

Ma

KEY STAGE

3

TIER

4–6

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	
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Instructions

Answers



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

Calculators



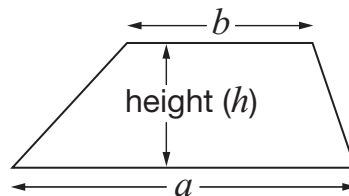
You **must not** use a calculator to answer any question in this test.

Formulae

You might need to use these formulae

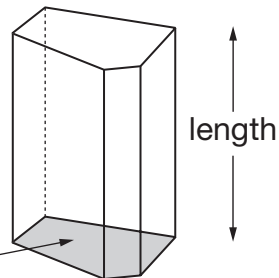
Trapezium

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



Prism

area of cross-section



$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

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**.

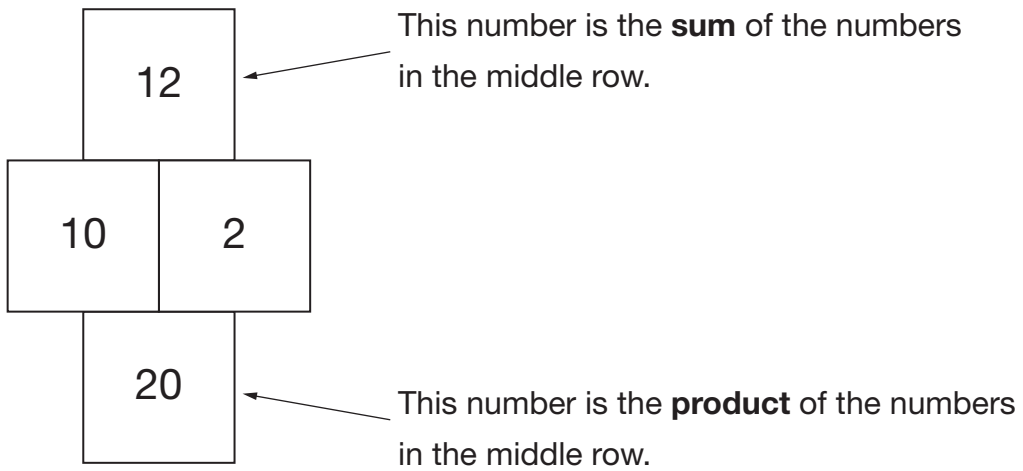
The population of **Sheffield** is about _____ **times** as big as

the population of **Ash Vale**.

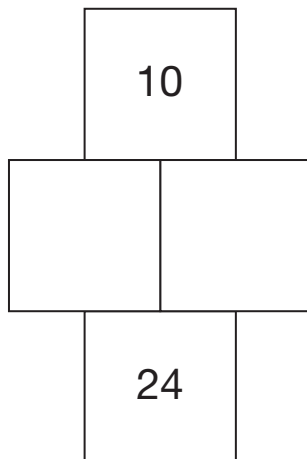
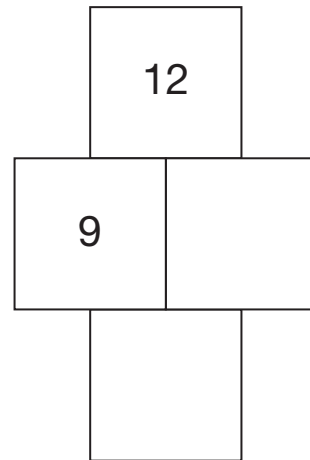
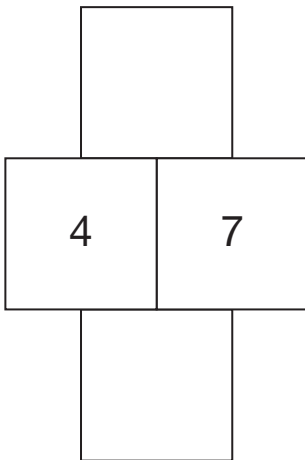
2 marks



