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.

Instructions

Answers

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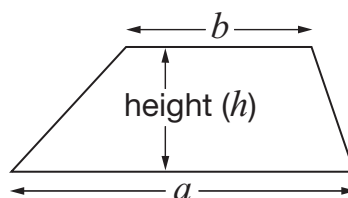
Calculators

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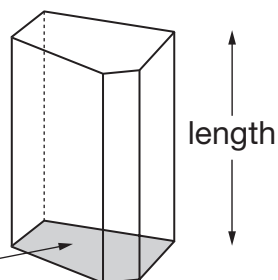
Formulae

You might need to use these formulae

Trapezium

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

Prism

area of cross-section

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
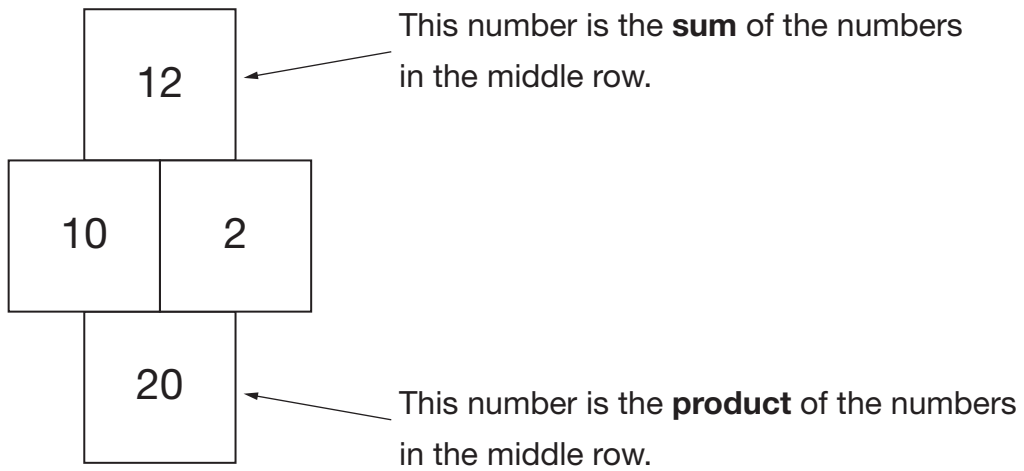
the population of **Harrogate**.

The population of **Sheffield** is about _____ **times** as big as
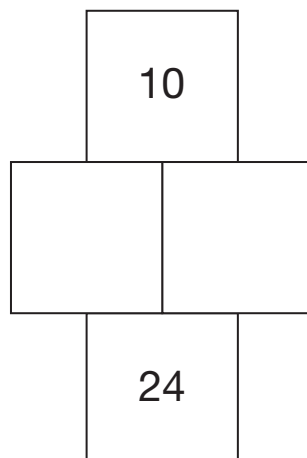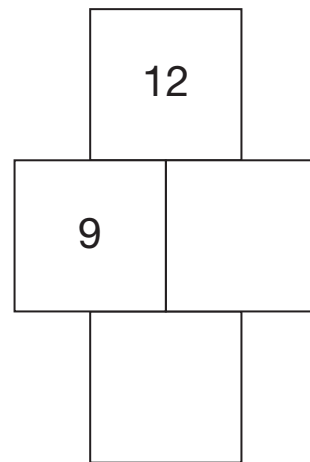
the population of **Ash Vale**.

