Ma

KEY STAGE
3

TIER
5–7

2008

# 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 a pair of compasses.
- 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**

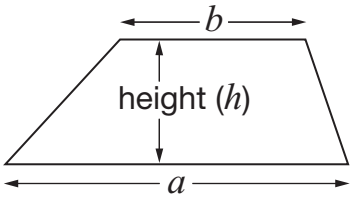
You **must not** use a calculator to answer any question in this test.

# Formulae

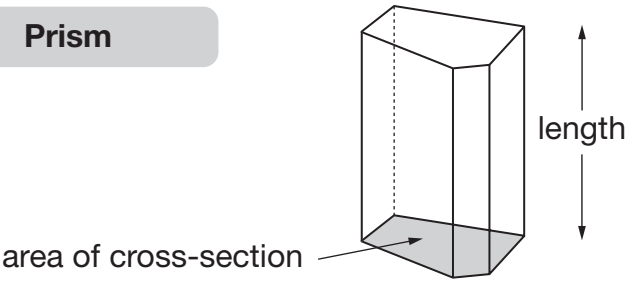
**You might need to use these formulae**

**Trapezium**

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




**Prism**




Volume = area of cross-section × length

**1.** Write two numbers that add to 10

One of the numbers must be **positive**.

The other number must be **negative**.

$\square + \square = 10$

1 mark

**2.** Work out the following.

$1.2 \times 6$

1 mark

$1.2 \div 6$

1 mark

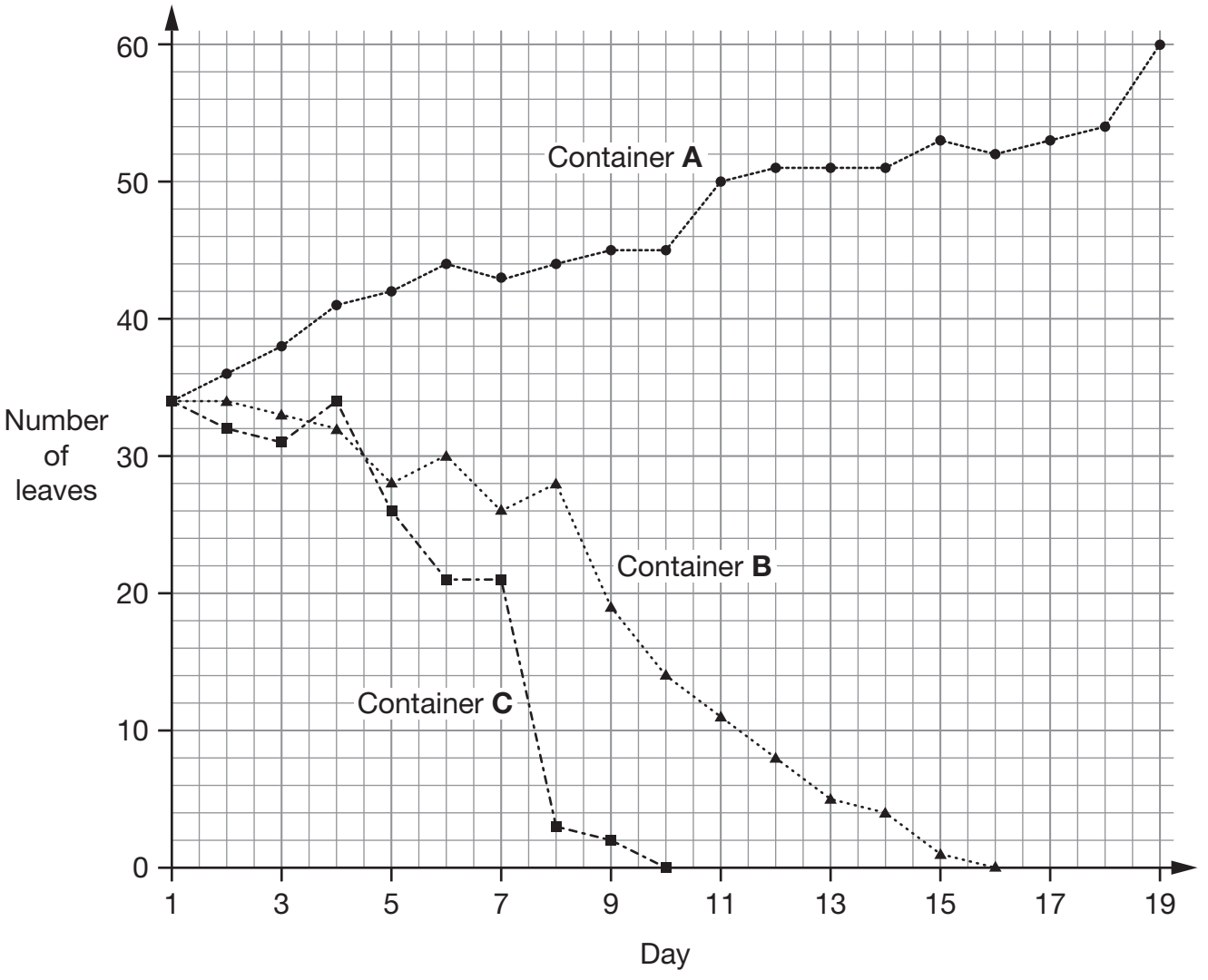
**3.** Duckweed is a plant that grows in water.

