Ma

KEY STAGE
3

TIER
4–6

2007

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 and a ruler.
- 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.

For marker's use only

TOTAL MARKS	

Instructions

Answers

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

Calculators

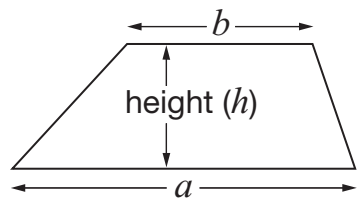
You **must not** use a calculator to answer any question in this test.

Formulae

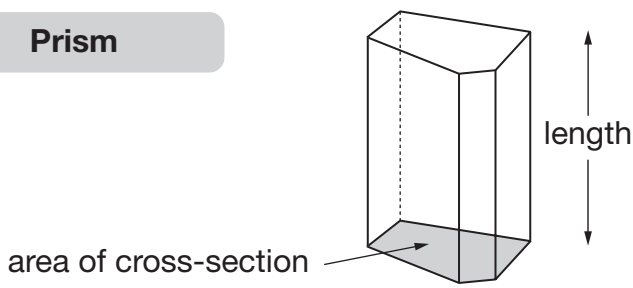
You might need to use these formulae

Trapezium

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



Prism



Volume = area of cross-section × length

1. The table shows the approximate populations of five different places.

Place	Approximate population
London	7 000 000
Sheffield	700 000
Harrogate	70 000
Ash Vale	7 000
Binbrook	700

(a) Which of the places has a population of about **seventy thousand**?

_____

1 mark

(b) Use the table to complete these sentences.

The population of **Harrogate** is about **10 times** as big as

the population of _____

The population of _____ is about **100 times** as big as

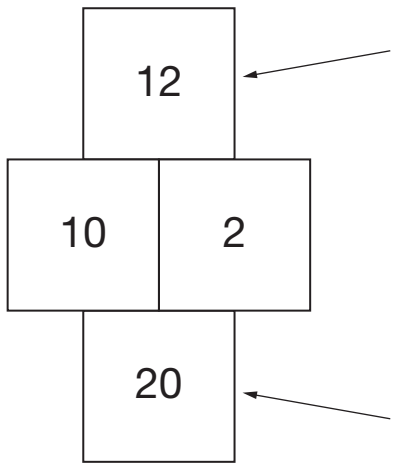
the population of **Harrogate**.

The population of **Sheffield** is about _____ **times** as big as

the population of **Ash Vale**.

2 marks

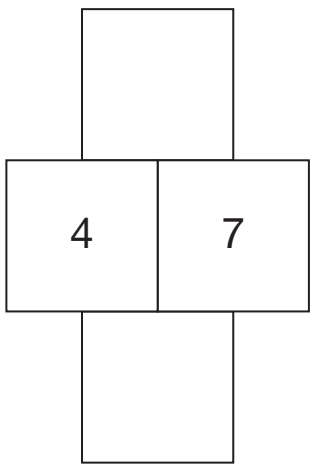
2. Here are the rules for a number grid.

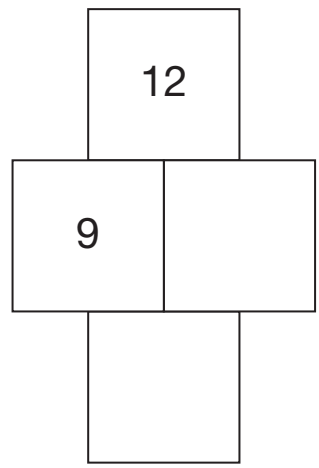


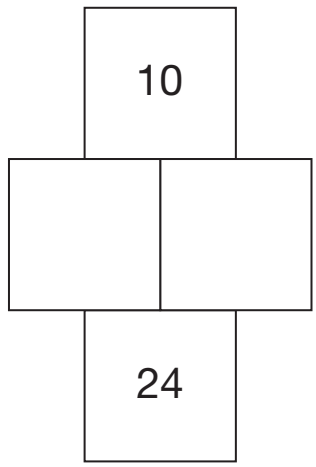
This number is the **sum** of the numbers in the middle row.

This number is the **product** of the numbers in the middle row.

Use the rules to write the missing numbers in these number grids.