2 marks

2. Here are the rules for a number grid.
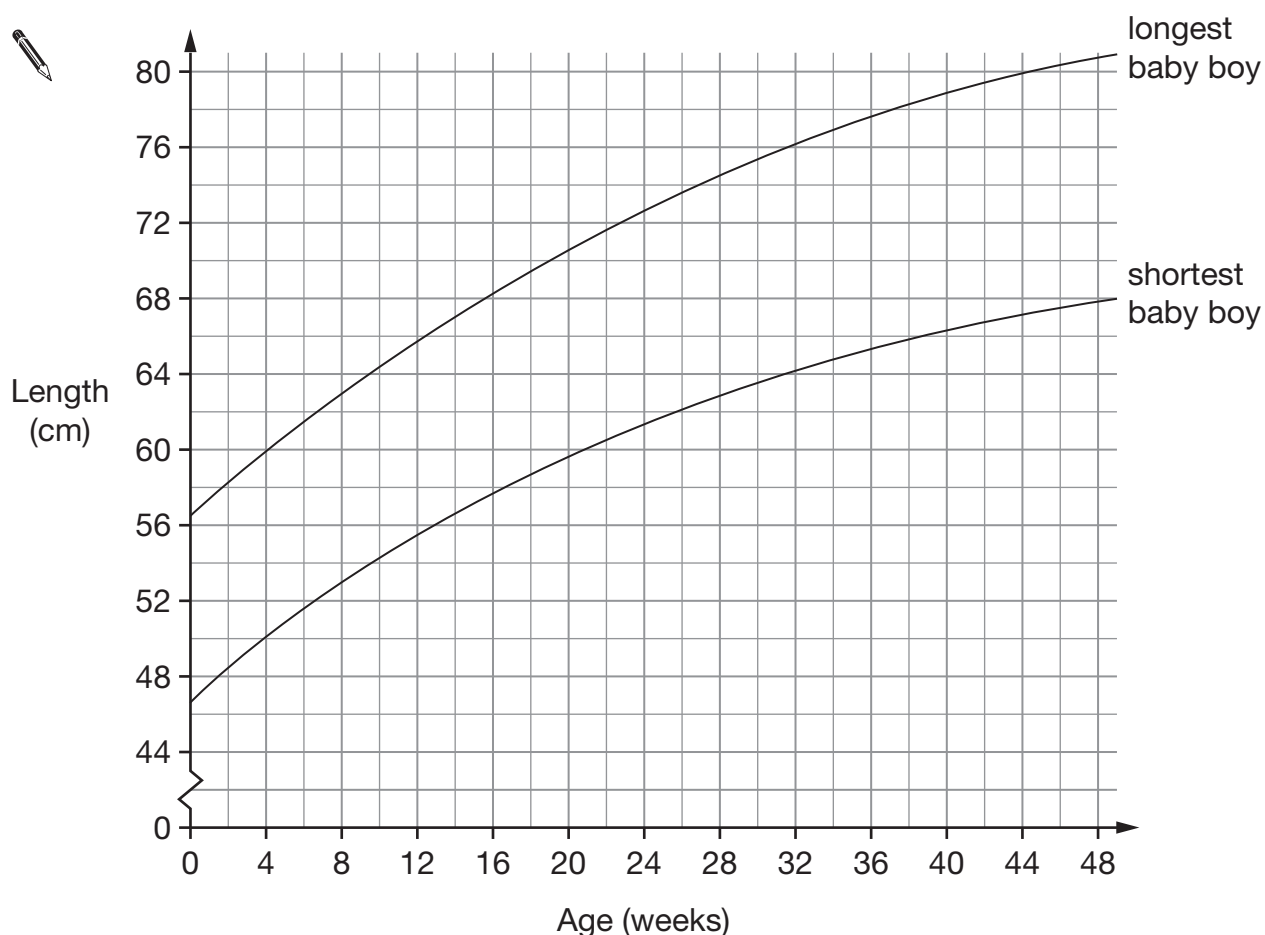
12

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

10   2

20

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

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

4   7

12

9

10

24

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.
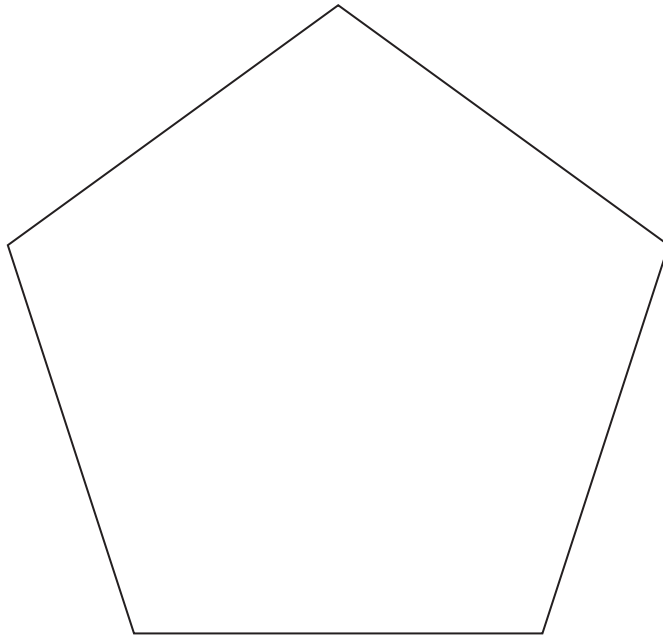
1 mark

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 $\frac{1}{3}$

$$\frac{\boxed{}}{\boxed{}}$$

1 mark

(b) Choose two of these six cards to

make a fraction that is **greater than** $\frac{1}{2}$ but **less than 1**

$$\frac{\boxed{}}{\boxed{}}$$

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.