Pupils added **different amounts of salt** to three identical containers of water.

In each container they put some duckweed plants.

Then they recorded the number of leaves on the plants every day.

**Results:**




**Key:**

**A**: No salt

**B**: Small amount of salt

**C**: Large amount of salt

(a) How many leaves were in each container on day **1**?

_____

1 mark

(b) In container **A**, how many **more** leaves were there on day **19** than on day **1**?

_____

1 mark

(c) Duckweed plants with no leaves are dead.

On which day did the pupils record that the plants in container **B** were dead?

Day _____

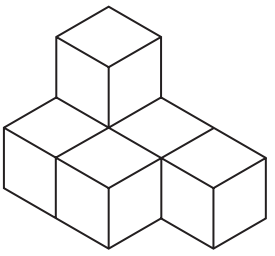
1 mark

(d) How did the amount of salt affect the **change** in the number of leaves?

1 mark

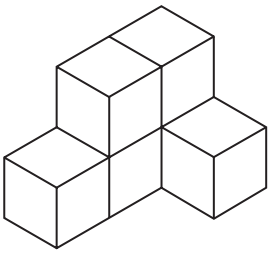
**4.** Each shape in this question is made from **six cubes**.

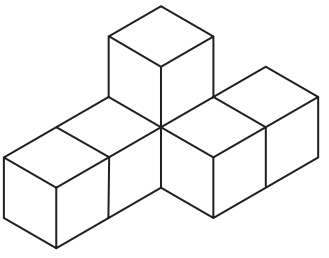
Look at this shape.

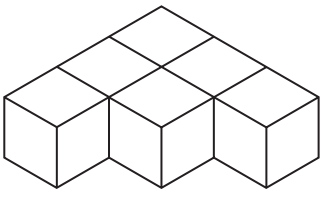


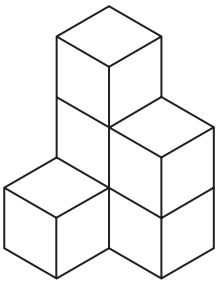
Which **two** of the diagrams below show the **same** shape?

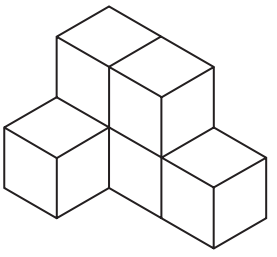
Tick (✓) them both.











1 mark

**5.** Write **numbers** in the boxes to make the statements true.

When $x =$ ☐ then $x + 3 =$ ☐

When $x =$ ☐ then $3x =$ ☐

When $x =$ ☐ then $\frac{x}{3} =$ ☐

2 marks

**6.** Boxes of tins are delivered to a shop.

There are **37 boxes**.

Each box contains **25 tins**.

How many tins are there?

