Opportunity Class Placement Test

Mathematical Reasoning Question Paper

Sample Test   **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

PV1

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1   ▲ represents a number.

$$67 - ▲ = 32 + 17$$

What number is ▲?

A   17

B   18

C   32

D   49

E   116

2   What number is six hundreds less than 74 251?

A   70 251

B   70 051

C   73 651

D   73 751

E   74 191

3   Liu Wei got on a train at twenty to midnight.

He got off the train at 2:45 pm the next day.

How long was he on the train?

A   2 hours 45 minutes

B   3 hours 5 minutes

C   13 hours 5 minutes

**D**   14 hours 45 minutes

E   15 hours 5 minutes

4   The shape below is made up of 8 small squares, all the same size.

How many **more** small squares need to be shaded so that three-quarters of the shape is shaded?

A   2

B   3

C   4

D   5

E   6

5   If each of these numbers is rounded to the nearest 10, which number changes the most?

A   45

B   54

C   77

D   80

E   99

6   Claire is standing at the X in the centre of the grid.

North

10 m

10 m
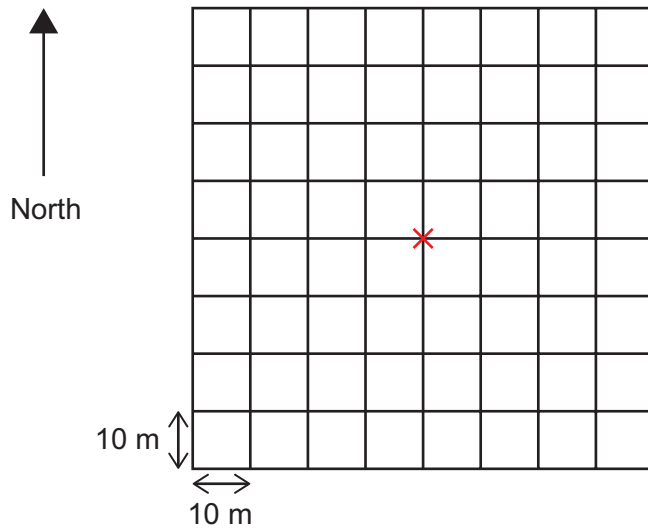
She follows these instructions, one after the other:

1   Walk 30 metres north.

2   Walk 20 metres east.

3   Walk 70 metres south.

4   Walk 20 metres west.

After this, how far is Claire from her starting position?

A   0 metres

B   4 metres

C   30 metres

D   40 metres

E   140 metres

7   In the five circles below, Hiro is going to write the numbers 1, 2, 3, 4, 5 once each.
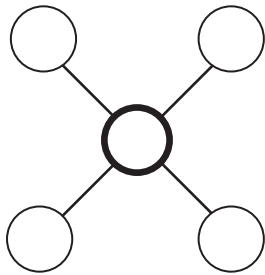
The three numbers in each line must add to 8.

What number must Hiro write in the middle circle?

A   1

B   2

C   3

D   4

E   5

8   Ollie makes a necklace by putting beads on a string.

He makes the necklace by repeating this step:

- Add 2 red beads and then 3 blue beads onto the string.

The finished necklace has 12 blue beads.

How many red beads does it have?

A   6

B   8

C   11

D   18

E   24

9   Two containers of water are shown below.

container X   container Y
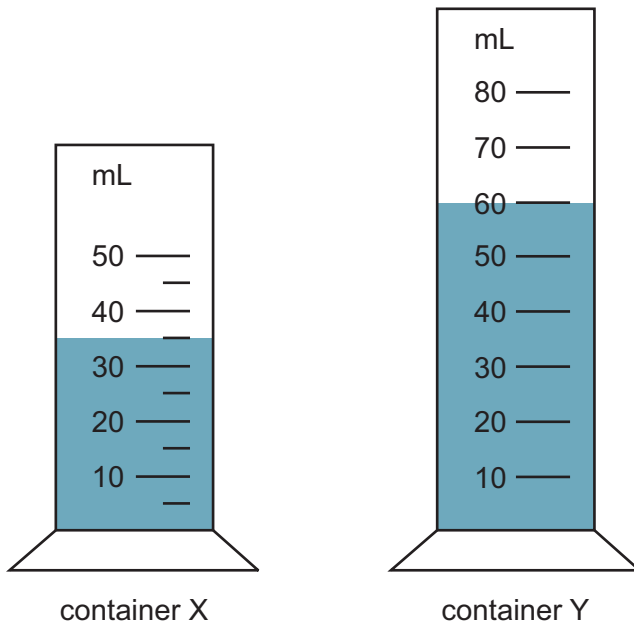
Water is poured from X into Y until Y contains 80 mL altogether.