Perimeter =   cm

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.

$$2.5 \; + \; 2.5 \; + \; 2.5 \; = \; \boxed{}$$

1 mark

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

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

$$\boxed{} \; + \; \boxed{} \; + \; \boxed{} \; = \; 4.5$$

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.

<div style="border:1px solid">

Contents

....

3 yellow sweets

5 green sweets

7 red sweets

4 purple sweets

1 black sweet

</div>

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 $\dfrac{1}{4}$

1 mark

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

$$\boxed{} \quad + \quad \boxed{} \quad = \quad \boxed{-8}$$

$$\boxed{} \quad - \quad \boxed{} \quad = \quad \boxed{-8}$$

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

14. (a) Write the missing numbers.

50% of 80 = _____

5% of 80 = _____

1% of 80 = _____

(b) Work out 56% of 80

You can use part (a) to help you.

_____

15.   Look at this equation.

$$y = 2x + 10$$

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

———————————

(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 $x = -4$?
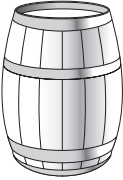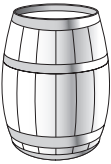
Put a ring round the correct equation.

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

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.

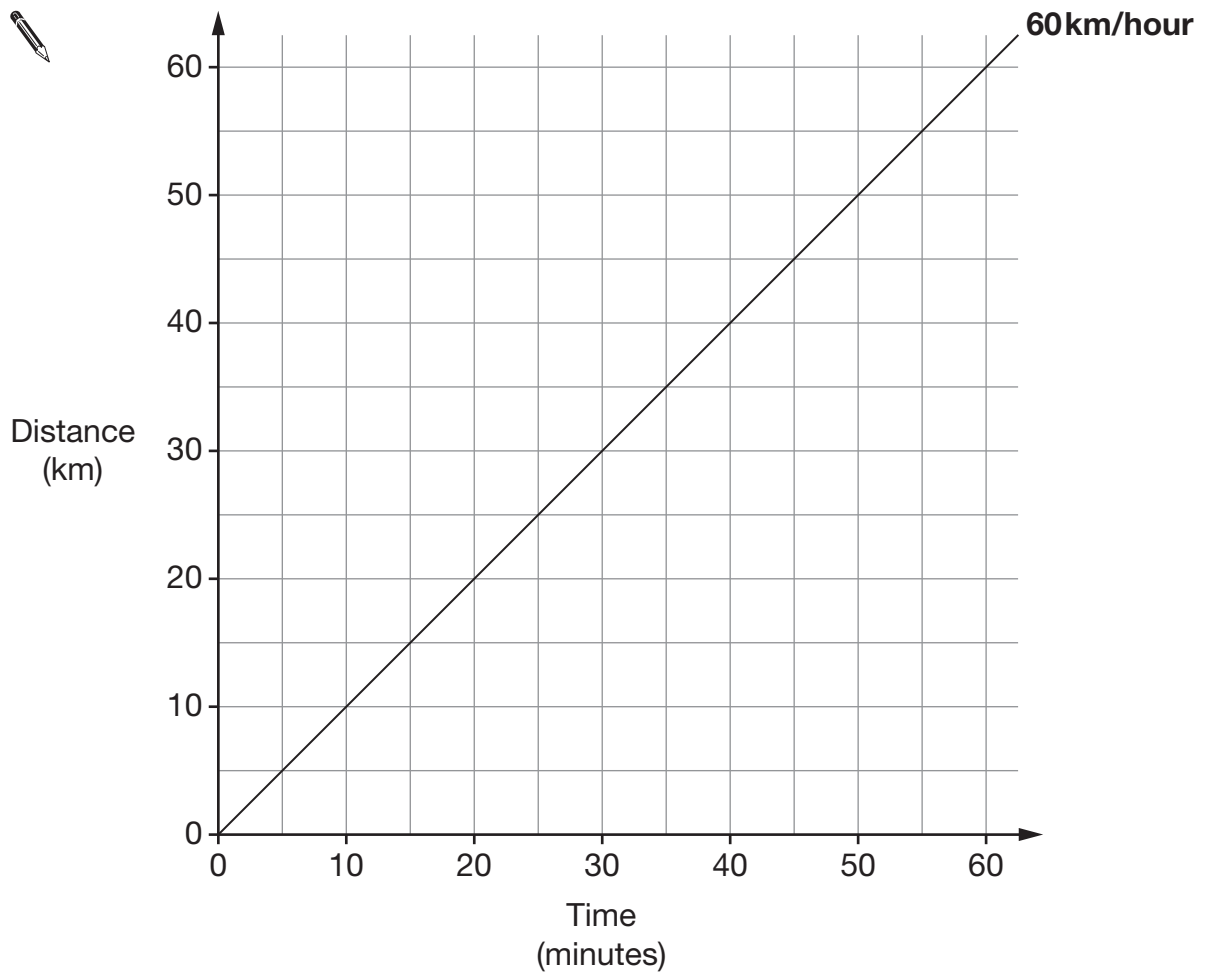Barrel **C** holds $\dfrac{1}{2}$ of the amount barrel **B** holds.