2 marks

**7.** (a) Write the correct numbers in the gaps below.

$1 \times 3\frac{1}{2} = 3\frac{1}{2}$

$2 \times 3\frac{1}{2} = 7$

$3 \times 3\frac{1}{2} = 10\frac{1}{2}$

$4 \times 3\frac{1}{2} =$ _____ 1 mark

$5 \times 3\frac{1}{2} =$ _____ 1 mark

$6 \times 3\frac{1}{2} = 21$

Use the table to help you work out this calculation.

$60 \times 3\frac{1}{2} =$ _____ 1 mark

(b) Is the answer to **11 × 3$\frac{1}{2}$** a **whole number**?

☐ Yes ☐ No

Explain your answer.

1 mark

**8.** Find the values of $x$

$5x - 3 = 12$

$x =$ _____

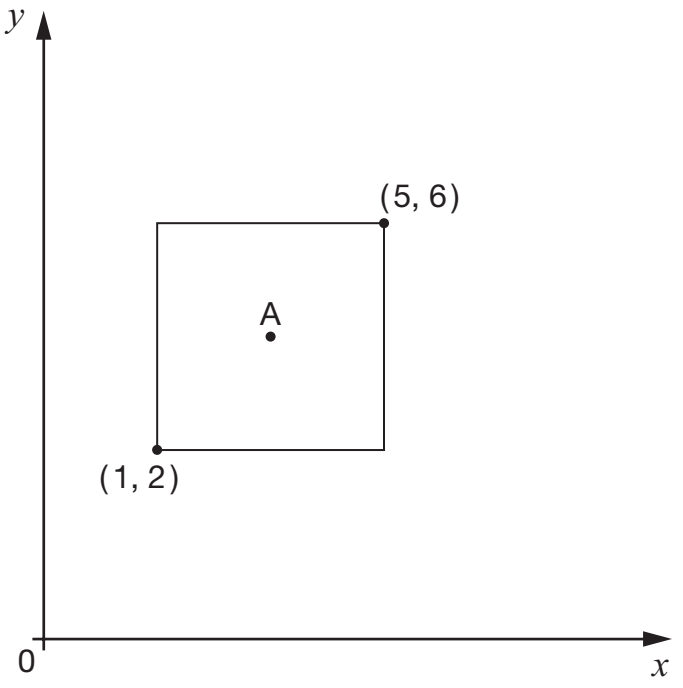
1 mark

$13 + 2x = 3$

$x =$ _____

1 mark

**9.** Look at the square drawn on the graph.




Not drawn accurately

Point A is the centre of the square.