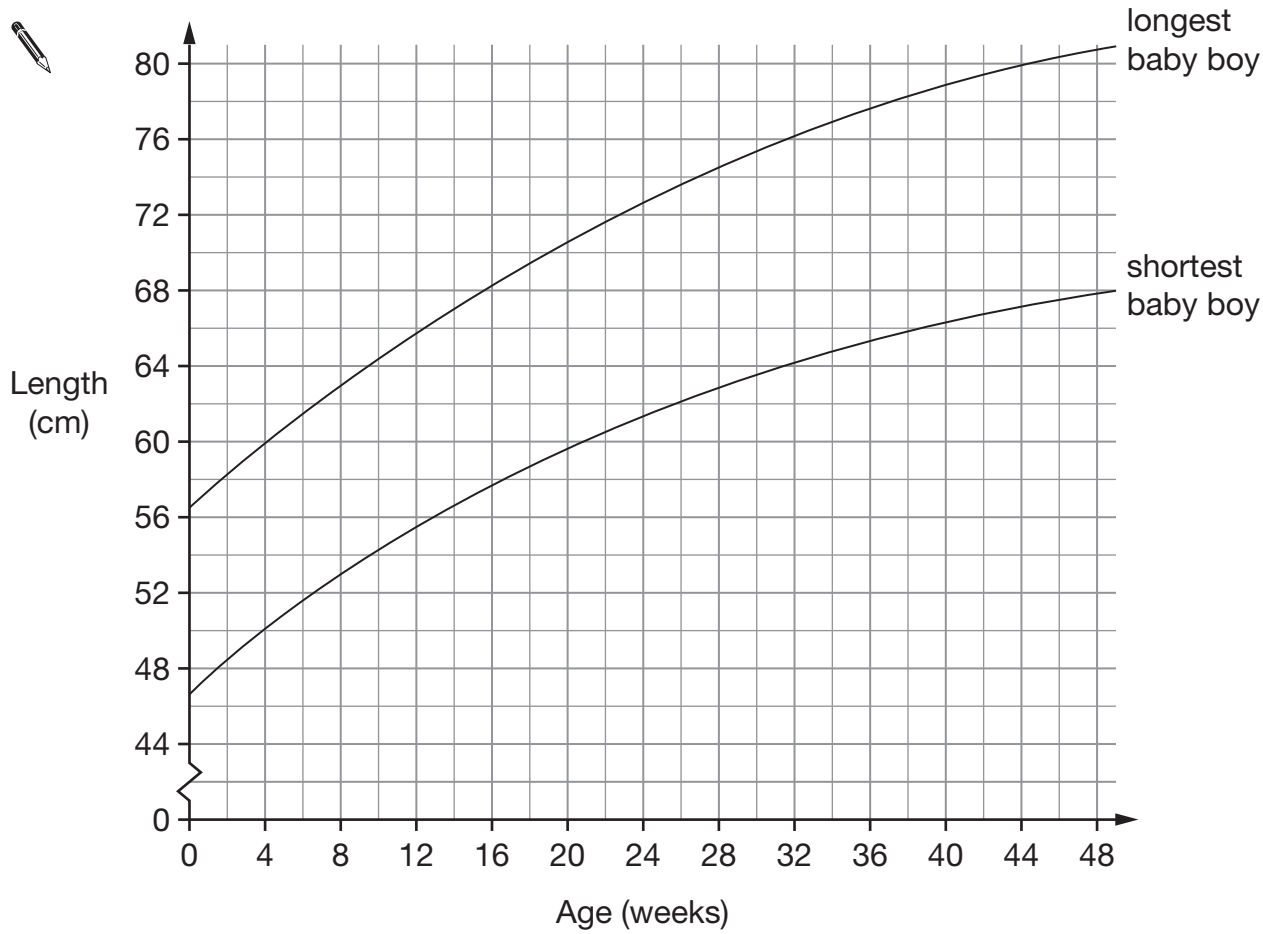




3 marks

3. The lengths of babies are measured at different ages.

The graph shows the longest and shortest a baby boy is likely to be.



(a) Write the missing numbers below.

A baby boy is **8 weeks old**.

The **longest** he is likely to be is about _____ cm.

1 mark

The **shortest** he is likely to be is about _____ cm.

1 mark

(b) A **34 week** old baby boy is **72 cm** long.