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.

60 km/hour

Distance (km)

Time (minutes)

(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

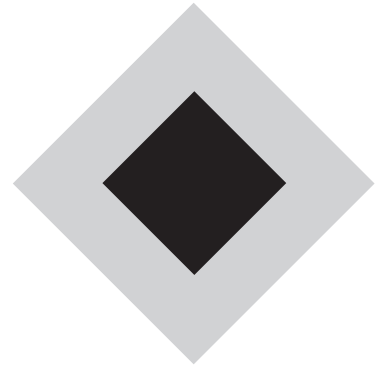(b) Now draw a line on the graph to represent a speed of **120 km/hour**.

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**?

_____ %

(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.

_____ : _____

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?
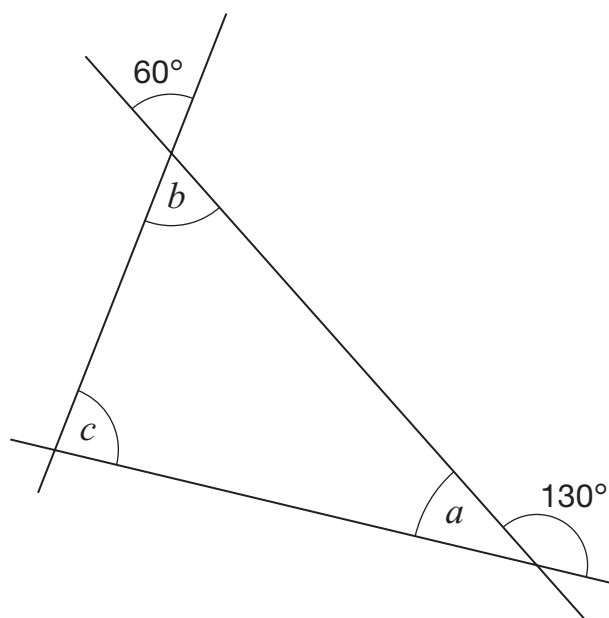
Tick (✓) the correct box.

☐   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.

60°

Not drawn
accurately

b

c

a   130°

Work out the sizes of angles *a*, *b* and *c*

Give reasons for your answers.

a = _____ ° because _____

_____

_____

b = _____ ° because _____

_____

_____

c = _____ ° because _____

_____

_____

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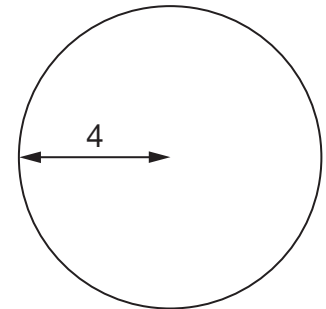
$$2(2n + 5) = 12$$

$n = $ _____

2 marks

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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.

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

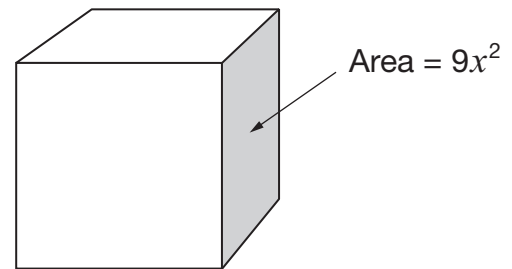$$\frac{1}{3} + \frac{8}{\boxed{}} = 1$$

25.   Look at the cube.

The area of a **face** of the cube is $9x^2$

Area $= 9x^2$

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

Write your answer as simply as possible.

END OF TEST