Ma

KEY STAGE
3

TIER
4–6

2009

Mathematics test

Paper 1

Calculator **not** allowed

First name _____

Last name _____

School _____

Remember

- The test is 1 hour long.
- You **must not** use a calculator for any question in this test.
- You will need: pen, pencil, rubber, ruler and tracing paper (optional).
- Some formulae you might need are on page 2.
- This test starts with easier questions.
- Try to answer all the questions.
- Write all your answers and working on the test paper – do not use any rough paper. Marks may be awarded for working.
- Check your work carefully.
- Ask your teacher if you are not sure what to do.

TOTAL MARKS

Instructions

Answers

This means write down your answer or show your working and write down your answer.

Calculators

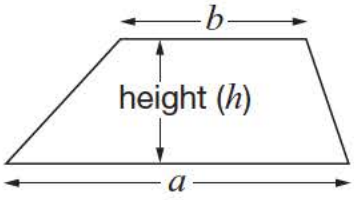
You **must not** use a calculator to answer any question in this test.

Formulae

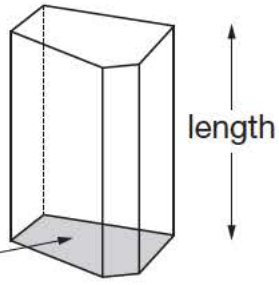
You might need to use these formulae

Trapezium

Area = $\frac{1}{2}(a + b)h$



Prism

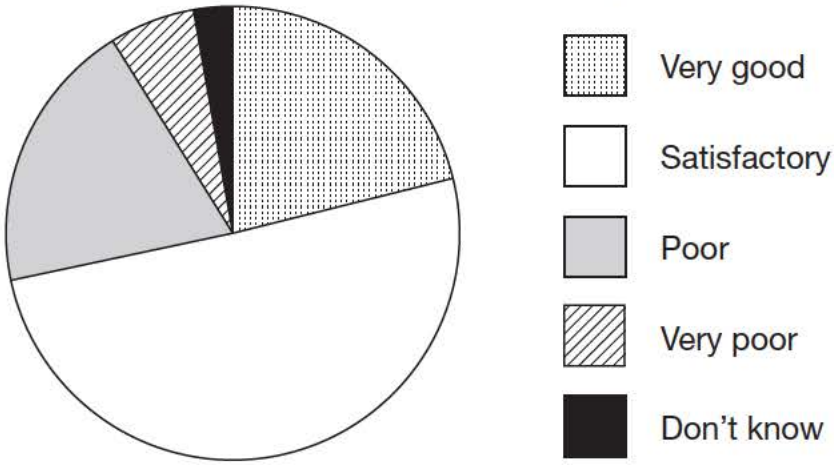


Volume = area of cross-section × length

1. In a survey, people were asked:

> How good is your doctor?

The pie chart shows the results.



(a) About what percentage of the people said **'Satisfactory'**?

_____ %

1 mark

(b) Altogether, about what percentage of the people said **'Poor'** or **'Very poor'**?

_____ %

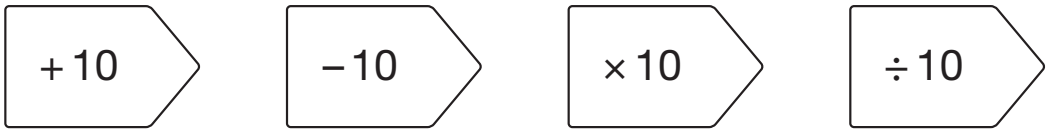
1 mark

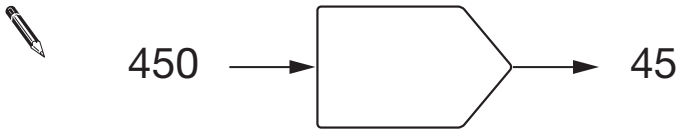
(c) Give one reason why a person may say **'Don't know'**.

1 mark

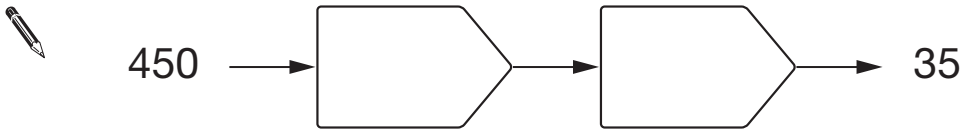
2. Fill in the boxes to complete each number chain.

