NSW GOVERNMENT

Student application number S 2 3 0

First name(s)

Family name

3933111803

Selective High School Placement Test

Mathematical Reasoning Question Paper

2023 **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.

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Admissions Testing

PV3

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1 Ngali has a music playlist.

The first song is 4 minutes long.

There are 3 more songs, and each song is 30 seconds shorter than the song before it.

How long is Ngali's playlist?

A 13 minutes

B 14 minutes 30 seconds

C 16 minutes

D 17 minutes 30 seconds

E 19 minutes

2 Kevin has some identical cubes and some identical spheres.

The weight of 8 cubes is the same as the weight of 5 spheres.

One sphere weighs 560 g.

How much does one cube weigh?

A 260 g

B 350 g

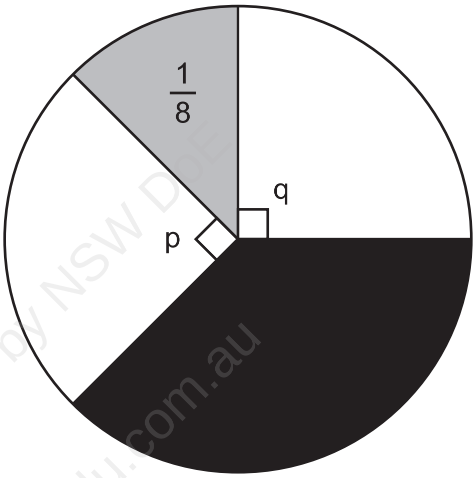
C 557 g

D 896 g

E 2800 g

3 In the circle, the angles labelled p and q are both right angles.

The grey part is $\frac{1}{8}$ of the whole circle.



What fraction of the circle is shaded black?

A $\frac{1}{4}$

B $\frac{2}{7}$

C $\frac{1}{3}$

D $\frac{3}{8}$

E $\frac{2}{5}$

4 Rob had a large bag of lollies to share with his friends, Hamid and Vera.

Rob gave Hamid half of the lollies from the bag.

Then he gave Vera 20 of the lollies that were left in the bag.

Then there were 24 lollies left in the bag, and Rob kept these for himself.

How many lollies were in the bag at the start?

A 40

B 44

C 48

D 64

E 88

5 Here are two number sentences, with empty boxes in each.

$$\square + 3 = \square + 6$$

$$\square \times 3 = \square \times 6$$

These number sentences can be correctly completed using four of the numbers below, once each.

$$\boxed{2} \quad \boxed{4} \quad \boxed{5} \quad \boxed{7} \quad \boxed{8}$$

One number is not used. What is the number?

A 2

B 4

C 5

D 7

E 8

6 Sydney's time zone is 14 hours ahead of New York's time zone.

When it is 9:30 am on 19th January in Sydney, what is the time and date in New York?

A 7:30 pm on 18th January

B 8:30 pm on 18th January

C 11:30 pm on 18th January

D 7:30 pm on 19th January

E 11:30 pm on 19th January

7 Poppy has a bag of 7 black marbles and 6 white marbles.

She takes 2 marbles out of the bag without looking.

One is black and the other is white.

She does not put them back in the bag.

She takes one more marble out of the bag without looking. What is the probability that it is white?

A $\frac{5}{13}$

B $\frac{5}{11}$

C $\frac{6}{13}$

D $\frac{1}{2}$

E $\frac{5}{6}$

8 Leroy finds the largest three-digit number that is a multiple of both 2 and 5.

He adds together the three digits of the number.

What is the result?

A 1

B 9

C 18

D 23

E 26

9 Jacinta has a 2-digit number.

Amber has a 2-digit number.

Jacinta multiplies their numbers together.

What is/are the possible number(s) of digits in the result?

A 3 only

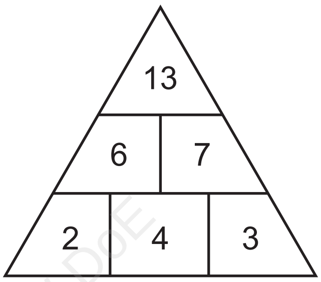
B 5 only

C 3 and 4 only

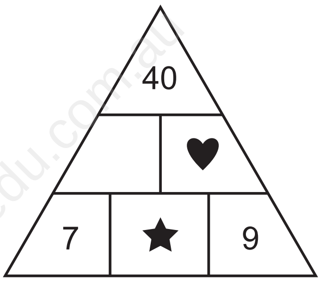
D 4 and 5 only

E 3, 4 and 5 only

10 In a number pyramid, each number in the middle and top rows is the sum of the two numbers below it. Below is an example.