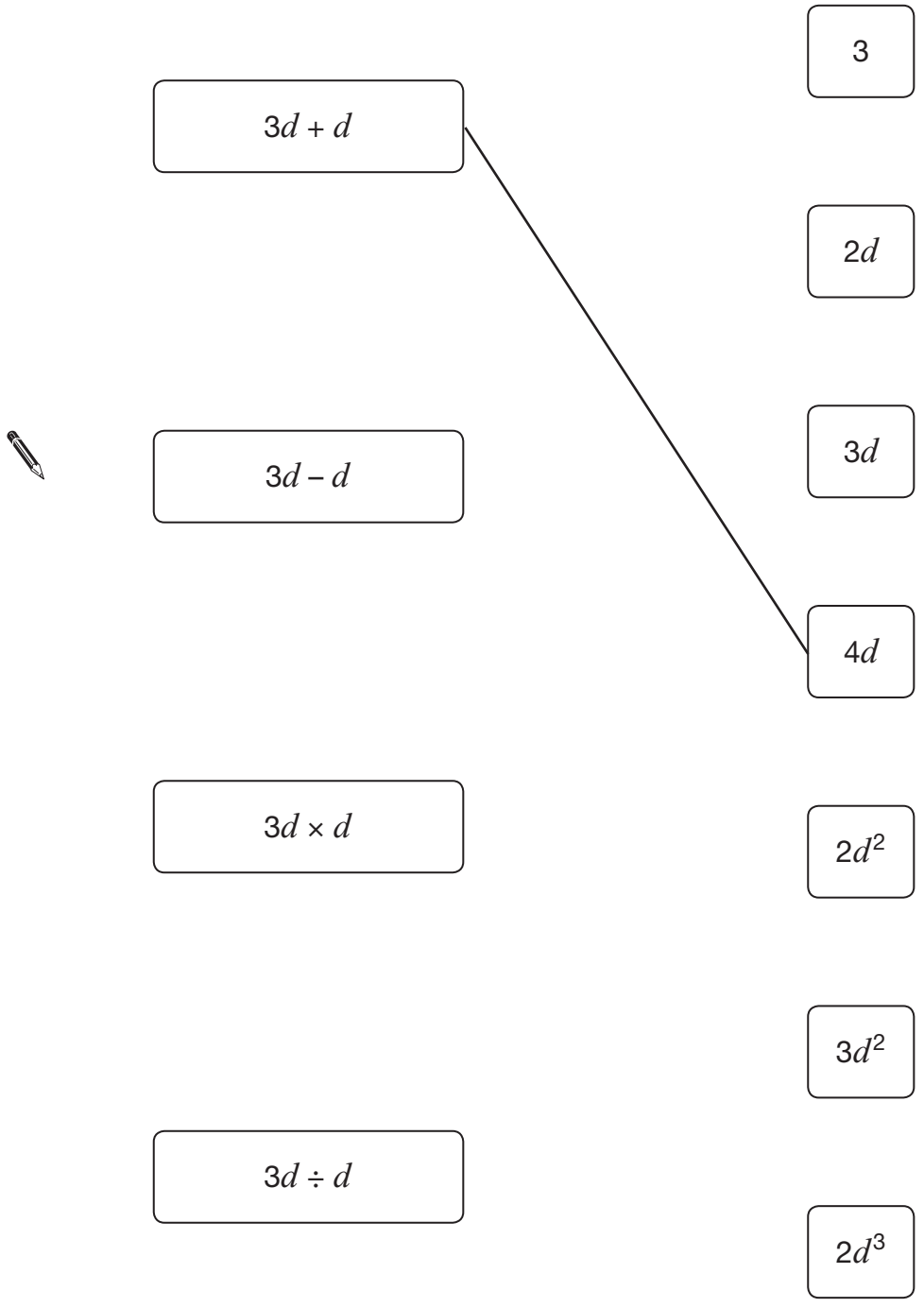
What are the coordinates of point A?

A is ( _____ , _____ )

2 marks

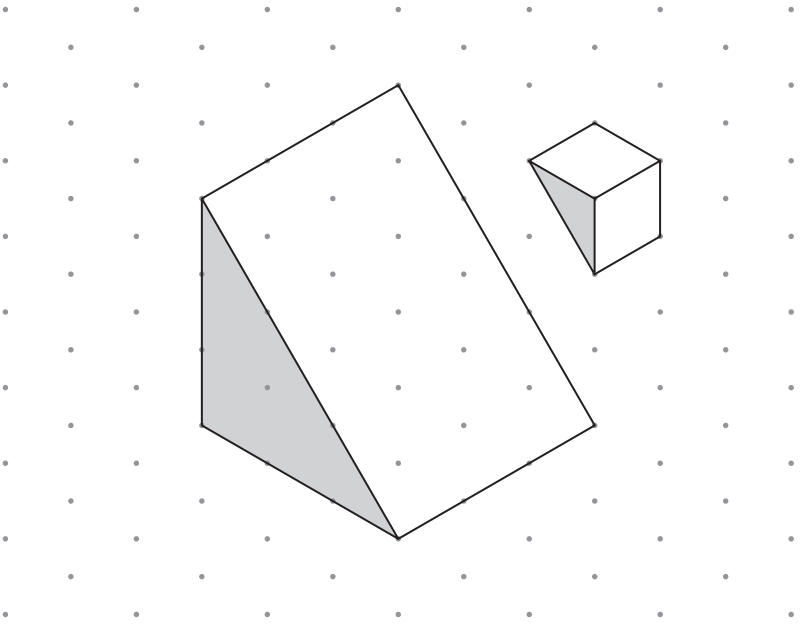
**10.** Match each expression on the left with the equivalent expression on the right.