How much water is left in container X?

A   5 mL

B   10 mL

C   15 mL

D   20 mL

E   25 mL

10 A wire of length 80 cm is made into a rectangle.

Two sides of the rectangle are 10 cm long.

All of the wire is used.

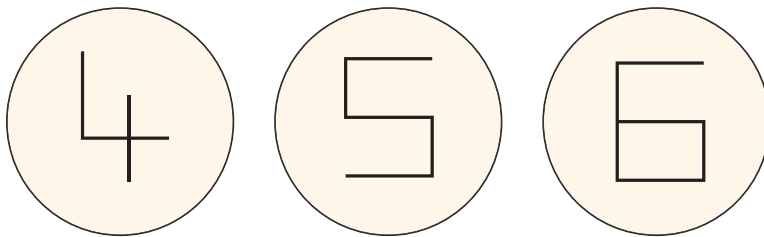What is the length of one of the longer sides of the rectangle?

A 15 cm

B 20 cm

C 30 cm

D 35 cm

E 60 cm

11 Here are three cards showing digits made of horizontal and vertical lines:

If you choose two different cards, what is the largest possible number of right angles you can count in your digits?

A 7

B 8

C 9

D 10

E 11

8

12 Woof dog food is sold in two different sizes.

A box containing 500 g costs $1.

A box containing $2\frac{1}{2}$ kg costs $4.50.
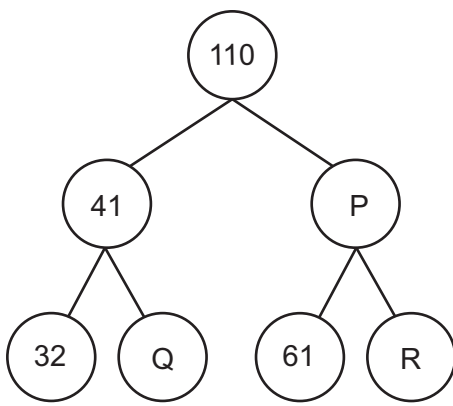

Joe needs to buy exactly 4 kg of dog food.

What is the lowest total price he can pay?

A $5.50

B $6

C $6.50

D $7

E $7.50

13 In this diagram, 8 + 2 = 10
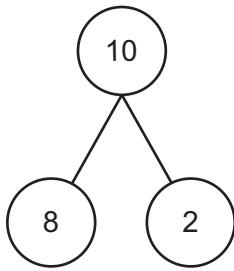
Here is a new diagram that works in the same way:

What is the value of Q multiplied by R?

A 63

B 72

C 81

D 88

E 90

**14** Rachael makes this object by gluing together 9 identical cubes.
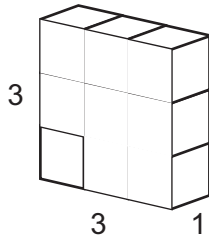
She can pick up the object and look at it from any direction.

How many of the faces of the cubes can she not see?

A 9

B 12

C 24

D 30

E 54

15 In a sequence, each number is 4 less than double the previous number.

Jasper finds the number directly before 36 in the sequence.

His answer has two digits. He adds these two digits to get a new number.

What is the new number?

A 2

B 4

C 5

D 7

E 14

16 Jo has three cards. Each card has a different number on it.

4	2	9
FOUR	TWO	NINE
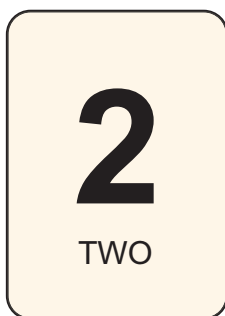
She uses all three cards to make different three-digit numbers.

What is the difference between the largest three-digit number Jo can make, and the smallest three-digit number Jo can make?