Below is another number pyramid, with three numbers missing.



What is the value of ★ + ♥?

A 25

B 33

C 45

D 57

E 65

11 Kirra draws a rhombus and a rectangle. They both have the same perimeter.

All of the sides of the rhombus are 6 cm long.

Two sides of the rectangle are 4 cm long.

What is the area of the rectangle?

A 16 cm^2

B 24 cm^2

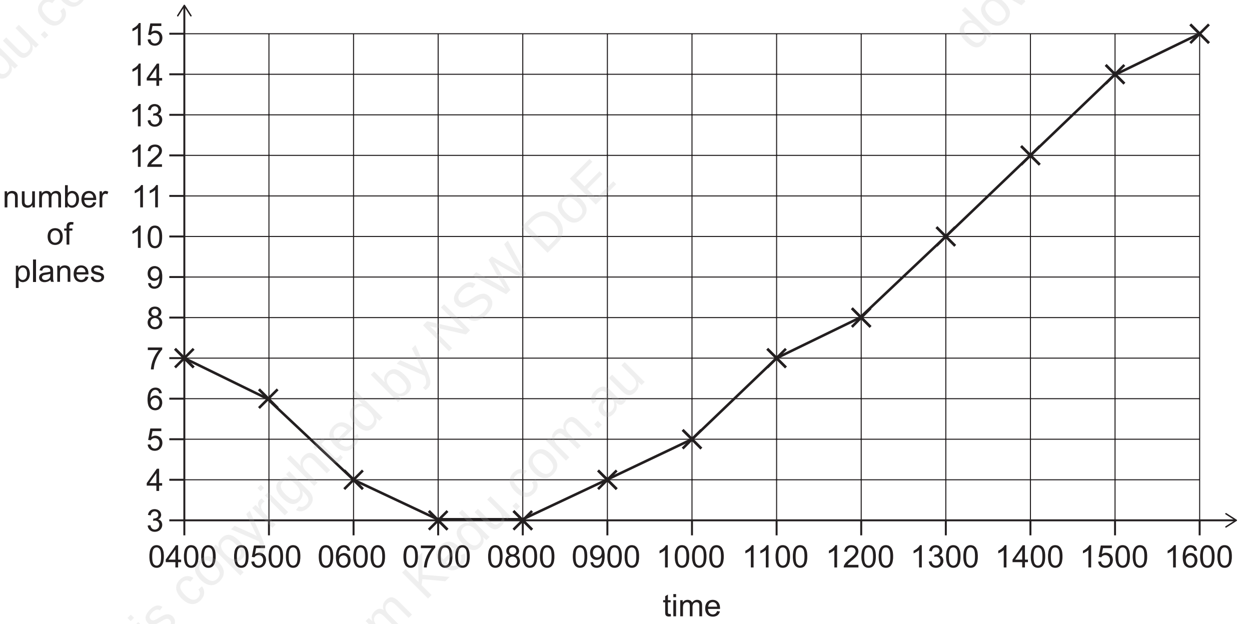
C 32 cm^2

D 64 cm^2

E 128 cm^2

12 Drew works at an airport.

The graph shows the number of planes on the ground at the airport from 0400 to 1600.



Drew started work at 0500.

How long after Drew started work was the number of planes on the ground double the number at 0500?

A 2 hours

B 9 hours

C 10 hours

D 11 hours

E 14 hours

13 Put these numbers in order from smallest to biggest.

$\frac{9}{4}$ $2\frac{75}{100}$ 2.5

A $\frac{9}{4}$ 2.5 $2\frac{75}{100}$

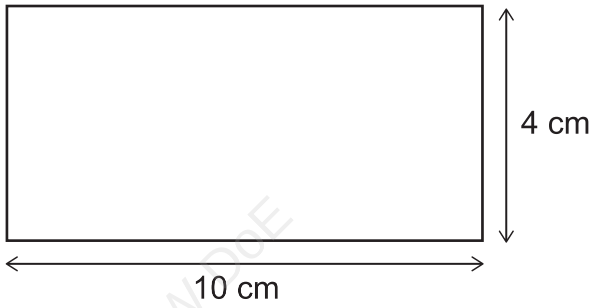
B $2\frac{75}{100}$ $\frac{9}{4}$ 2.5

C $2\frac{75}{100}$ 2.5 $\frac{9}{4}$

D 2.5 $\frac{9}{4}$ $2\frac{75}{100}$

E 2.5 $2\frac{75}{100}$ $\frac{9}{4}$

14 On a map there is a rectangular field. The measurements of the field on the map are shown here:



[diagram not to scale]

2 centimetres on the map represents 5 metres in real life.