Use any of the following:

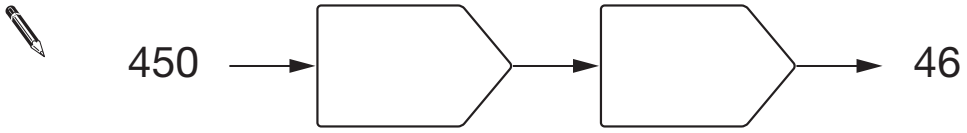




1 mark



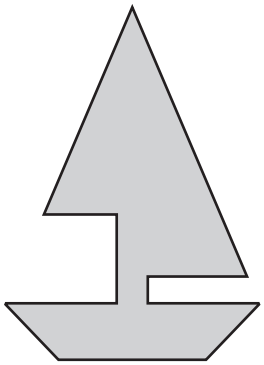
1 mark



1 mark

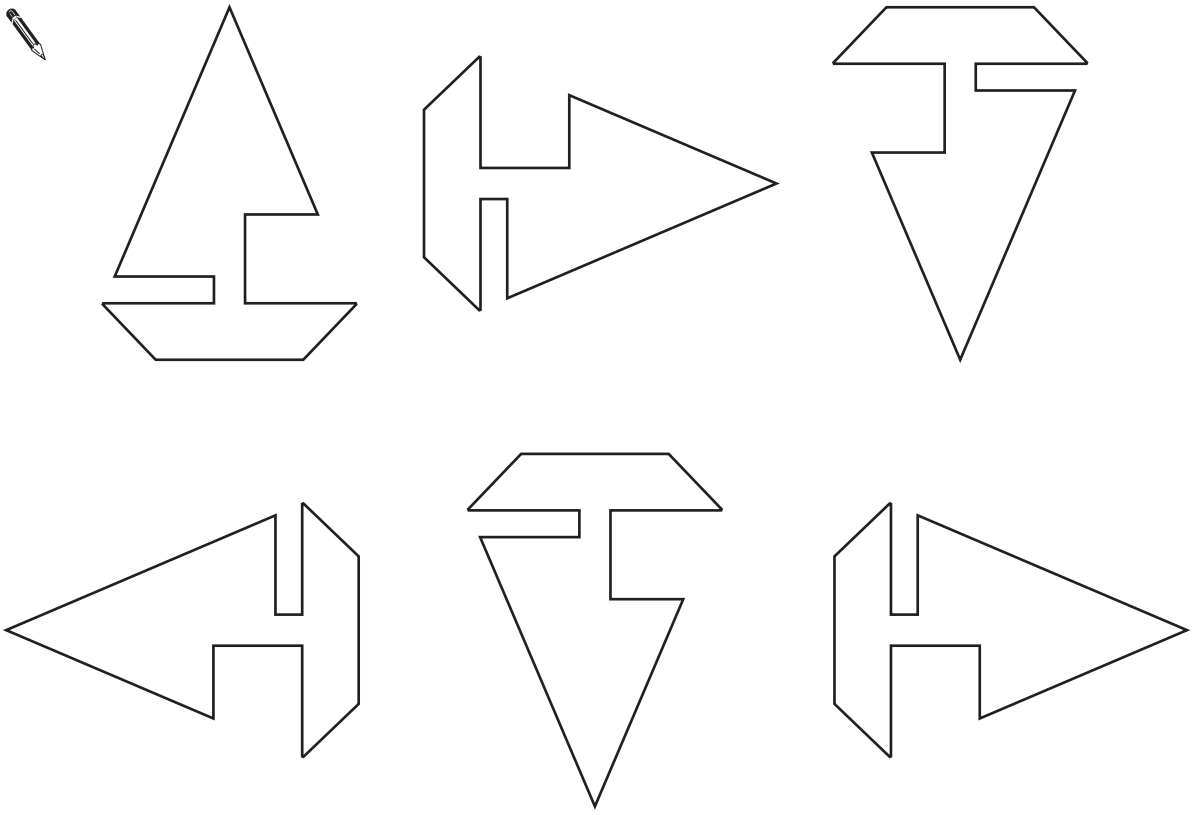
3. Samir has a piece of card that is grey on one side and white on the other.

He cuts out this shape from the card.



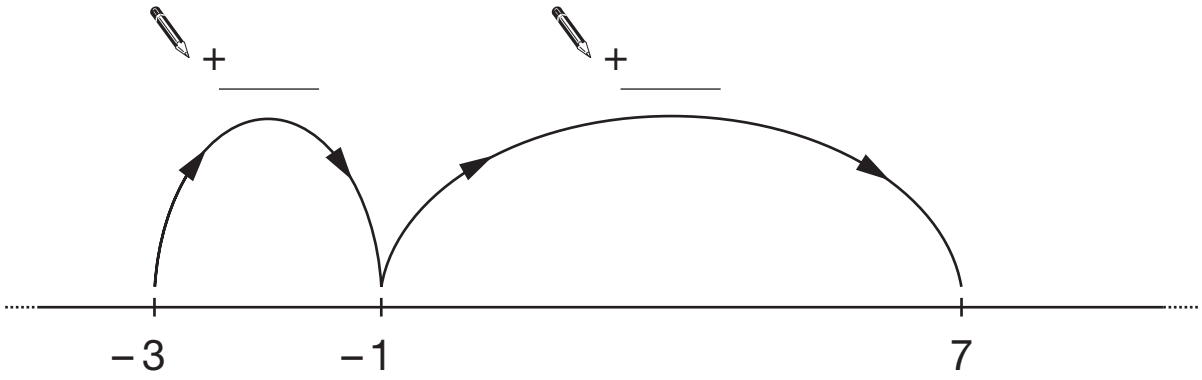
He turns over the shape so that the white side is showing.