A 513

B 648

C 675

D 693

E 707

17 Balal opens a new shop. The shop is open Monday to Friday.

Below are two column graphs showing the sales of umbrellas in Balal's shop in the two weeks after opening:
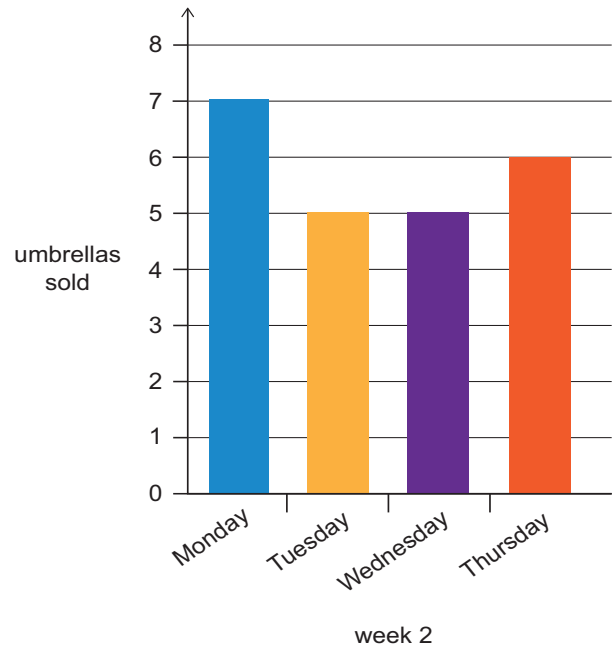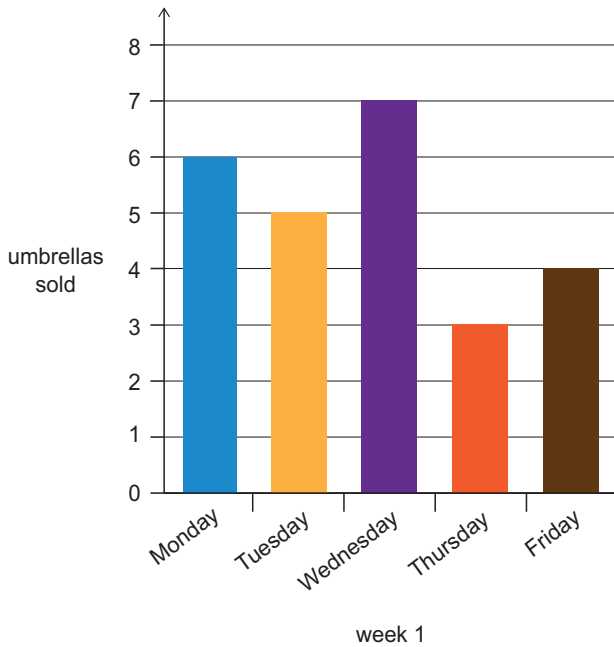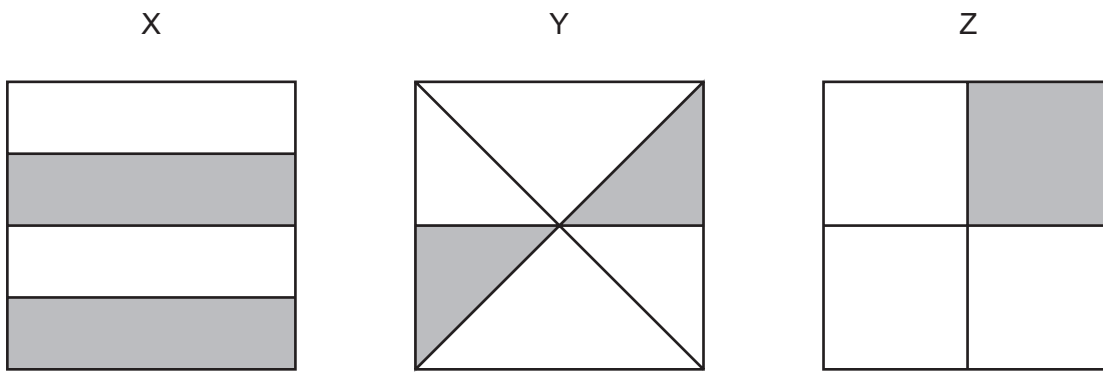

week 1

week 2

Balal wants to sell more umbrellas in week 2 than in week 1.