What is the area of the field in real life?

A $40\,\text{m}^2$

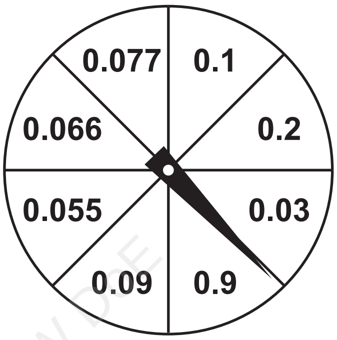
B $70\,\text{m}^2$

C $100\,\text{m}^2$

D $200\,\text{m}^2$

E $250\,\text{m}^2$

15 A spinner has sections of equal size. The sections are shown in the diagram below.


0.077
0.1
0.066
0.2
0.055
0.03
0.09
0.9

The spinner is spun once.

What is the probability that it lands on a number greater than $\frac{9}{100}$?

A 0

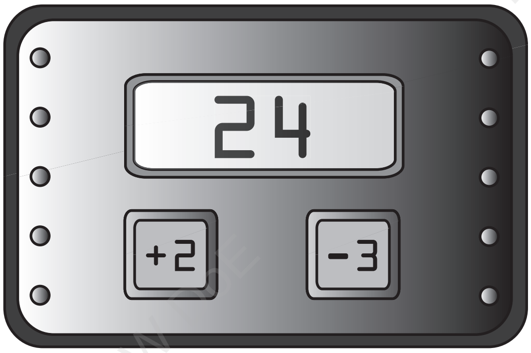
B $\frac{1}{4}$

C $\frac{3}{8}$

D $\frac{1}{2}$

E $\frac{3}{4}$

16 I have a number machine. The machine has 2 buttons.



If I press the '+2' button, the machine adds 2 to the number on the screen.

If I press the '−3' button, the machine subtracts 3 from the number on the screen.

I can press the buttons as many times as I like, in any order.

The screen is showing the number 24.

I want the screen to show the number 7.

What is the smallest number of button presses I need to do?

A 6

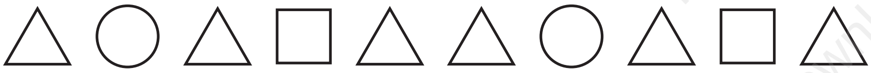
B 7

C 8

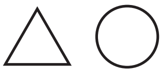
D 9

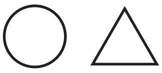
E 10

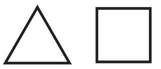
17 A pattern repeats every 5 shapes. The beginning of the pattern is shown below.

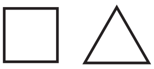


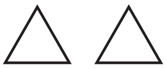
What are the 92nd and 93rd shapes, in that order?

A 

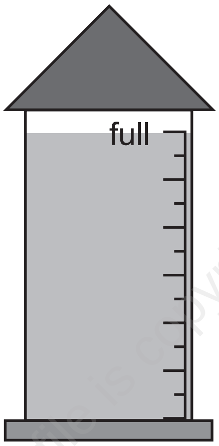
B 

C 

D 

E 

18 Here is a bird feeder that is full of seeds.



It contains exactly the right amount of seeds to feed one magpie every day for 3 days, **or** to feed one wattlebird every day for 6 days.

What is the largest number of days that it can feed one magpie **and** one wattlebird?

A 1.5 days

B 2 days

C 3 days

D 4.5 days

E 9 days

19 Yasmine has four weights: half a kilogram, 800 grams, 250 grams and 400 grams.

Which of the following totals can be made by adding together two or more of her weights?

1 1450 grams

2 1100 grams

3 three quarters of a kilogram

A 3 only

B 1 and 2 only

C 1 and 3 only

D 2 and 3 only

E 1, 2 and 3

20 In the grid below, Mike is standing in the square labelled M. Nina is standing in the square labelled N.

6								
5		M						
4								
3								
2								
1						N		
	A	B	C	D	E	F	G	H

Xavier wants to stand in a square that is the same distance from both Mike and Nina.

Where can Xavier stand?