Tick (✓) **all** the shapes below that show the **white** side of Samir's shape.

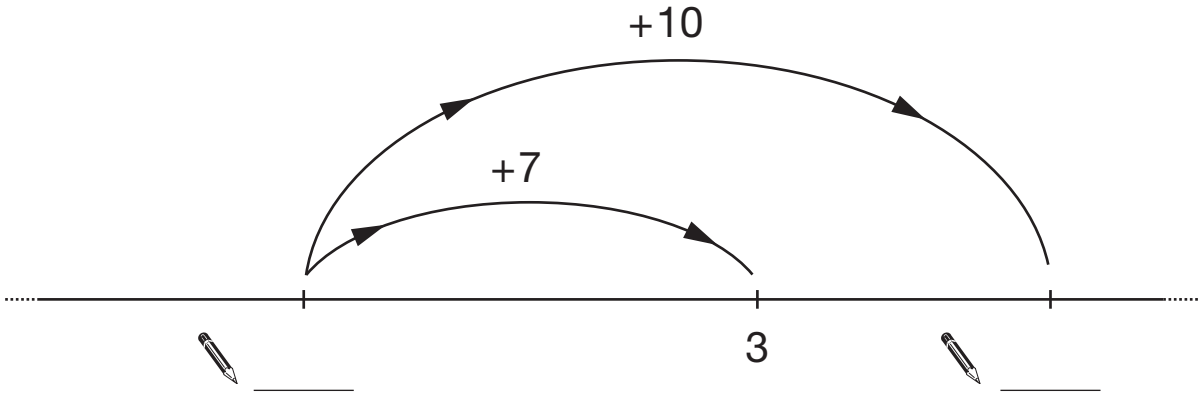


2 marks

4. Write in the missing numbers.



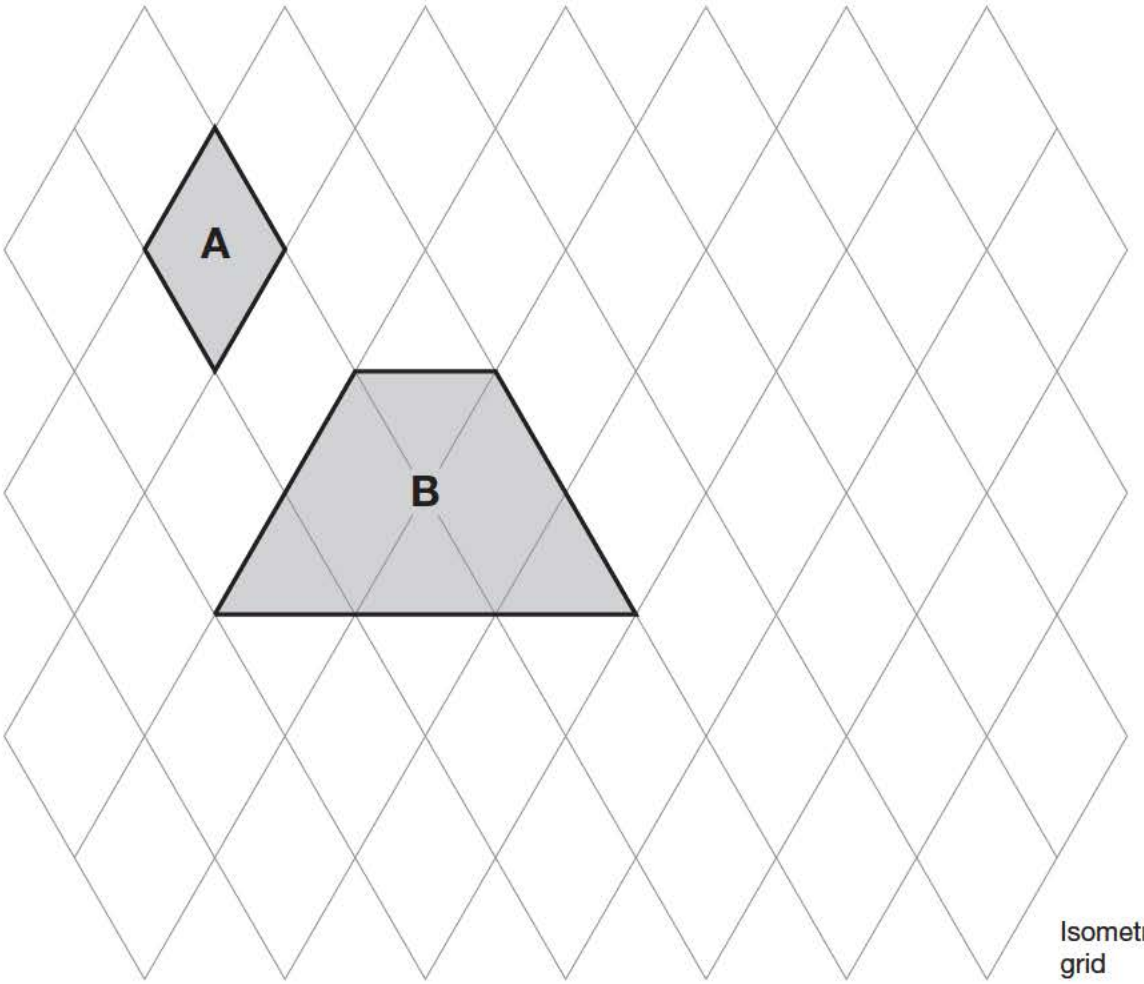
1 mark



1 mark

1 mark

5. Look at the shaded shapes.



Isometric grid

(a) The area of shape **A** is **3 cm²**

What is the area of shape **B**?