What is the smallest number of umbrellas he needs to sell on Friday of week 2 to achieve this?

A 2

B 3

C 4

D 5

E 6

18 Here are three squares, X, Y and Z.

X   Y   Z

Which of the squares has/have $\frac{2}{8}$ shaded?

A   none of them

B   square X only

C   square Y only

D   squares X and Z only

E   squares Y and Z only

19 Here are the first four terms of a number sequence:

$$3, \ 6, \ 12, \ 24, \ \dots$$

What is the difference between the 4th term and the 6th term in this sequence?

A   12

B   24

C   48

D   72

E   96

20 Hassan goes to the shops with his pocket money.

He spends $\frac{1}{3}$ of it in the first shop, and $\frac{1}{6}$ of it in each of the other shops that he visits.

He has $\frac{1}{6}$ of his pocket money left at the end.

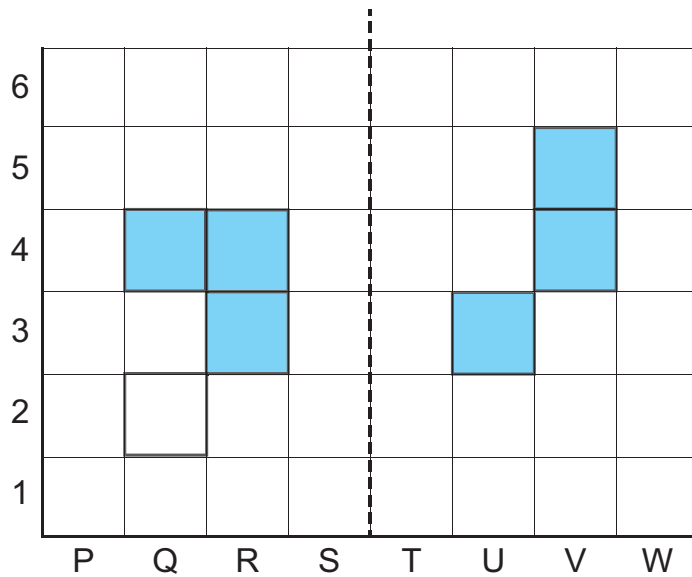How many shops does Hassan visit altogether?

A 3

B 4

C 5

D 6

E 8

21

Ellie is going to shade three more squares in the diagram above.

She wants the dashed line to be a line of symmetry. When she has finished shading, the patterns of squares on the left and right will be reflections of each other.

What are the grid references of the three squares Ellie needs to shade?

A R5, V2, W4

B S3, T4, U4

C S3, U5, W4

D Q5, U4, V2

E Q5, W3, W4

22 This diagram shows the locations of trees in a park.

On this diagram, north is **to the right** as shown.
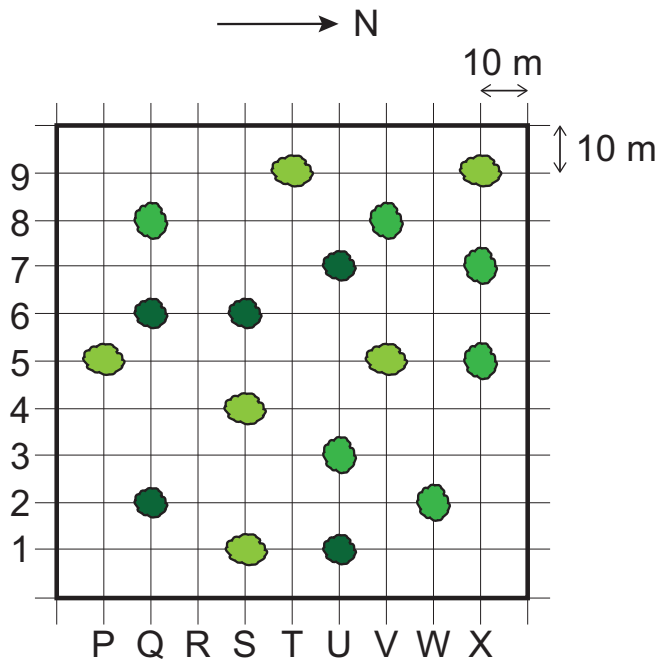
A birdwatcher stands at T5. There is a bird sitting in a tree south-west of where he is standing. The tree is more than 25 m away.