The first one is done for you.



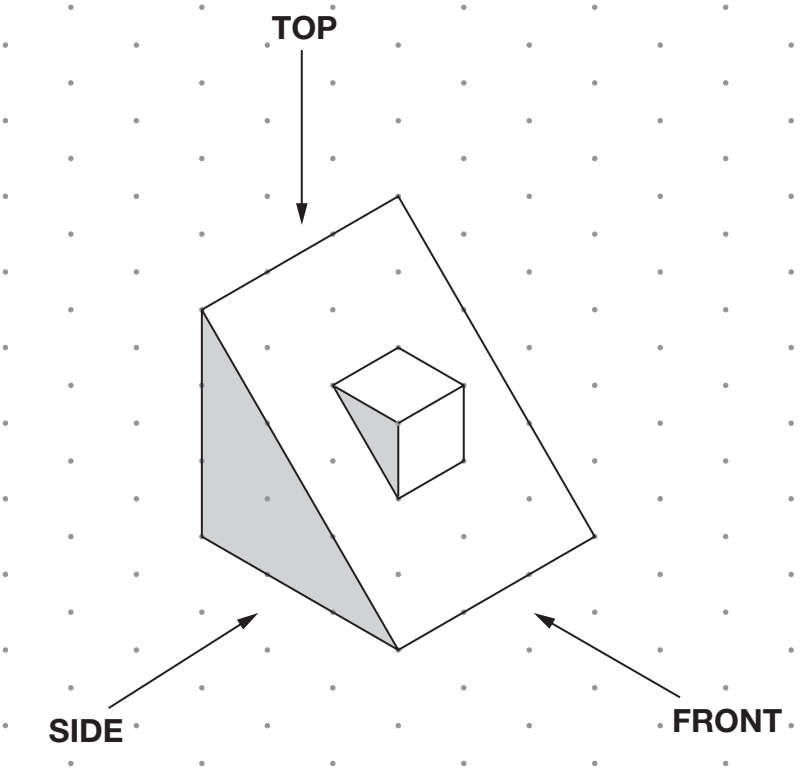

2 marks

**11.** Look at the two triangular prisms.



Isometric grid

They are joined to make the new shape below.




Isometric grid

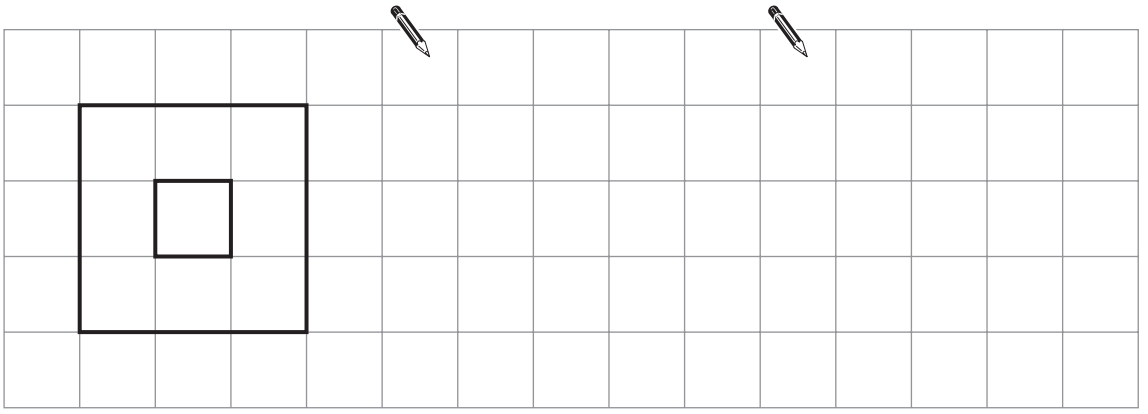
Complete the views of the new shape on the grid.

The first one is done for you.

View from the **TOP**

View from the **FRONT**

View from the **SIDE**



Square grid

2 marks

**12.** I am thinking of a number.

My number is a **multiple of 6**

What **three other numbers** must my number be a multiple of?