_____ cm²

1 mark

(b) On the grid, draw a **triangle** that has an area of **6 cm²**

1 mark

6. Write the missing digits in each calculation below.

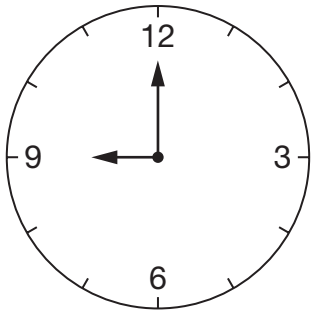
The first one is done for you.

1	9	×	3	=	5	7
		×	3	=	5	1
		×	3	=	4	

1 mark

1 mark

7. (a) I started swimming at **9am**.

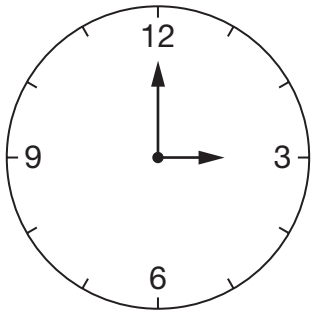


When I finished swimming, the **minute hand** of the clock had **turned 360°**

What time did I finish swimming?

1 mark

(b) I started walking at **3pm**.



When I finished walking, the **hour hand** of the clock had **turned 90°**

What time did I finish walking?

1 mark

8. Look at this set of four number cards.

20	20	20	20

The **sum** of these numbers is **80**

Now look at the two sets of number cards below.

Set A			
17	18	19	20

Set B			
21	22	23	24

Which set has a **sum** that is **closer to 80**?

☐ Set A ☐ Set B

Explain your answer.

1 mark

9. (a) A number chain starts

$$1 \longrightarrow 2 \longrightarrow 5 \longrightarrow \ldots$$

To find the next number you use the rule **× 3 then − 1**

Write the next two numbers in the number chain.

$$1 \longrightarrow 2 \longrightarrow 5 \longrightarrow \_\_\_\_ \longrightarrow \_\_\_\_$$

1 mark

(b) Here is a different number chain.

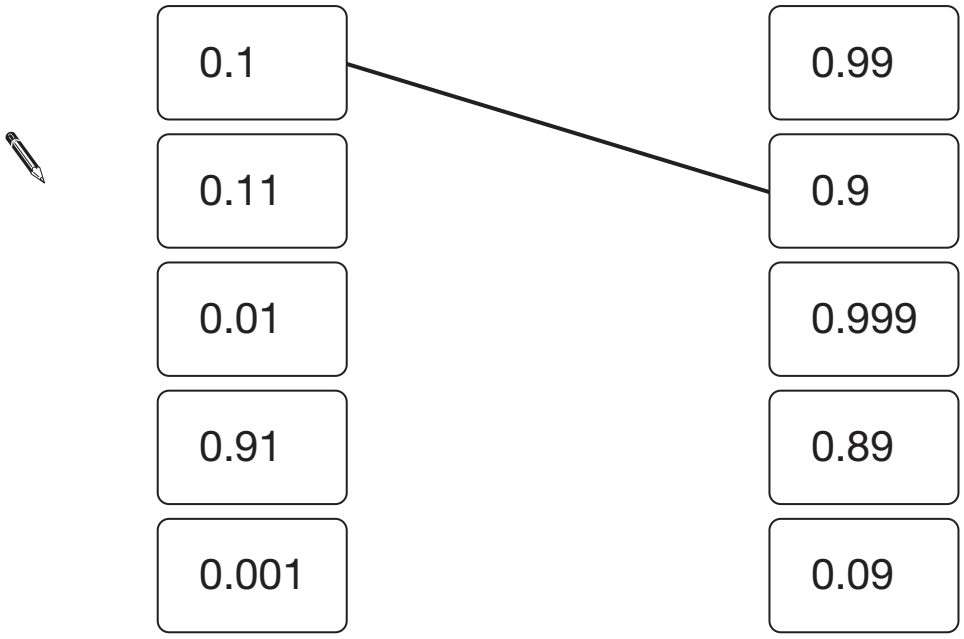
$$3 \longrightarrow 9 \longrightarrow 27 \longrightarrow 81 \longrightarrow \ldots$$

What could the **rule** be to find the next number?