What is the grid reference for the tree where the bird is sitting?

A Q2

B Q8

C S4

D S6

E W2

23 To feed 8 penguins, a zoo needs a total of 24 kg of fish per week.

To feed 4 sea lions, the zoo needs a total of 24 kg of fish per week.

How much fish would the zoo need to feed 4 penguins and 8 sea lions for one week?

A 12 kg

B 24 kg

C 48 kg

D 60 kg

E 64 kg

24 A square piece of centimetre squared paper is folded as shown:
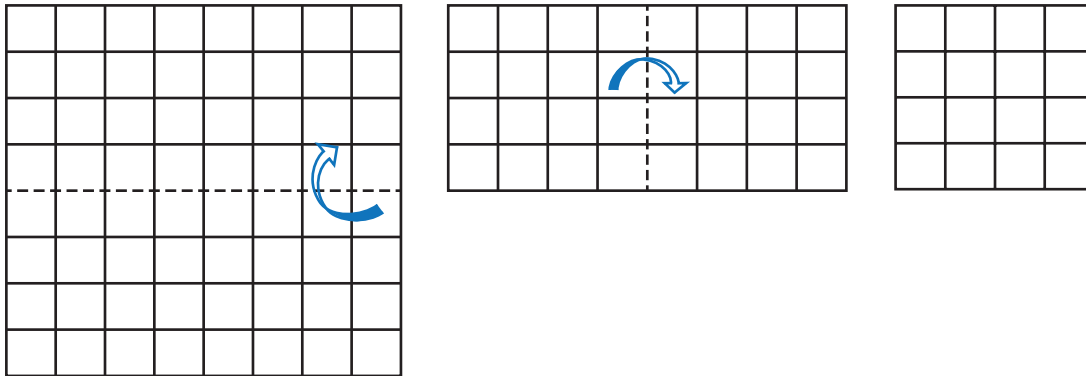
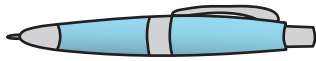The sections shaded black are then cut out and thrown away.

The paper is then unfolded completely.

What is the area of the paper that is left?

A 10 cm^2

B 20 cm^2

C 24 cm^2

D 40 cm^2

E 58 cm^2

25 A pen costs $1.40 and a pencil costs 80 cents.

pen
$1.40

pencil
80 cents

Susie buys a pen and a pencil and pays with a $10 note.

The shop assistant has no $1 or $2 coins, and no notes.

Susie's change contains exactly nine 50 cent coins.

What is the greatest number of 20 cent coins that Susie could have in her change?

A 14

B 16

C 17

D 20

E 21

26 11th August 1999 was a Wednesday.

Which day of the week was 21st September 1999?

A Friday

B Saturday

C Sunday

D Monday

E Tuesday

27 A group of children were asked how many pets they had at home.

The graph shows the results:
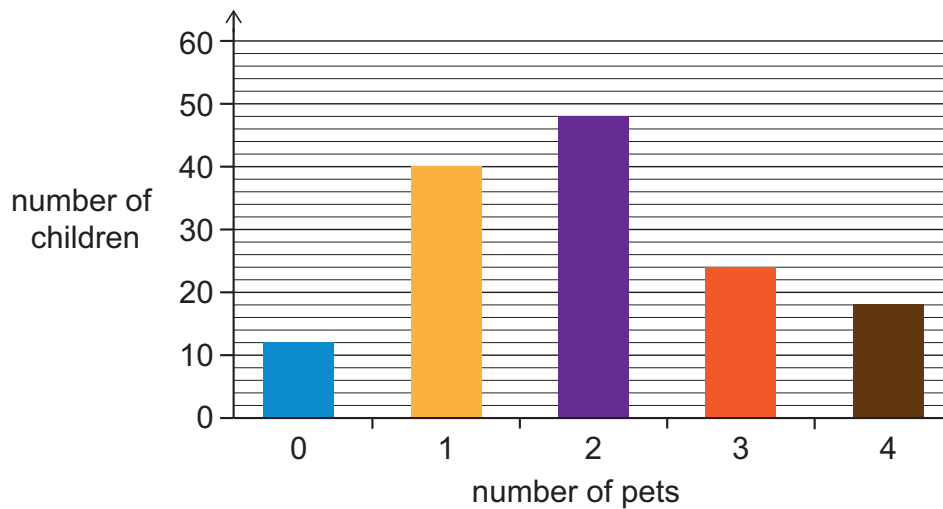
Mary reads the graph and makes 3 claims:

    1   More than 100 children had 1 or 2 pets.

    2   Exactly three times as many children had 2 pets as 0 pets.

   **3**   There were 24 more children with 2 pets than children with 3 pets.

Using the information on the graph, which of Mary's claims is/are correct?

A   claim 1 only

B   claim 2 only

C   claim 3 only

D   claims 1 and 2

E   claims 2 and 3

28 Amanda has a large cube made from four small grey cubes and four small white cubes.

She can look at it from any direction.

She can see 24 faces of the small cubes.
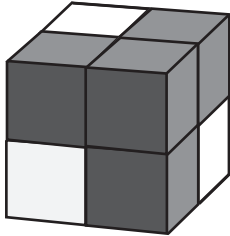
Amanda breaks the large cube into the two equal objects shown below.
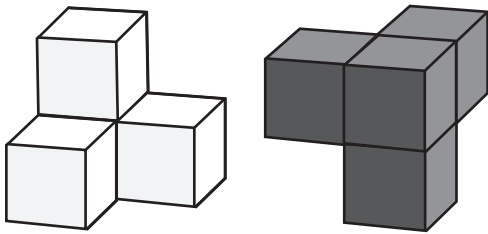
She picks the objects up and looks at them from all directions.

How many faces of the small cubes can Amanda see?

A 24

B 30

C 36

D 40

E 48

29 Jack and Sarah had 12 strawberries.

They ate all of them.

Sarah ate twice as many strawberries as Jack.
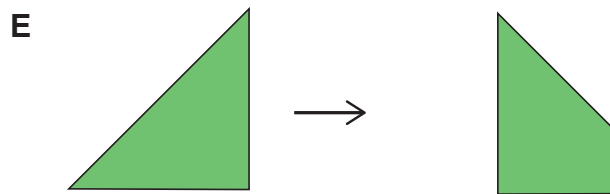
How many strawberries did Sarah eat?
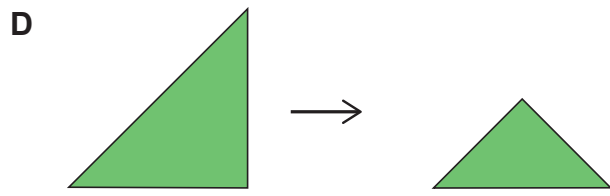
A 3

B 4

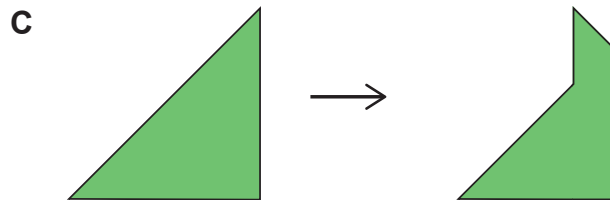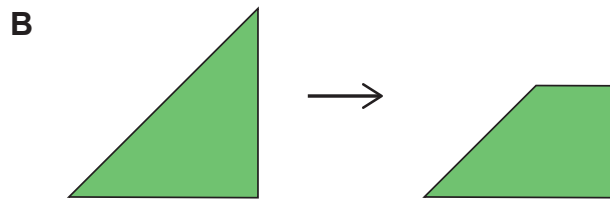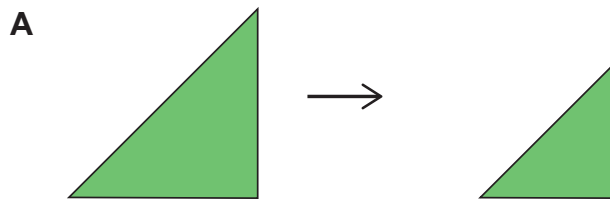**C** 6