_____, _____ and _____

1 mark

**13.** There are **25 pupils** in a class.

The table shows information about their test results in maths and English.

| | | English | | |
|---|---|---|---|---|
| | | Level 5 | Level 6 | Level 7 |
| **maths** | Level 5 | 0 | 1 | 1 |
| | Level 6 | 2 | 7 | 0 |
| | Level 7 | 2 | 1 | 4 |
| | Level 8 | 0 | 1 | 6 |

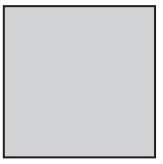
(a) How many pupils had the **same level** in both maths and English?

1 mark

(b) How many pupils had a **higher** level in **maths** than in English?

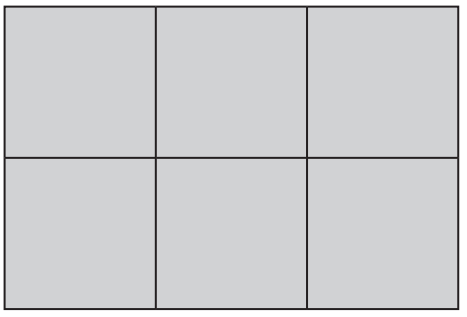
1 mark

**14.** The diagram shows a square with a **perimeter** of **12cm**.



Not drawn accurately

Six of these squares fit together to make a rectangle.



Not drawn accurately

What is the **area** of the **rectangle**?

You **must** give the correct unit with your answer.

1 mark

1 mark

**15.** The table shows whether pupils in a class walk to school.

| | Walk to school | Do **not** walk to school |
|---|---|---|
| Boys | 2 | 8 |
| Girls | 5 | 10 |

(a) What percentage of the **boys** walk to school?

_____ %

1 mark

(b) What percentage of the **pupils** in this class walk to school?

_____ %

2 marks

**16.** A pupil recorded the times of **23** people running the 100 metres.
The stem-and-leaf diagram shows the results.

| | | | | | | |
|---|---|---|---|---|---|---|
| 13 | 6 | | | | | |
| 14 | 1 | 3 | 4 | | | |
| 14 | 7 | 7 | 8 | 9 | | |
| 15 | 0 | 1 | 1 | 3 | 4 | 4 |
| 15 | 5 | 7 | 8 | 8 | 9 | |
| 16 | 2 | 2 | 4 | 4 | | |

**Key:**

13 | 6 represents 13.6 seconds

(a) Two of the people ran the 100 metres in **14.7 seconds**.

How many of them ran the 100 metres **faster** than this?

_____ people

1 mark

(b) What was the **range** of times?

seconds

2 marks

(c) What was the **median** time?

seconds

1 mark

**17.** (a) For each sequence below, tick (✓) the correct box to show if it is **increasing**, **decreasing** or **neither**.

| | | | | increasing | decreasing | neither |
|---|---|---|---|---|---|---|
| $\frac{1}{2}$ | $\frac{1}{3}$ | $\frac{1}{4}$ | $\frac{1}{5}$ | ☐ | ☐ | ☐ |
| $\frac{6}{13}$ | $\frac{7}{12}$ | $\frac{8}{11}$ | $\frac{9}{10}$ | ☐ | ☐ | ☐ |
| $\frac{1}{2}$ | $\frac{2}{4}$ | $\frac{3}{6}$ | $\frac{4}{8}$ | ☐ | ☐ | ☐ |
| $\frac{3}{2}$ | $\frac{4}{3}$ | $\frac{5}{4}$ | $\frac{6}{5}$ | ☐ | ☐ | ☐ |

2 marks

(b) A different sequence has this expression for the $n$th term:

$$\frac{1}{(n+1)^2}$$

Work out the first four terms in the sequence.

_____ _____ _____ _____

1 mark

**18.** Find the value of $x$

$6 + 2x = x - 6$

$x =$ _____

2 marks

---

**19.** Work out

$$\frac{1 \times 2 \times 3 \times 4 \times 5}{1 \times 2 \times 3} =$$ _____

1 mark

$$\frac{(1 \times 2 \times 3 \times 4 \times 5)^2}{(1 \times 2 \times 3)^2} =$$ _____

1 mark

**20.** This map of part of America shows Chicago and New York.

The scale is **1cm to 100 miles**.