1 mark

10. (a) Join all the pairs of numbers that **add** together to equal **1**

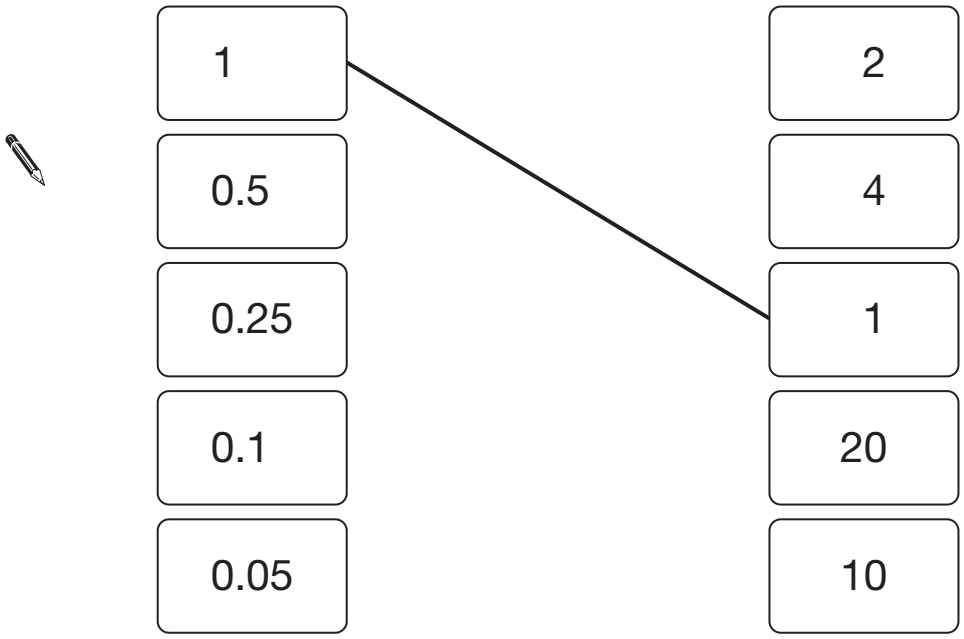
The first one is done for you.



2 marks

(b) Now join all the pairs of numbers that **multiply** to equal **1**

The first one is done for you.



2 marks

11. Paul has **15** T-shirts.

The information shows the colours of his T-shirts.

5 black

3 white

3 red

2 dark blue

1 light blue

1 yellow

Paul is going to take one of his T-shirts at random.

(a) What is the probability that the T-shirt will be **red**?

1 mark

(b) What is the probability that the T-shirt will **not** be **black**?

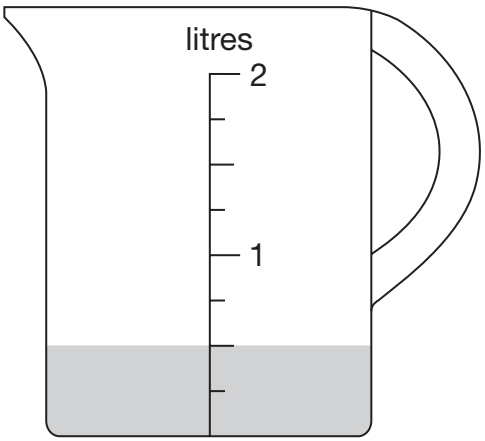
1 mark

(c) He takes one of his **blue** T-shirts at random.

What is the probability that the T-shirt is **light blue**?

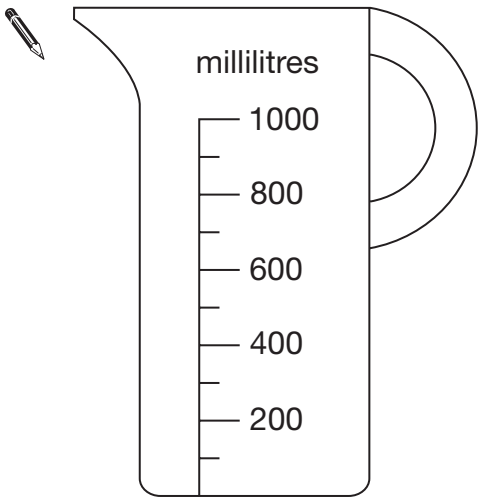
1 mark

12. Zak has some water in a jug.



He pours this water into the jug below.

Draw the correct level of the water on the jug.

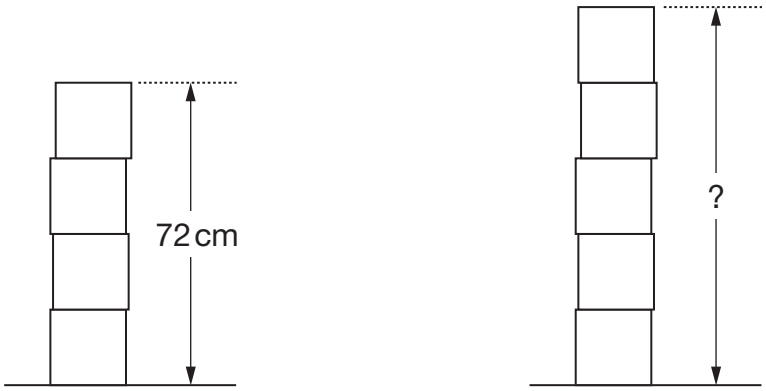


1 mark

13. Lisa has some boxes that are all cubes of the same size.

She uses four of the boxes to make a pile with a height of **72 cm**.

