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KEY STAGE

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TIER

4–6

2003

Mathematics test

Paper 1

Calculator not allowed

Please read this page, but do not open your booklet until your teacher tells you to start. Write your name and the name of your school in the spaces below.

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, a pair of compasses, tracing paper and mirror (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.

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

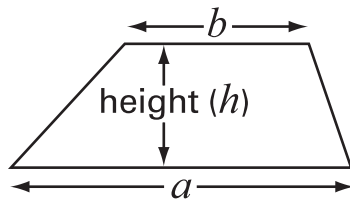


You **must not** use a calculator to answer any question in this test.

Formulae

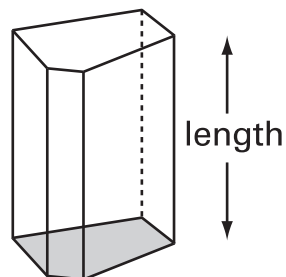
You might need to use these formulae

Trapezium



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

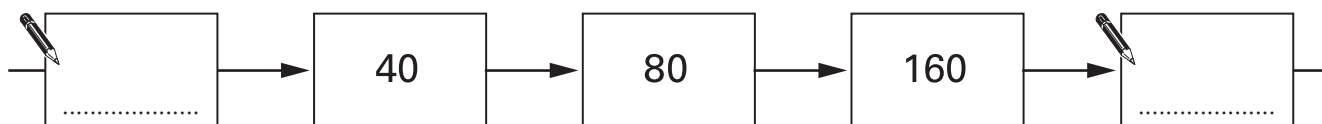
Prism



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

1. (a) The number chain below is part of a **doubling** number chain.

Fill in the two missing numbers.



1 mark

- (b) The number chain below is part of a **halving** number chain.

Fill in the two missing numbers.



1 mark



2. A teacher has five number cards.

She says:

'I am going to take a card at random.

Each card shows a **different** positive whole number.

It is **certain** that the card will show a number less than 10

It is **impossible** that the card will show an even number.'

What numbers are on the cards?



.....

.....

2 marks

3. Work out



$$1048 + 208 = \dots\dots\dots$$

.....

1 mark

$$4828 - 480 = \dots\dots\dots$$

.....

1 mark

4. When the wind blows it feels colder.
The stronger the wind, the colder it feels.

Fill in the gaps in the table.

The first row is done for you.

Wind strength	Temperature out of the wind (°C)	How much colder it feels in the wind (°C)	Temperature it feels in the wind (°C)
Moderate breeze	5	7 degrees colder	-2
Fresh breeze	-8	11 degrees colder
Strong breeze	-4 degrees colder	-20
Gale	23 degrees colder	-45

.....
1 mark

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1 mark

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1 mark

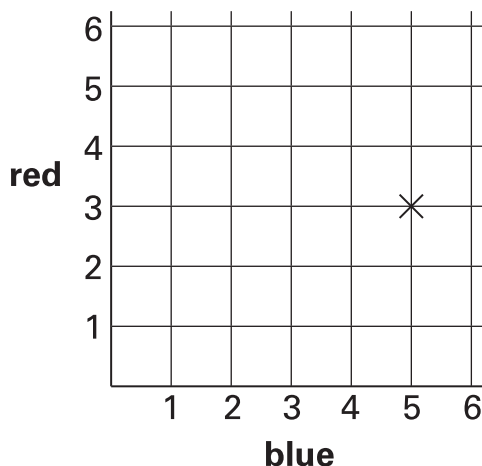


5. Some pupils throw two fair six-sided dice. Each dice is numbered 1 to 6
One dice is blue. The other dice is red.

Anna's dice show **blue 5, red 3**

Her **total score** is **8**

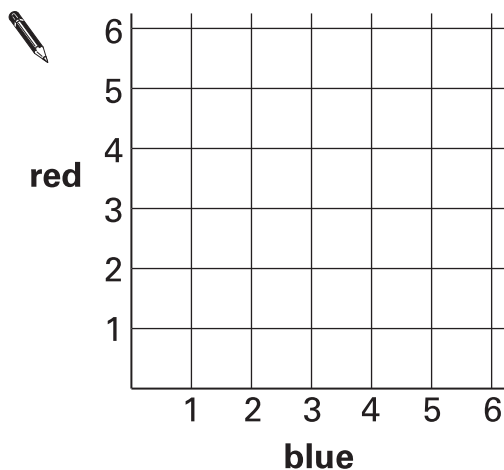
The cross on the grid shows her throw.