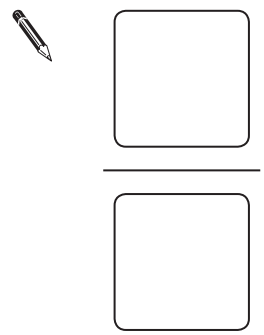
Put a cross on the graph to show this information.

1 mark

4. Here are six number cards.

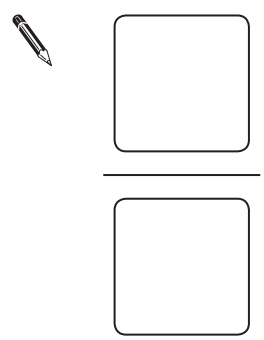
2	4	6	8	10	12

(a) Choose two of these six cards to make a fraction that is equivalent to $\frac{1}{3}$



1 mark

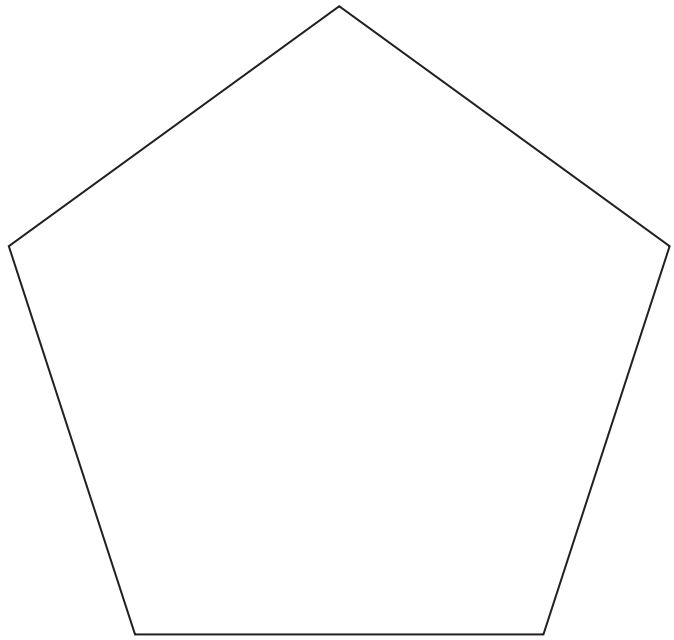
(b) Choose two of these six cards to make a fraction that is **greater than** $\frac{1}{2}$ but **less than 1**



1 mark

5. The shape below is a regular pentagon.

All five sides are exactly the same length.



Measure accurately one of the sides, then work out the **perimeter** of the pentagon.

1 mark

1 mark

Perimeter = cm

1 mark

6. (a) A **three-digit** number is a **multiple of 4**

What could the number be?

Give an example.

Now give a **different** example.

1 mark

(b) A **two-digit** number is a **factor of 100**

What could the number be?

Give an example.

1 mark

Now give a **different** example.

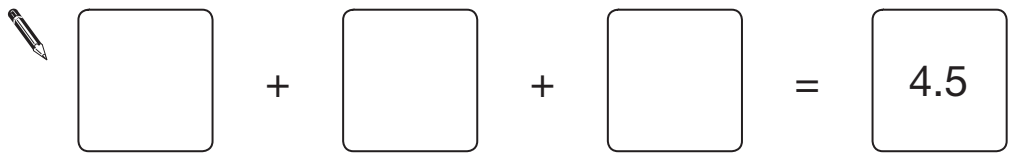
1 mark

7. (a) Write the answer to this calculation.

1 mark

(b) Now write a number in each box to make this calculation correct.

The three numbers must be the **same**.



1 mark

8. Sam says:

> The **only** four-sided shape with four right angles is a square.

Is Sam correct?

☐ Yes ☐ No

Explain your answer.

1 mark

9. (a) When $x = 8$, what is the value of $5x$?

Tick (✓) the correct box below.

☐ 5 ☐ 13 ☐ 40 ☐ 58 ☐ None of these

1 mark

(b) When $x = 8$, what is the value of $3x - x$?

Tick (✓) the correct box below.

☐ 0 ☐ 3 ☐ 16 ☐ 30 ☐ None of these

1 mark

(c) When $x = 8$, what is the value of x^2?

Tick (✓) the correct box below.

☐ 8 ☐ 10 ☐ 16 ☐ 64 ☐ None of these

1 mark

10. Lisa uses a grid to multiply **23** by **15**

×	**20**	**3**
10	200	30
5	100	15

200 + 100 + 30 + 15 = 345

Answer: **345**

Now Lisa multiplies two different numbers.