2. Here are the rules for a number grid.



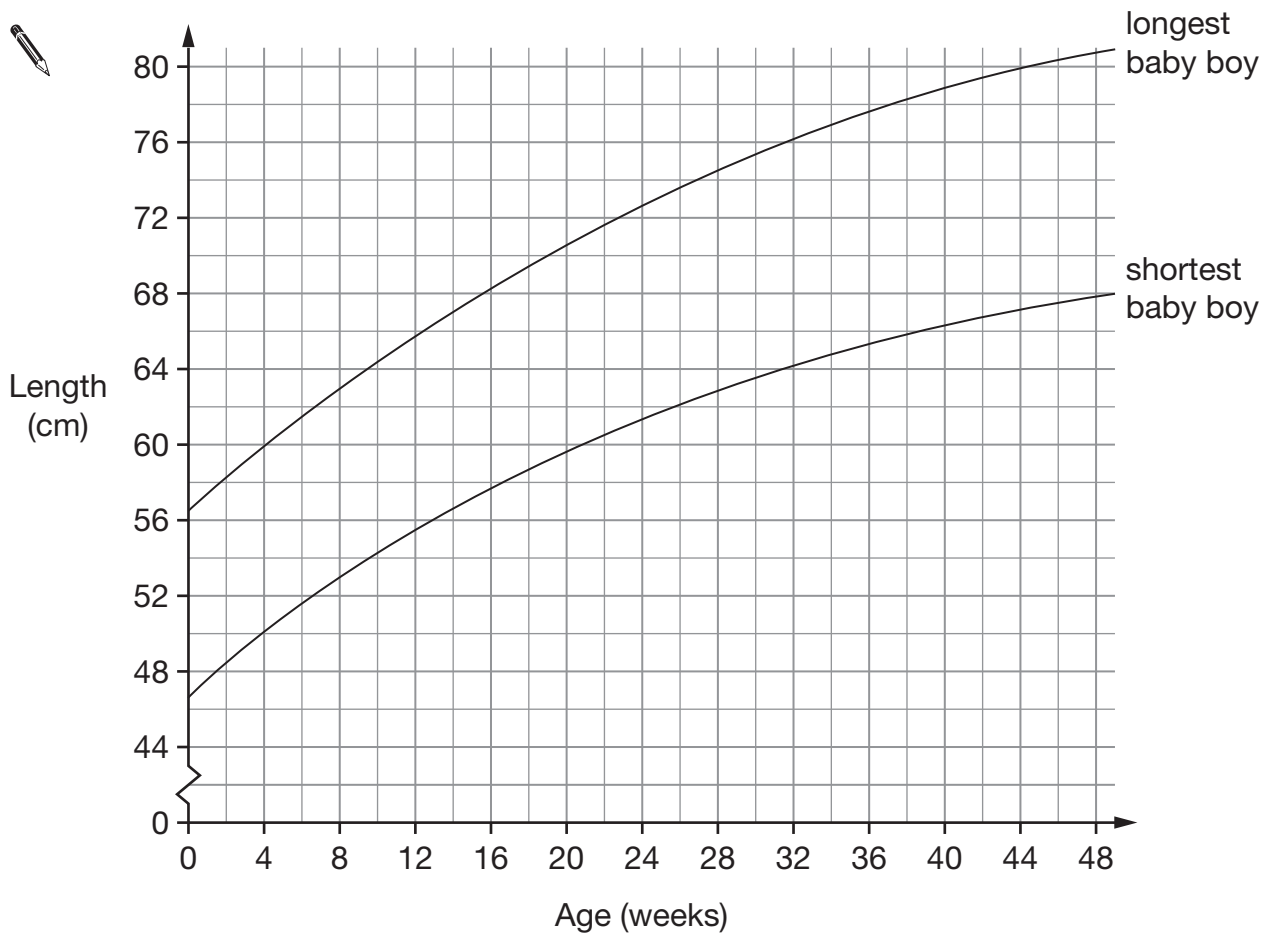
Use the rules to write the missing numbers in these number grids.



 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

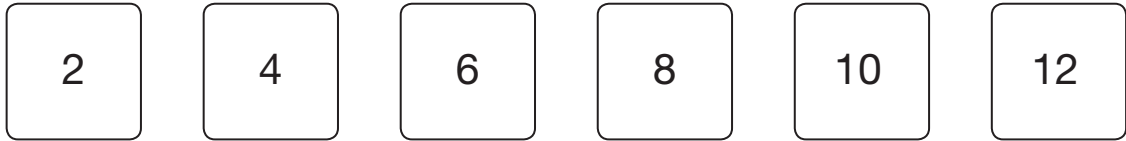
(b) A **34 week** old baby boy is **72 cm** long.

Put a cross on the graph to show this information.