D 8

E 24

30 Peter starts with a piece of paper in the shape of a triangle, as shown.
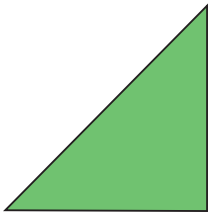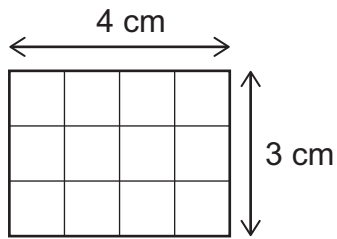

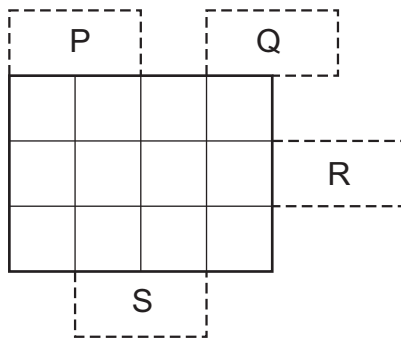He makes **just one fold** in the paper, without moving it in any other way.

Which of the following shapes could **not** be the result?

A

B

C

D

E

31 Ethan draws a rectangle 4 cm long and 3 cm wide.

He has a paper rectangle which is 2 cm long and 1 cm wide. He wants to place it in one of the four positions shown, P, Q, R or S, to make a new shape.

Ethan wants the perimeter of the new shape to be 4 cm more than the perimeter of his starting rectangle.

Which of the positions are possible?

A   P and Q only

B   P and S only

C   Q and R only

D   R and S only

E   P, Q, R and S

32 I am playing a computer game and I have 1000 points.

In the game, I buy 5 buildings, each costing 106 points. I also buy 1 farm.

I have 140 points left afterwards.
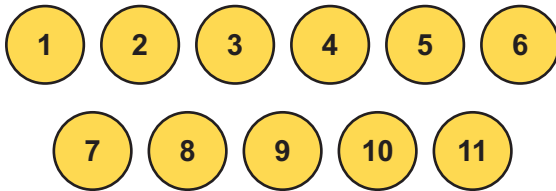
How many points did the farm cost?

A   330

B   356

C   470

D   610

E   754

33 Jess has a bag of eleven counters numbered 1 to 11.

Without looking, she takes one counter out of the bag at random.

Which of the following statements below is/are correct?

    1   Jess is equally likely to take out an even number or an odd number.

    2   Jess is more likely to take out a number greater than 6 than a number less than 6.

    3   Jess is equally likely to take out the number 2 or the number 9.
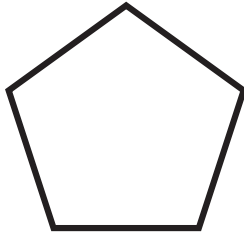
A   statement 2 only

B   statement 3 only

C   statements 1 and 2 only

D   statements 1 and 3 only

E   statements 1, 2 and 3

34

Bruce has a regular pentagon.

He makes one straight-line cut to divide the pentagon into two shapes.

Which of these can he make with one cut?

    X   A triangle and a hexagon

    Y   Two quadrilaterals

    Z   A quadrilateral and a pentagon

A X only

B Y only

C X and Z only

D Y and Z only

E X, Y and Z

35 My old ruler has had some of its markings rubbed off.

It only has marks at 0, 2, 3 and 7 centimetres.

However, I can still make a line that is 1 cm long by drawing between the marks at 2 and 3.
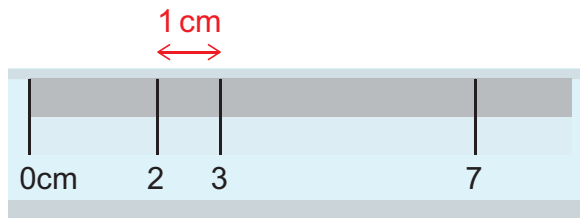
What length of straight line can I **not** make accurately by drawing between two marks, without moving the ruler?

A 3 cm

B 4 cm

C 5 cm

D 6 cm

E 7 cm

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