Complete the grid, then give the answer below.

×	_____	**40**	**3**
30	_____	_____	_____
_____	600	_____	18

Answer: _____

3 marks

11. Fred has a bag of sweets.

Contents
3 yellow sweets
5 green sweets
7 red sweets
4 purple sweets
1 black sweet

He is going to take a sweet from the bag at random.

(a) What is the **probability** that Fred will get a **black** sweet?

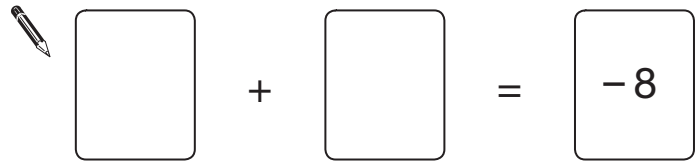
1 mark

(b) Write the missing **colour** in the sentence below.

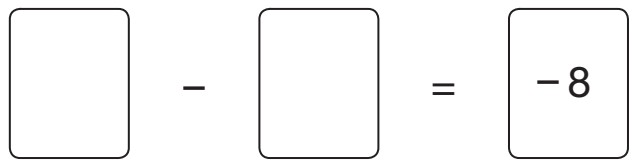
The probability that Fred will get a _____ sweet is $\frac{1}{4}$

1 mark

12. Write a number in each box to make the calculations correct.



1 mark



1 mark

13. A rectangle has an **area** of **24 cm^2**

How long could the sides of the rectangle be?

Give three **different** examples.

_____ cm and _____ cm

_____ cm and _____ cm

_____ cm and _____ cm

2 marks

14. (a) Write the missing numbers.

50% of 80 = _____

5% of 80 = _____

1% of 80 = _____

2 marks

(b) Work out 56% of 80

You can use part (a) to help you.

_____

1 mark

15. Look at this equation.

$$y = 2x + 10$$

(a) When $x = 4$, what is the value of y?

1 mark

(b) When $x = -4$, what is the value of y?

1 mark

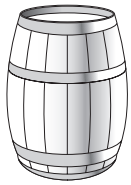
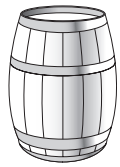
(c) Which equation below gives the **same** value of y for both $x = 4$ and $x = -4$?

Put a ring round the correct equation.

$y = 2x$ $\quad$ $y = 2 + x$ $\quad$ $y = x^2$ $\quad$ $y = \frac{x}{2}$

1 mark

16. The diagram shows four different sized barrels.

			
Barrel **A** holds **54 gallons**	Barrel **B** holds **36 gallons**	Barrel **C** holds **18 gallons**	Barrel **D** holds **9 gallons**

Write the missing fractions **as simply as possible**.

The first one is done for you.

Barrel **C** holds $\frac{1}{2}$ of the amount barrel **B** holds.

