct?

    1 She sold ten more orange drinks than lemon drinks.

    2 She sold twice as many orange drinks as lemon drinks.

    3 She sold five more lemon drinks than orange drinks.

A statement 1 only

B statement 2 only

C statement 3 only

D statements 1 and 2 only

E statements 2 and 3 only

29 This shape is a trapezium with two right angles:

[diagram not to scale]

Anna has a square piece of card with side length 24 cm.

What is the greatest possible number of these trapeziums Anna can cut out from this card?

A 16

B 24

C 32

D 48

E 64

30 Jamal makes a number sequence. He chooses the 1st number in the sequence.

Then he follows these two rules, one after the other, repeatedly:

- Subtract 100 to get the next number in the sequence.

- Add 10 to get the next number in the sequence.

The 6th number in the sequence is 8451.

What is the 1st number in Jamal's sequence?

A 8171

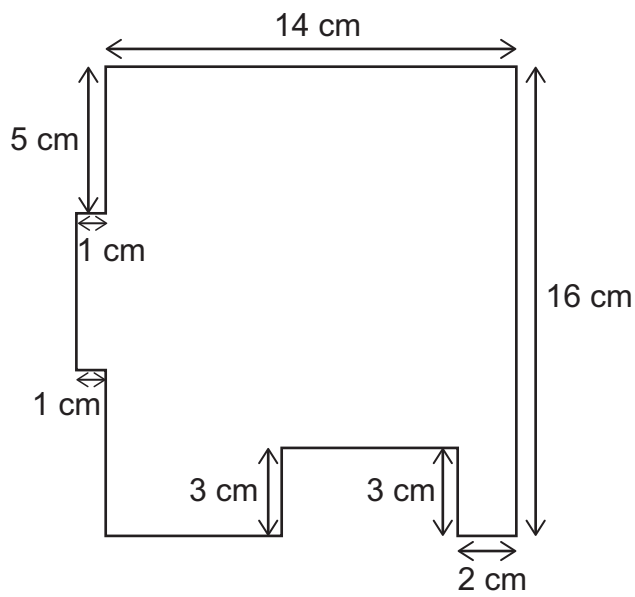**B** 8181

C 8711

D 8721

E 8731

31 A robot is facing south-east.

It makes 58 quarter-turns clockwise, then 93 quarter-turns anti-clockwise.

In which direction is the robot now facing?

A north

B north-east

C north-west

D south-east

E south-west

32 This shape is made from rectangles.

[diagram not to scale]

What is the perimeter of this shape?

A 44 cm
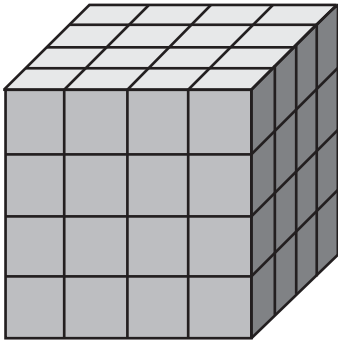
B 52 cm

C 60 cm

D 64 cm

E 68 cm

33 Timothy writes down the number 24. He reverses the digits to make the number 42. He then works out that 42 is 18 more than his starting number, 24.

Nicole writes down a whole number between 10 and 99. She also reverses the digits of her number. She finds that this makes a number that is 72 more than her starting number.
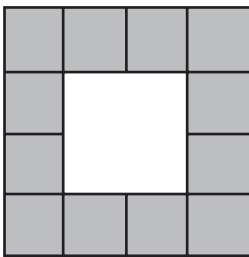
What was the last digit of Nicole's starting number?

A 2

B 3

C 5

D 7

E 9

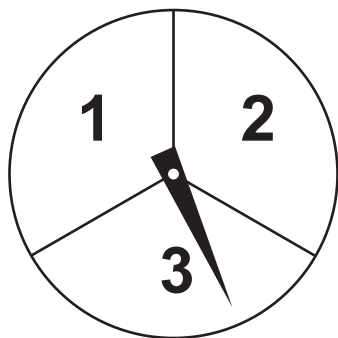**34** Harry has a large, **solid** cube made from 64 small cubes:

He removes some small cubes. He now sees this view when he looks at **any** of the six faces:

How many small cubes are in the object now?

A 16

B 32

C 36

D 40

E 72

35 Aaron and Tom have a game where they each spin this spinner once, and whoever spins the higher number wins.

They play this game 8 times.

During the game:

- Aaron spins two 1s, three 2s and three 3s.
- Tom spins two 1s, five 2s and one 3.

There are no draws.

How many games does Aaron win?

A 2

B 4

C 5

D 6

E It is not possible to tell.

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