Atlanta is further south than both Chicago and New York.

It is **710 miles** from Chicago and **850 miles** from New York.

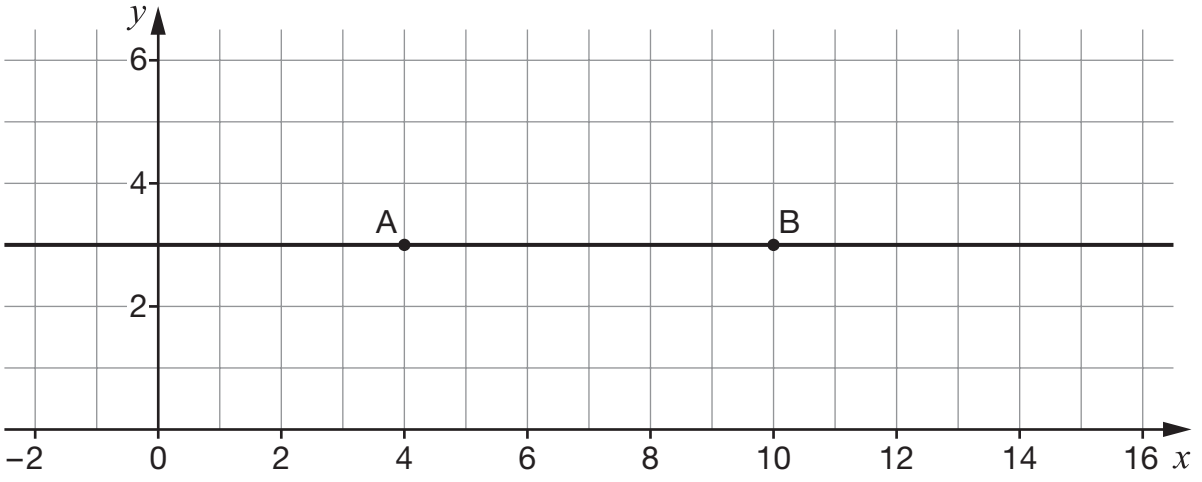
Use accurate construction to show Atlanta on the map.

You **must** leave in your construction lines.

2 marks

**21.** Point A has coordinates (4, 3) and point B has coordinates (10, 3)

They lie on a horizontal line.




Another point, P, lies on the **same** horizontal line.

P is **twice as far from A** as it is from B.

What could the coordinates of point P be?

There are two possible answers. Give them both.

( _____ , _____ ) or ( _____ , _____ )

2 marks

**22.** In this question, consider only positive values of $x$

Look at this function.

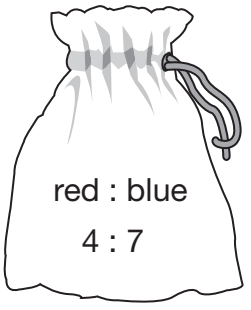
| | |
|---|---|
| $p = 3x$ | As $x$ increases, $p$ increases. |

For each function below, tick (✓) the correct box.

| | | | |
|---|---|---|---|
| $q = x - 2$ | As $x$ increases, ☐ | $q$ increases | ☐ $q$ decreases |
| $r = \frac{1}{2}x$ | As $x$ increases, ☐ | $r$ increases | ☐ $r$ decreases |
| $s = 2 - x$ | As $x$ increases, ☐ | $s$ increases | ☐ $s$ decreases |
| $t = \frac{1}{x}$ | As $x$ increases, ☐ | $t$ increases | ☐ $t$ decreases |

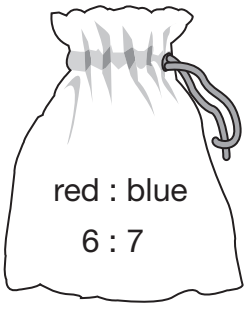
2 marks

**23.** In a bag, there are **red** and **blue** cubes in the ratio **4 : 7**




I add **10 more red cubes** to the bag.