_____ 1 mark



4. Here are six number cards.



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



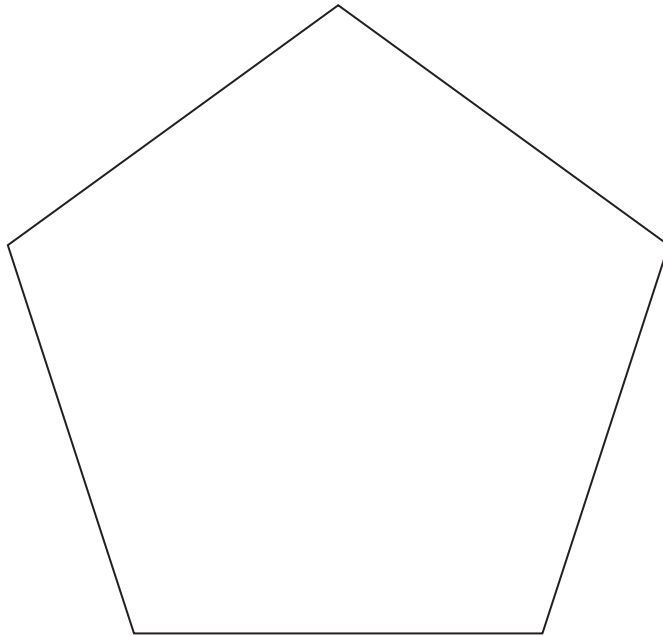
1 mark

- (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 24cm^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



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.



$y = 2x$

$y = 2 + x$

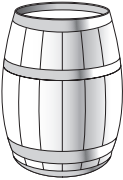
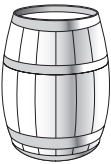


$y = x^2$

$y = \frac{x}{2}$

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.



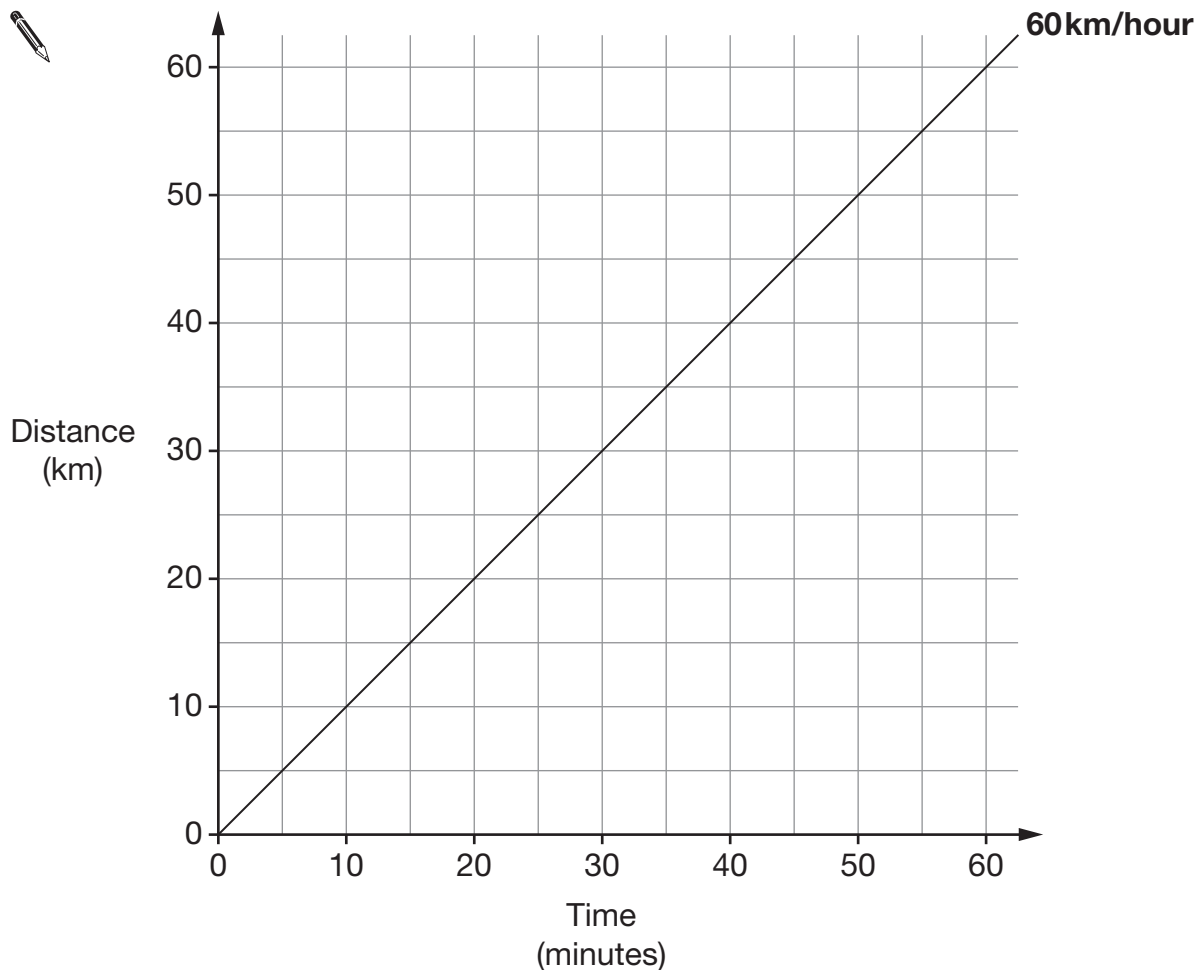
Barrel **D** holds _____ of the amount barrel **B** holds.