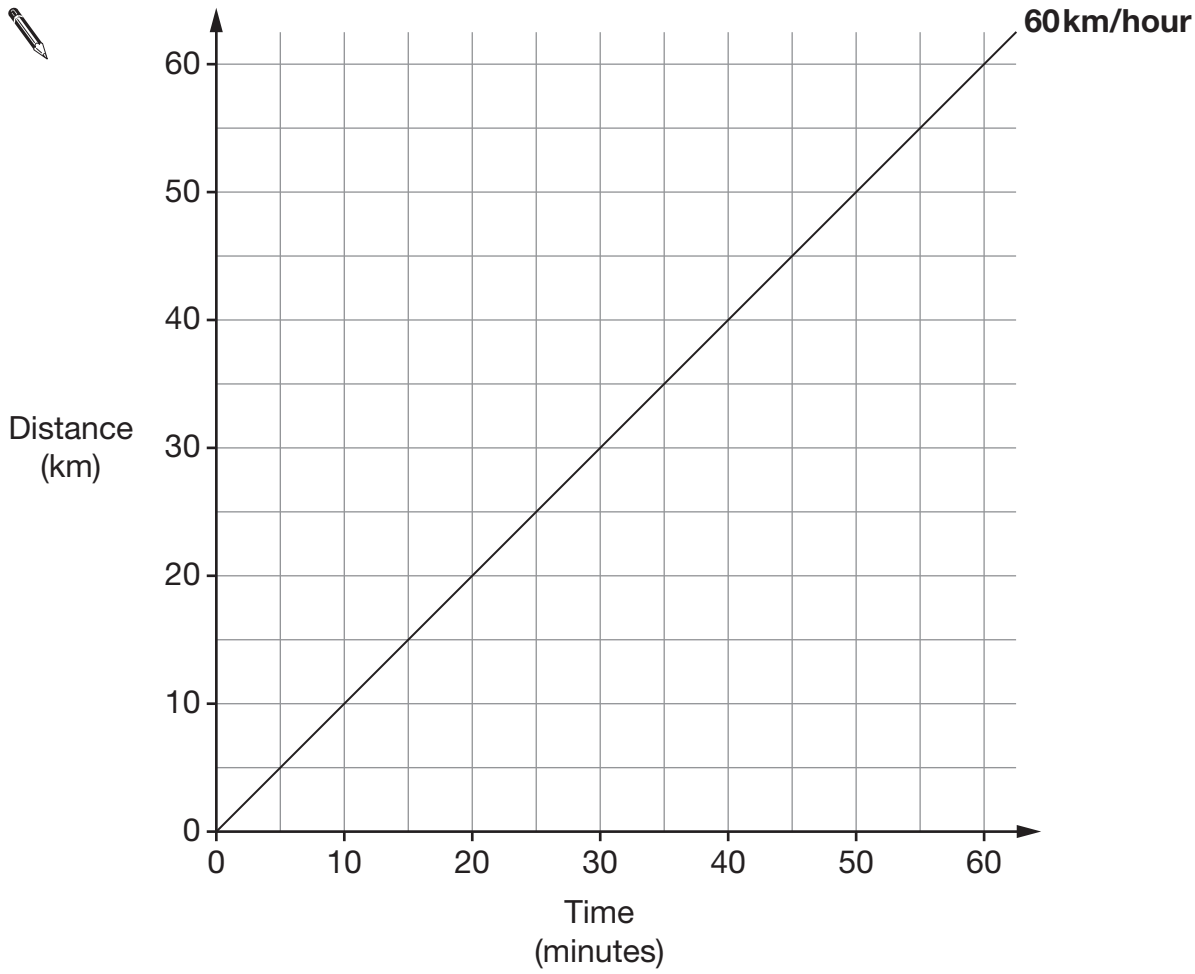
Barrel **D** holds _____ of the amount barrel **B** holds.

Barrel **C** holds _____ of the amount barrel **A** holds.

Barrel **B** holds _____ of the amount barrel **A** holds.

2 marks

17. The line on the graph below represents a speed of 60 km/hour.



(a) Draw a line on the graph to represent a speed of **30 km/hour**.

Label the line by writing 30 km/hour.

1 mark

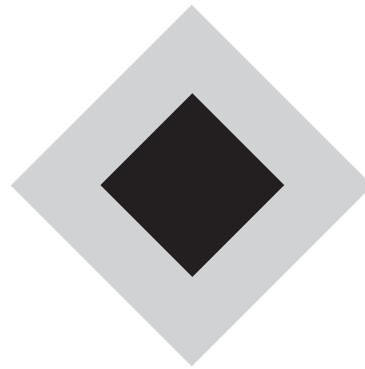
(b) Now draw a line on the graph to represent a speed of **120 km/hour**.

Label the line by writing 120 km/hour.

1 mark

18. (a) In this design, the ratio of **grey to black** is **3 : 1**

What **percentage** of the design is **black**?



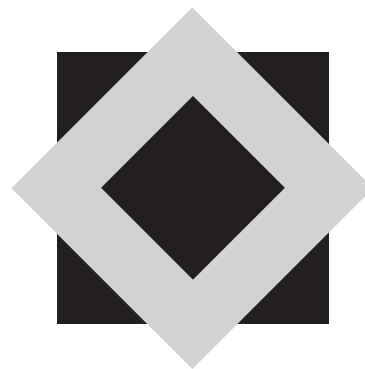
_____ %

1 mark

(b) In this design, **60%** is **grey** and the rest is black.

What is the ratio of **grey to black**?

Write your ratio in its simplest form.



_____ : _____

2 marks

19. In a bag there are only red, blue and green counters.

(a) I am going to take a counter out of the bag at random.

Complete the table below.