She puts one more box on top of the pile.



Work out the height of the pile of **five** boxes.

_____ cm

2 marks

14. (a) Work out **5%** of **360**

1 mark

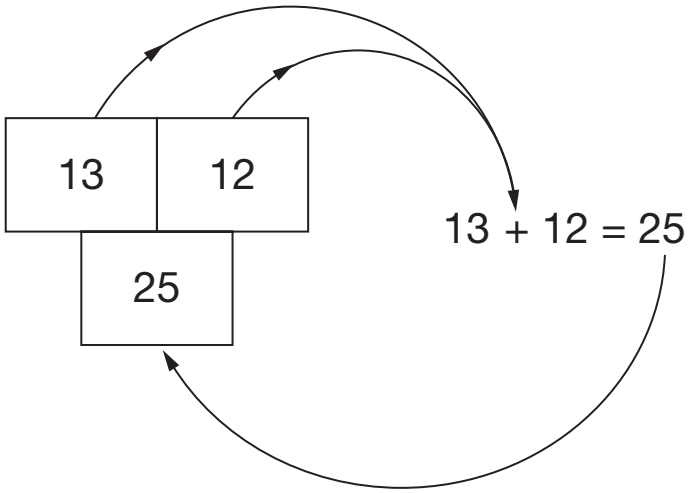
(b) Work out **15%** of **360**

You can use part (a) to help you.

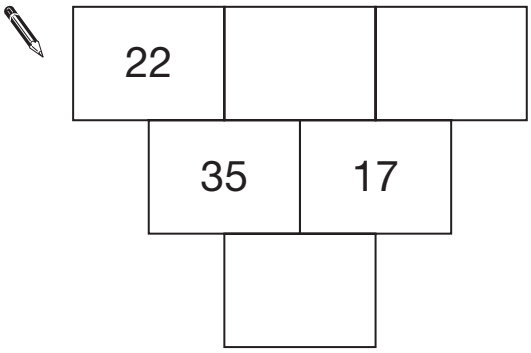
1 mark

15. In these number grids, two numbers are added to give the number below.

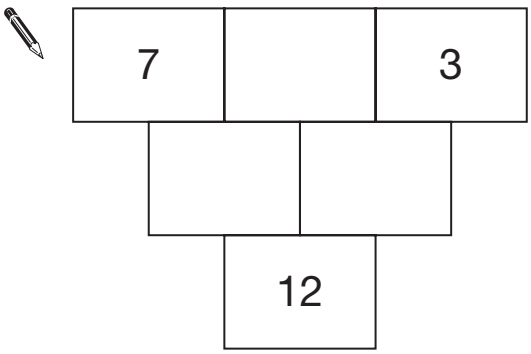
Example:



Write numbers in the number grids below to make them correct.

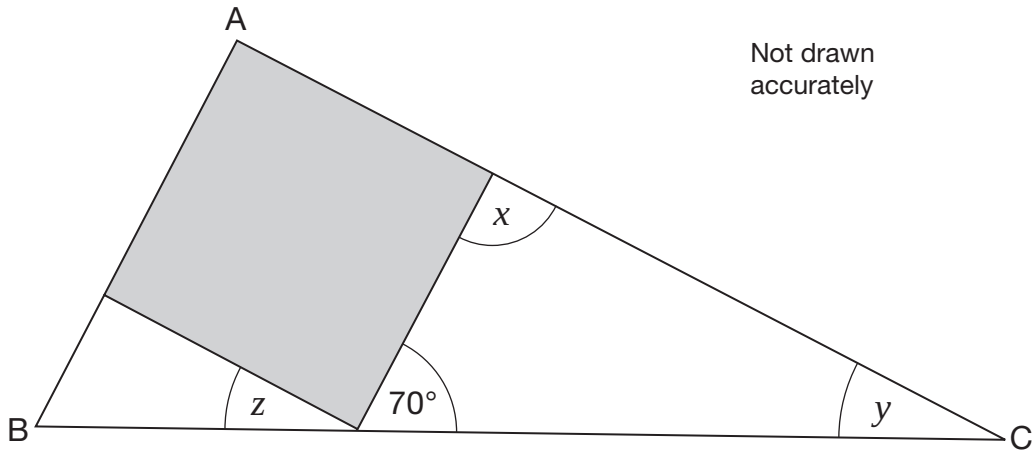


1 mark



1 mark

16. Look at the right-angled triangle ABC.



The square fits exactly inside the triangle.