Now there are **red** and **blue** cubes in the ratio **6 : 7**




How many **blue** cubes are in the bag?

2 marks

**24.** (a) A straight line goes through the points (0, 1), (2, 5) and (4, 9)

The equation of the straight line is $y = 2x + 1$

Is the point (7, 12) on this straight line?

☐ Yes ☐ No

Explain your answer.

1 mark

(b) A **different** straight line goes through the points (0, 1), (2, 7) and (4, 13)

Write the equation of this straight line.

1 mark

**25.** (a) Explain why $\sqrt{89}$ must be between 9 and 10

1 mark

(b) $\sqrt{389}$ is also between two consecutive whole numbers.

What are the two numbers?

_____ and _____

1 mark

**26.** Here are the rules of a game.

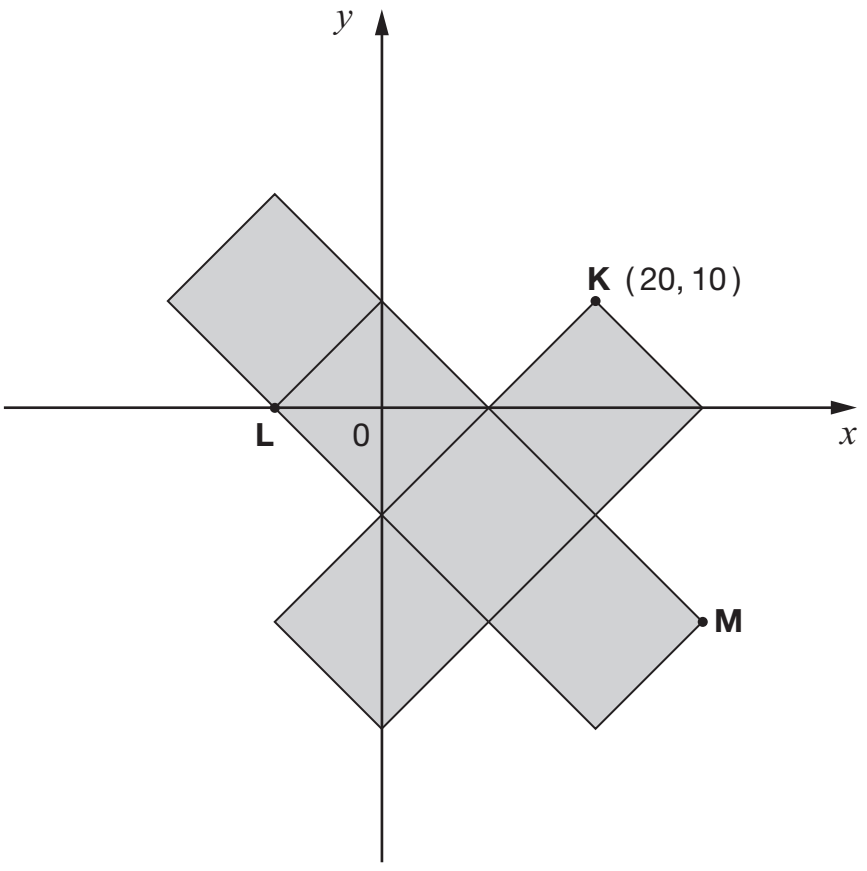
> Each person chooses heads or tails at random, then a coin is thrown.
>
> People who choose the side shown by the coin are left in the game.
>
> The rest are out of the game.

If a group of **1000 people** are going to play this game, how many people might you expect to be left in the game after **5 throws**?

_____ people

2 marks

**27.** The diagram shows the net of a cube made of 6 squares.




Not drawn accurately

**K** is the point **(20, 10)**

What are the coordinates of the points **L** and **M**?

L is ( _____ , _____ ) _____ 1 mark

M is ( _____ , _____ ) _____ 1 mark

**28.** Ed writes:

$$\frac{1}{2} \text{ of } 10^3 = 5^3$$

Show why Ed is **wrong**.

1 mark

**END OF TEST**



QCA/08/3291 (Pupil pack)
QCA/08/3286 (Mark scheme pack) 282671