Colour of counters	Number of counters	Probability
Red	6	
Blue		$\frac{1}{5}$
Green	6	

2 marks

(b) Before I take a counter out of the bag, I put **one extra blue** counter into the bag.

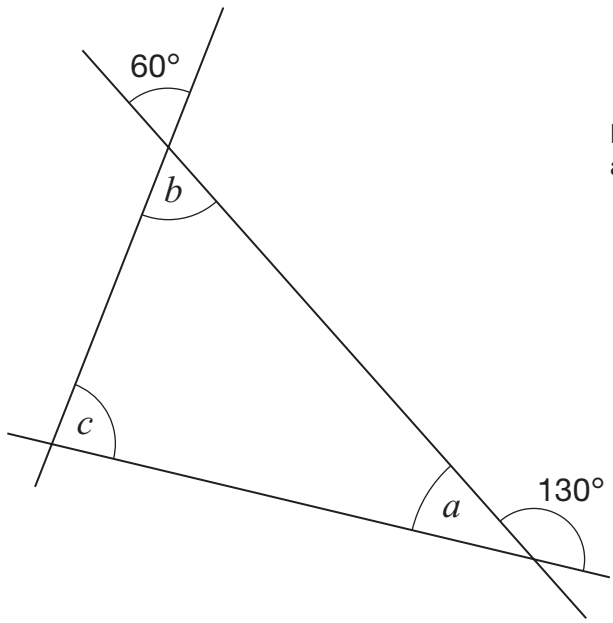
What effect does this have on the probability that I will take a **red** counter?

Tick (✓) the correct box.

- ☐ The probability has increased.
- ☐ The probability has decreased.
- ☐ The probability has stayed the same.
- ☐ It is impossible to tell.

1 mark

20. The diagram shows three straight lines.



Not drawn accurately

Work out the sizes of angles a, b and c

Give reasons for your answers.

a = _____ ° because _____

_____

_____ 1 mark

b = _____ ° because _____

_____

_____ 1 mark

c = _____ ° because _____

_____

_____ 1 mark

21. (a) Some of the fractions below are **smaller than $\frac{1}{9}$**

Tick (✓) them.

☐ $\frac{1}{10}$ ☐ $\frac{4}{9}$ ☐ $\frac{1}{2}$ ☐ $\frac{1}{100}$ ☐ $\frac{1}{8}$

1 mark

(b) To the nearest per cent, what is **$\frac{1}{9}$ as a percentage**?

Tick (✓) the correct percentage.

☐ 0.9% ☐ 9% ☐ 10% ☐ 11% ☐ 19%

1 mark

(c) Complete the sentence below by writing a **fraction**.

$\frac{1}{9}$ is half of _____

1 mark

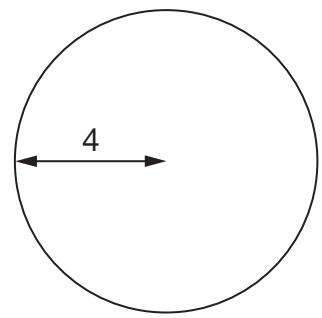
22. Solve this equation.

$$2(2n + 5) = 12$$

n = _____

2 marks

23. Kevin is working out the **area** of a circle with **radius 4**



He writes:

Area = π × 8

Explain why Kevin's working is **wrong**.

1 mark

24. Write the missing numbers in these fraction sums.

$$\frac{1}{4} + \frac{\square}{8} = 1$$

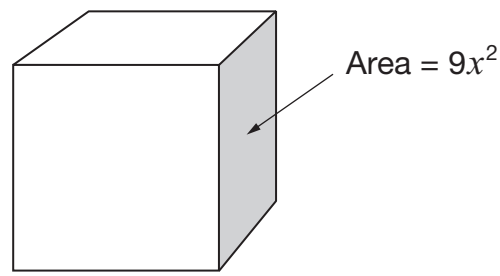
1 mark

$$\frac{1}{3} + \frac{8}{\square} = 1$$

1 mark

25. Look at the cube.

The area of a **face** of the cube is $\mathbf{9}\boldsymbol{x}^{\mathbf{2}}$



Write an expression for the **total surface area** of the cube.

Write your answer as simply as possible.

_____

1 mark

END OF TEST

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QCA/06/2781 (Pupil pack)
QCA/06/2778 (Mark scheme pack)