A D3 only

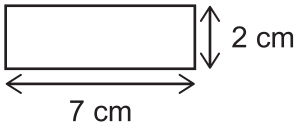
B any square in row 3

C any square in column D

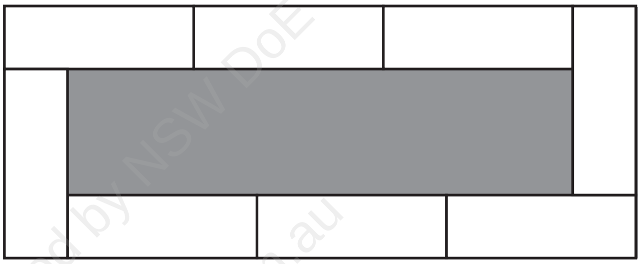
D any square on the line from A6 to F1

E any square on the line from B1 to G6

21 Fraser has eight identical rectangles, each with length 7 cm and width 2 cm, as shown.



He makes the design below by joining the rectangles.



[diagram not to scale]

What is the area of the shaded region created in the middle of the design?

A 75 cm^2

B 95 cm^2

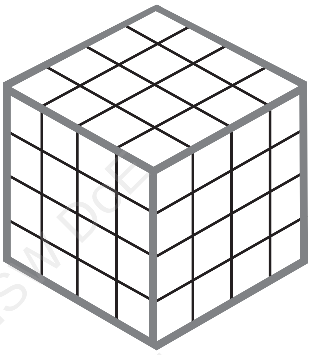
C 105 cm^2

D 117 cm^2

E 147 cm^2

22 This large solid cube is made from identical smaller cubes.

A thick grey line is painted along every edge.



How many of the smaller cubes have grey paint on them?

A 32

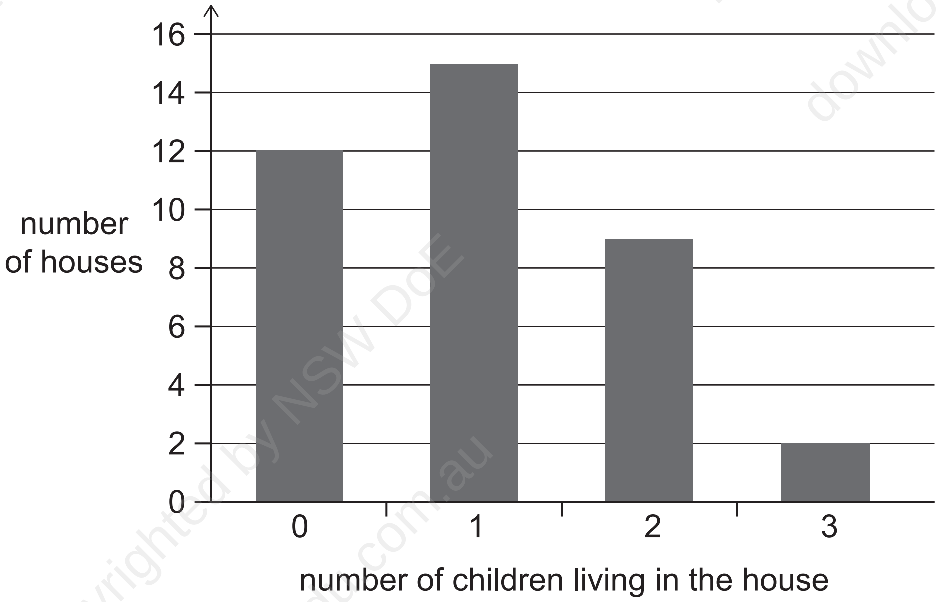
B 36

C 40

D 48

E 52

23 The column graph shows the number of children living in all the houses in a street.



How many children altogether live in the houses on the street?