- (a) Carl's **total score** is **6**

What numbers could Carl's dice show?

Put crosses on the grid to show **all** the different pairs of numbers Carl's dice could show.

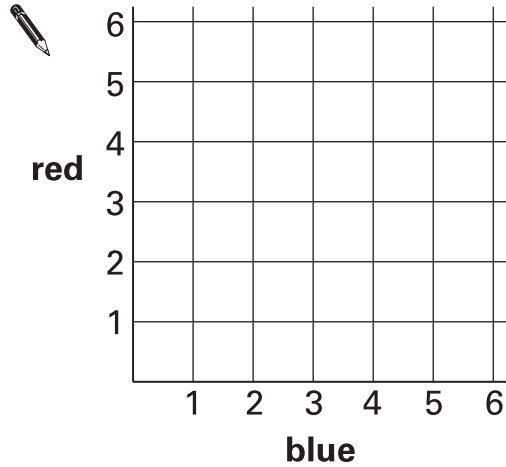


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.....
2 marks

(b) The pupils play a game.

Winning rule: Win a point if the number on the **blue** dice is the **same as** the number on the **red** dice.

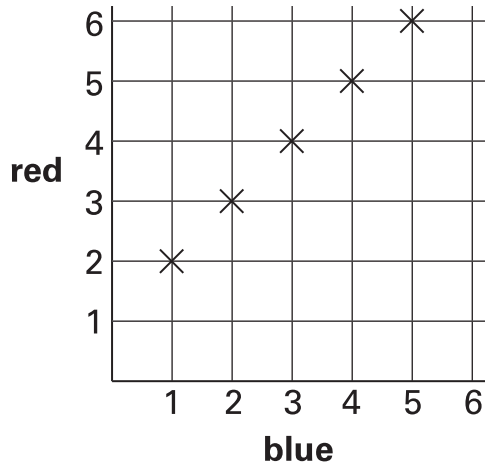
Put crosses on the grid to show **all** the different winning throws.



.....
.....
2 marks

(c) The pupils play a different game.

The grid shows all the different winning throws.



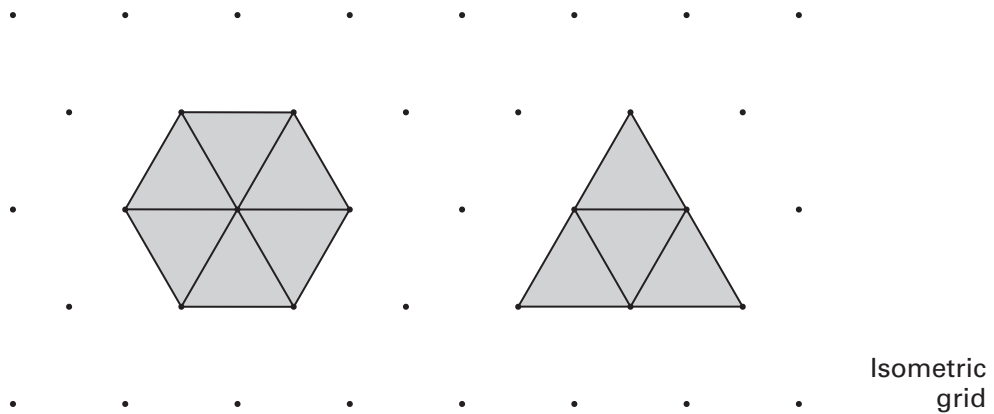
Complete the sentence below to show the winning rule.

Winning rule: Win a point if the number on the **blue** dice is

.....
1 mark



6. Look at the hexagon and the triangle.



Isometric grid

(a) Do the hexagon and triangle have the **same area**?

Tick (✓) Yes or No.



Yes

No

Explain your answer.



.....
1 mark

(b) Do the hexagon and triangle have the **same perimeter**?

Tick (✓) Yes or No.



Yes

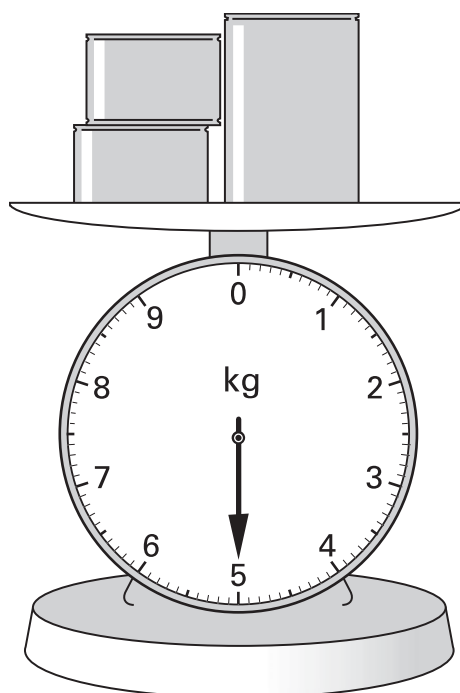
No

Explain your answer.