Work out the sizes of angles x, y and z

$x =$ _____ °

$y =$ _____ °

$z =$ _____ °

3 marks

17. Look at these equations.

$$11 = 6 + a$$

$$a + 7 = 10 + b$$

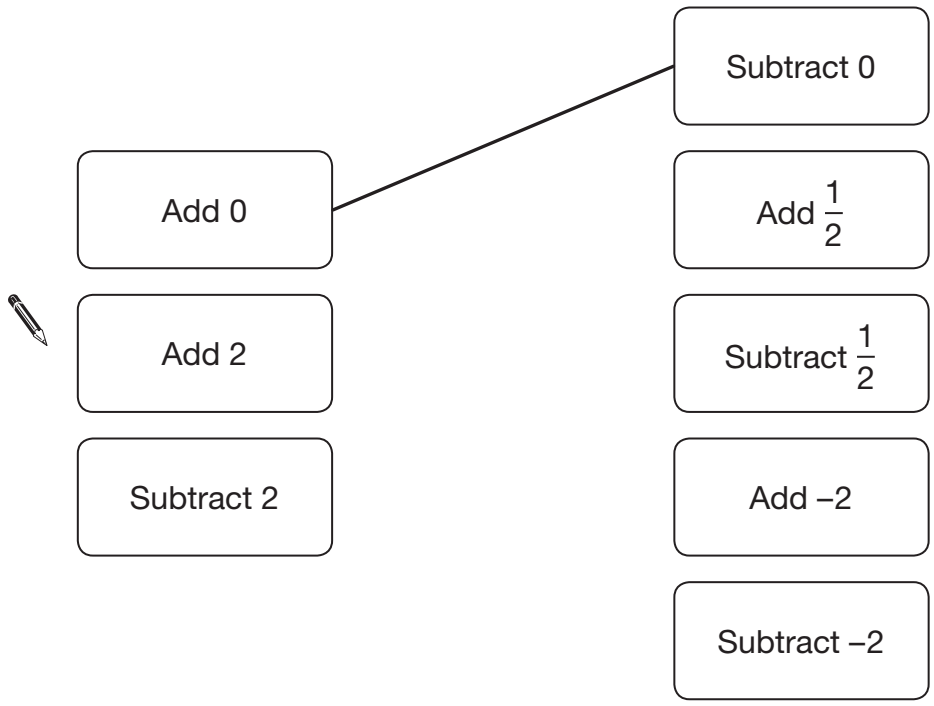
Use **both** equations to work out the value of b

$b =$ _____

2 marks

18. Match each instruction on the left with an instruction on the right that has **the same effect**.

The first one is done for you.



1 mark

19. Pupils are investigating oak leaves.

They want to collect a sample of oak leaves.

Here is their plan for how to collect the sample.

Plan
Choose one oak tree. Take 10 leaves from the lowest branches of the tree.

Give **two** reasons why this sample of leaves may **not be representative** of all oak leaves.

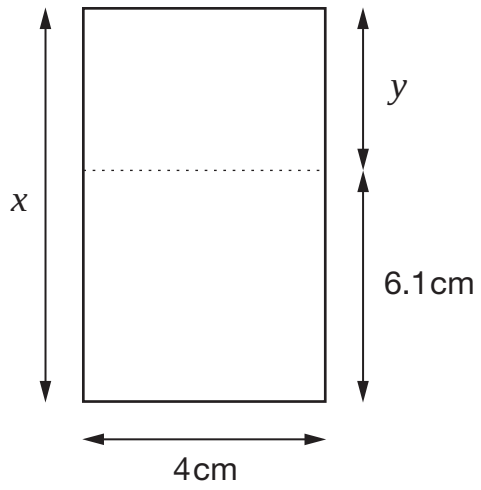
First reason:

1 mark

Second reason:

1 mark

20. Look at the rectangle.



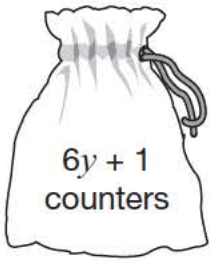
The **total area** of the rectangle is **40cm²**

Work out lengths x and y

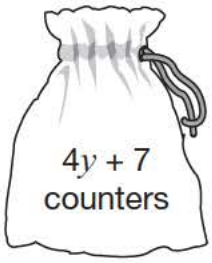
x = _____ cm y = _____ cm

2 marks

21. (a) Bags A and B contain some counters.



Bag A



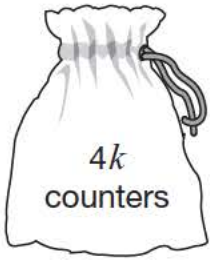
Bag B

The number of counters in each bag **is the same**.

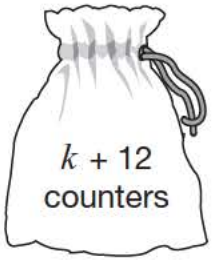
Work out the value of y

2 marks

(b) Bag **C** contains **more** counters than bag **D**.



Bag C



Bag D

What is the **smallest** possible value of k?

2 marks

22. Gary took part in a quiz show and won a **million pounds**.

He spent **£20 000** on a holiday.

Then he spent **half** of the **money left** on a house.