A 6

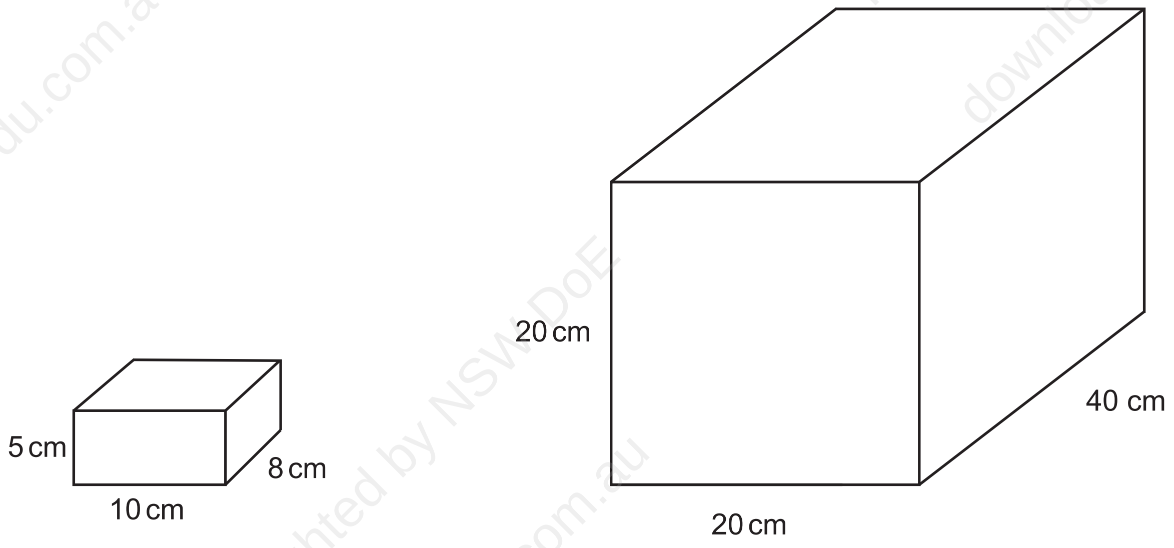
B 26

C 38

D 39

E 51

24 These two solid rectangular prisms are made from the same material.


5 cm
8 cm
10 cm
20 cm
40 cm
20 cm

[diagram not to scale]

The smaller rectangular prism weighs 600 g.

How much does the larger rectangular prism weigh, in kilograms?

A 2.4 kg

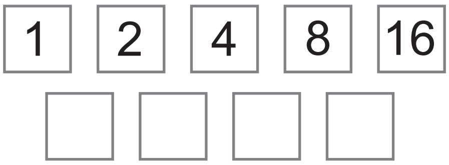
B 15 kg

C 24 kg

D 15 000 kg

E 24 000 kg

25 In each empty box below, Brianna writes the lowest common multiple of the two numbers above it.



What is the difference between the sum of the numbers in the top row and the sum of the numbers in the bottom row?

A 1

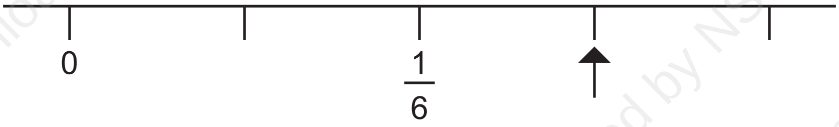
B 16

C 23

D 31

E 139

26 Part of a number line is shown below:



Which fraction does the arrow point to?

A $\frac{1}{4}$

B $\frac{3}{4}$

C $\frac{1}{5}$

D $\frac{1}{7}$

E $\frac{1}{9}$

27 A rectangular prism has some edges that are 1 cm, some edges that are 3 cm, and some edges that are 4 cm.

What is the sum of the lengths of **all** the edges of the rectangular prism?

A 8 cm

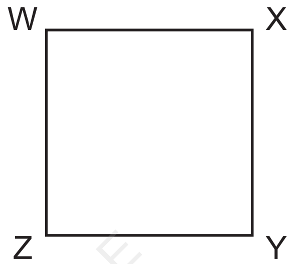
B 16 cm

C 24 cm

D 32 cm

E 48 cm

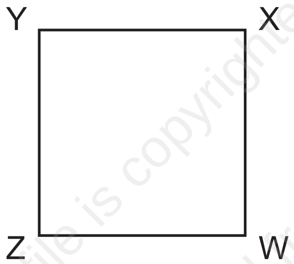
28 The square below has corners labelled W, X, Y and Z.



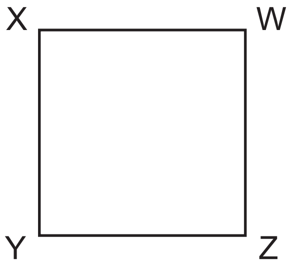
It is reflected first in its vertical line of symmetry, then in its horizontal line of symmetry, then in its vertical line of symmetry again.

Which of the following diagrams shows the square after the reflections?