.....
1 mark

7. There are two small tins and one big tin on these scales.



The two small tins each have the same mass.

The mass of the big tin is **2.6 kg**.

What is the mass of one small tin?

Show your working.

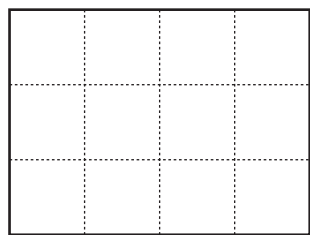


kg

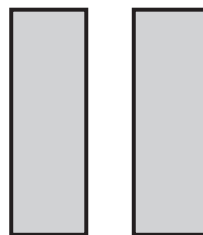
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.....
2 marks



8. I have a square grid and two rectangles.

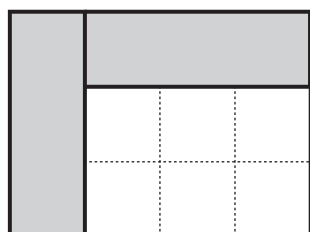


grid



two rectangles

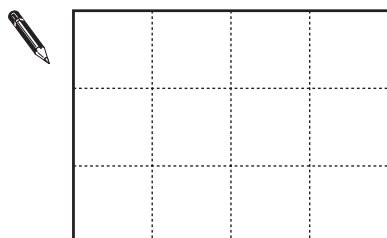
I make a pattern with the grid and the two rectangles:



The pattern has **no** lines of symmetry.

(a) Put both rectangles on the grid to make a pattern with **two** lines of symmetry.

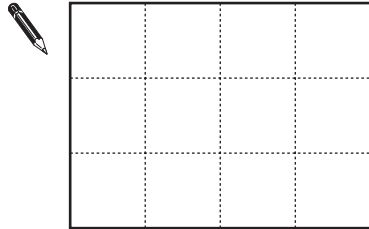
You must **shade** the rectangles.



.....
1 mark

- (b) Put both rectangles on the grid to make a pattern with **only one** line of symmetry.

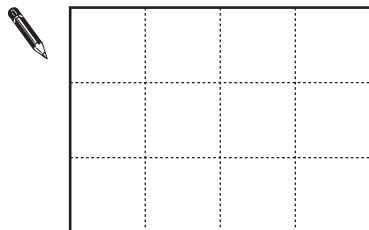
You must **shade** the rectangles.



.....
1 mark

- (c) Put both rectangles on the grid to make a pattern with **rotation** symmetry of **order 2**

You must **shade** the rectangles.



.....
1 mark

9. Simplify these expressions.



$$5k + 7 + 3k = \dots\dots\dots$$

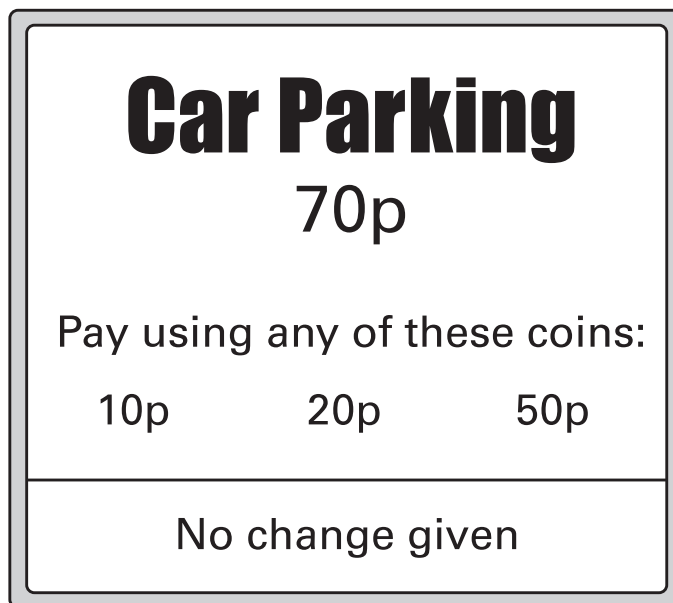
.....
1 mark

$$k + 1 + k + 4 = \dots\dots\dots$$

.....
1 mark



10. A car park shows this sign.



Complete the table to show all the **different ways** of paying **exactly 70p**.