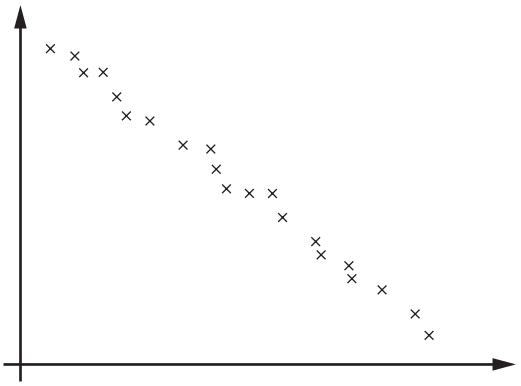
How much did Gary's house cost?

£

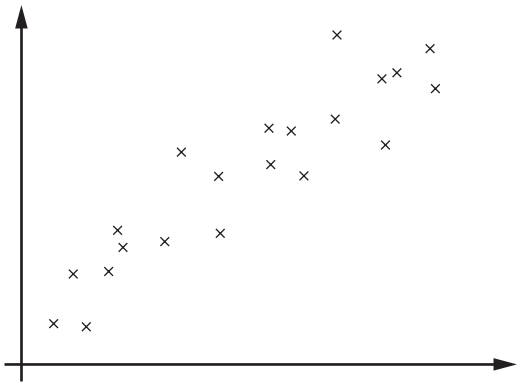
2 marks

23. Look at these two scatter graphs. They are both drawn using the same scale.

Graph A



Graph B



(a) Which scatter graph shows **positive** correlation?

☐ A ☐ B

Explain your answer.

1 mark

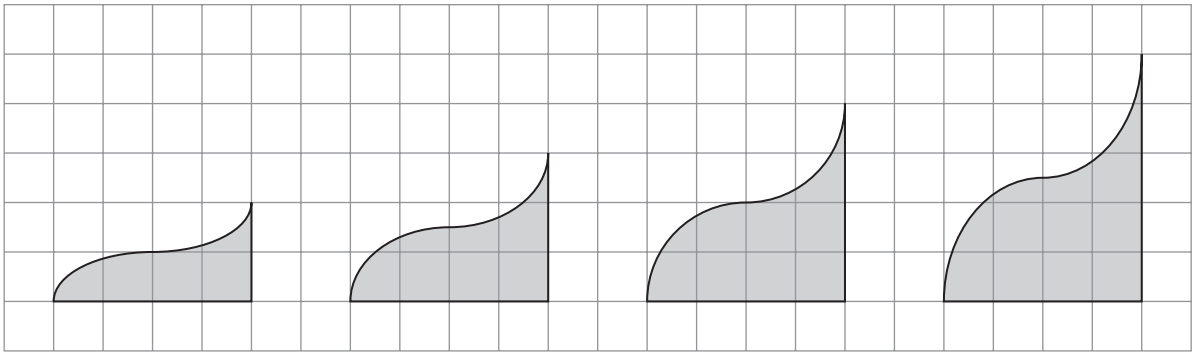
(b) Which scatter graph shows **stronger** correlation?

☐ A ☐ B

Explain your answer.

1 mark

24. Look at the sequence of shapes on a square grid.



Shape number 1 | Shape number 2 | Shape number 3 | Shape number 4

The table shows information about these shapes.

Shape number N	Base B	Height H	Area A
1	4	2	4
2	4	3	6
3	4	4	8
4	4	5	10

Rules connect N, B, H and A.

Write one missing letter in each space below to complete the rule.

H = _____ + 1

A = _____ × 2

_____ = $2N$ + 2

2 marks

25. Look at this information.

$$\frac{27}{40} = 0.675$$

$$\frac{29}{40} = 0.725$$

Use this information to write the missing **decimals** below.

$$\frac{31}{40} = \_\_\_\_\_$$

1 mark

$$\frac{23}{40} = \_\_\_\_\_$$

1 mark

26. In this question, n stands for any **whole number**.

(a) For the expression $\boldsymbol{2n}$, tick (✓) the correct statement below.

- ☐ $\boldsymbol{2n}$ must be odd.
- ☐ $\boldsymbol{2n}$ must be even.
- ☐ $\boldsymbol{2n}$ could be odd or even.

Explain your answer.

1 mark

(b) For the expression $\boldsymbol{3n}$, tick (✓) the correct statement below.

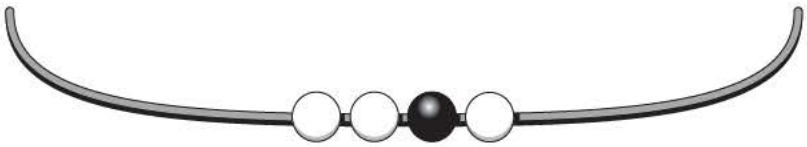
- ☐ $\boldsymbol{3n}$ must be odd.
- ☐ $\boldsymbol{3n}$ must be even.
- ☐ $\boldsymbol{3n}$ could be odd or even.

Explain your answer.

1 mark

PLEASE TURN OVER

27. On this necklace the ratio of black beads to white beads is **1 : 3**



How many **more** black beads do you need to add to make the ratio of black to white **3 : 1**?

_____ black beads

1 mark

28. Show that the **difference** between 3^2 and 3^3 is **18**

1 mark

END OF TEST

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