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 60km/hour.



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

Label the line by writing 30km/hour.

1 mark

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

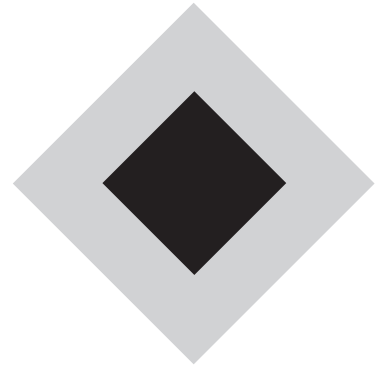
Label the line by writing 120km/hour.

1 mark



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

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



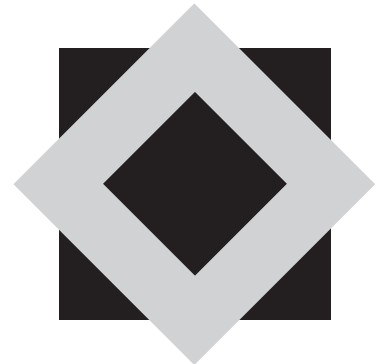
_____ %

 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.

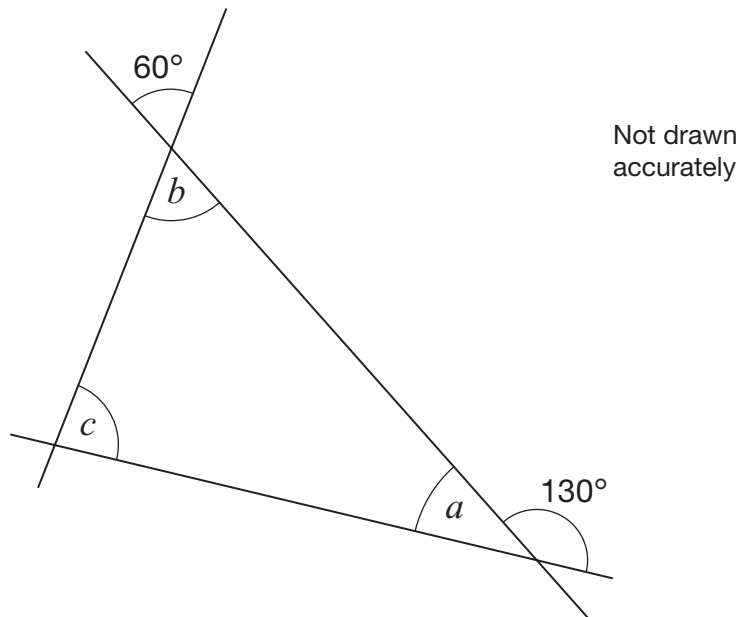


- The probability has increased.
- The probability has decreased.
- The probability has stayed the same.
- It is impossible to tell.

1 mark



20. The diagram shows three straight lines.



Work out the sizes of angles a , b and c

Give reasons for your answers.



$a =$ _____ $^{\circ}$ because _____

1 mark

$b =$ _____ $^{\circ}$ because _____

1 mark

$c =$ _____ $^{\circ}$ 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.

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



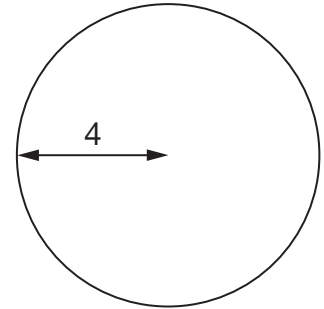
$$n = \underline{\hspace{2cm}}$$

2 marks

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

He writes:

$$\text{Area} = \pi \times 8$$



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



1 mark

24. Write the missing numbers in these fraction sums.



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

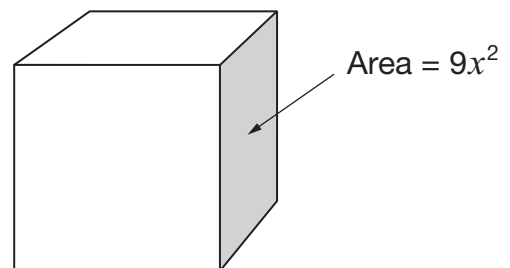
1 mark

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

1 mark

25. Look at the cube.

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



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

Write your answer as simply as possible.



1 mark



END OF TEST