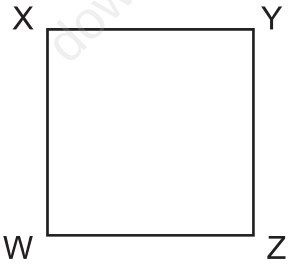
A



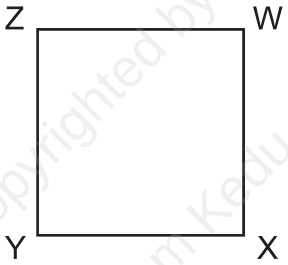
B



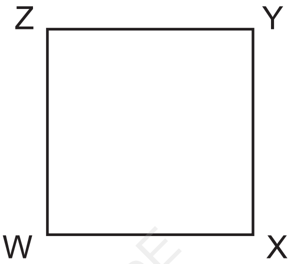
C



D



E



29 Amir has some Australian coins that add up to 25c in total.

Bo has some Australian coins that add up to 20c in total.

Amir and Bo mix all their coins together, and they ask Charley to take one without looking.

The probability that Charley will take a 10c coin is $\frac{2}{7}$

What is the probability that Charley will take a 20c coin?

A 0

B $\frac{1}{7}$

C $\frac{1}{5}$

D $\frac{20}{45}$

E $\frac{5}{7}$

30 In the number sentences below, the square, triangle and circle each represent a different whole number.

▲ × 4 = ●

▲ + 24 = ●

▲ + ● = ■

What number does the square represent?

A 24

B 28

C 30

D 36

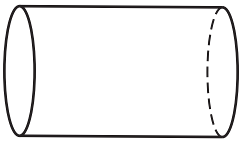
E 40

31 Mandra has a 3D object.

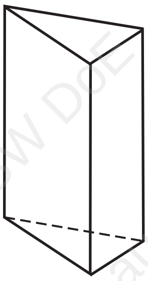
She shines a light on the object from different directions, making different shadows.

Which of the following objects can Mandra use to make a rectangular shadow?

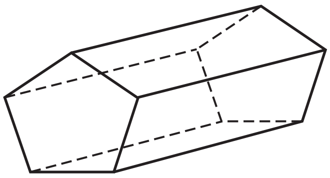
object 1: cylinder



object 2: triangular prism



object 3: pentagonal prism



A object 2 only

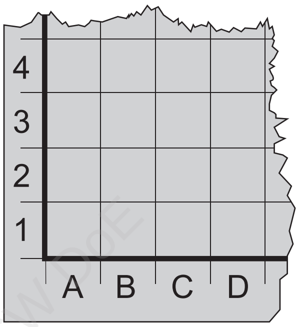
B objects 1 and 2 only

C objects 1 and 3 only

D objects 2 and 3 only

E objects 1, 2 and 3

32 Hannah has a grid with numbers going up the side and letters going along the bottom. The bottom left corner of her grid is shown below.



Hannah places a counter on square A1 and moves the counter repeatedly up, right, down and left, by one less square each time.

The first five and last two steps are given below:

up 10
right 9
down 8
left 7
up 6
…
up 2
right 1

On which square does the counter finish?

A E5

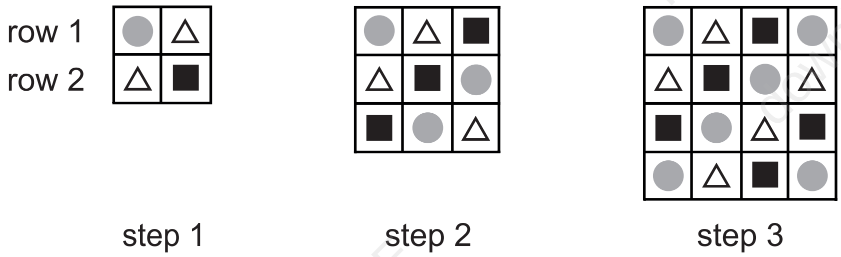
B E7

C F5

D F7

E G7

33 Below are the first three steps of a pattern made from circles, triangles, and squares.



How many triangles will there be in Row 11 of Step 18?

A 3

B 4

C 5

D 6

E 7

34 △ + □ is odd.

□ × ○ is odd.

Which of these statements is/are correct?

1 △ + □ + ○ is odd.

2 △ multiplied by the sum of □ and ○ is odd.

3 □ multiplied by the sum of ○ and △ is odd.

A statement 1 only

B statement 2 only

C statement 3 only

D statements 1 and 2 only

E statements 2 and 3 only

35 Kaleem asks 30 students how many siblings they have.

He records the results in the table below.

The table is not complete.

number of siblings	**number of students**
0	
1	
2	
3	4
4	3
5	2

The number of students with no siblings is equal to the number of students with two siblings.

The most common number of siblings is one.

What is the smallest possible number of students with only one sibling?

A 5

B 6

C 7

D 8

E 9

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