Number of 10p coins	Number of 20p coins	Number of 50p coins
7	0	0

.....
.....
2 marks

11. Fill in the missing numbers.



$$\frac{1}{2} \text{ of } 20 = \frac{1}{4} \text{ of } \dots\dots\dots$$

.....
1 mark

$$\frac{3}{4} \text{ of } 100 = \frac{1}{2} \text{ of } \dots\dots\dots$$

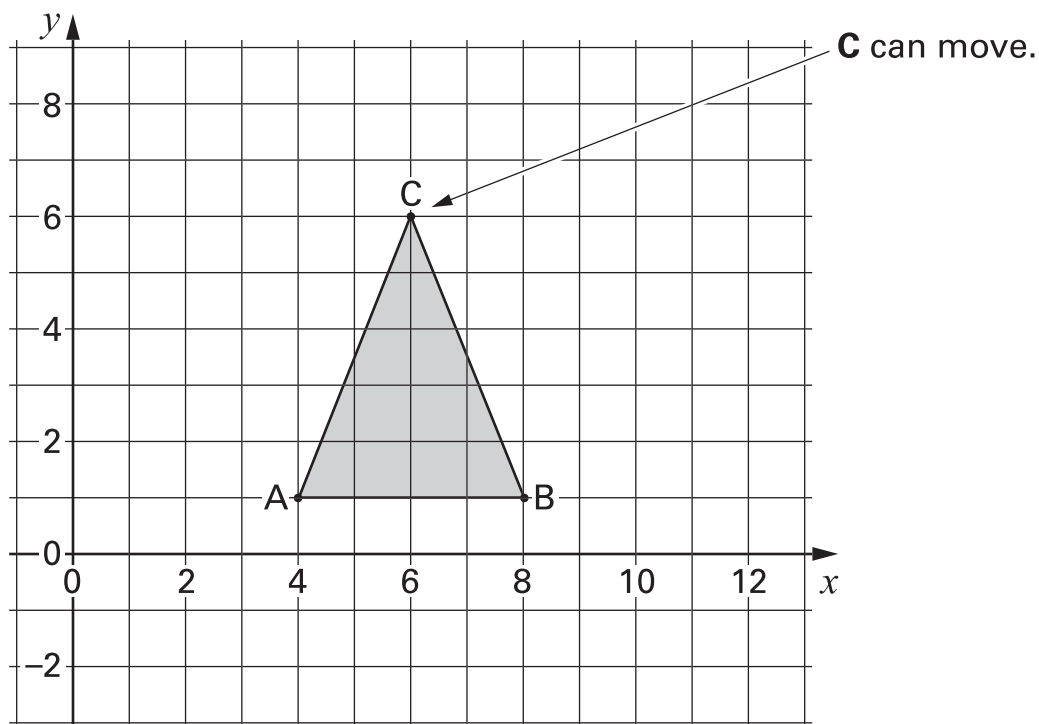
.....
1 mark

$$\frac{1}{3} \text{ of } 60 = \frac{2}{3} \text{ of } \dots\dots\dots$$

.....
1 mark



12. On this square grid, **A** and **B** must not move.



When C is at (6, 6), triangle ABC is **isosceles**.

(a) C moves so that triangle ABC is still **isosceles**.

Where could C have moved to?

Write the coordinates of its new position.



(.....,.....)

.....
1 mark

(b) Then C moves so that triangle ABC is **isosceles and right-angled**.

Where could C have moved to?

Write the coordinates of its new position.



(.....,.....)

.....
1 mark

13. (a) There are four people in Sita's family.
Their shoe sizes are 4, 5, 7 and 10

What is the **median** shoe size in Sita's family?



.....

.....
1 mark

- (b) There are **three** people in John's family.
The **range** of their shoe sizes is **4**

Two people in the family wear shoe size 6
John's shoe size is **not 6** and it is **not 10**

What is John's shoe size?



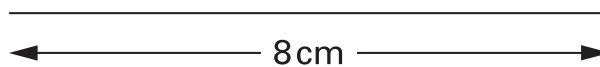
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1 mark



14. Use compasses to construct a triangle that has sides **8 cm**, **6 cm** and **7 cm**.
Leave in your construction lines.

One side of the triangle is drawn for you.



.

.
2 marks

15. (a) I pay **£16.20** to travel to work each week.

I work for **45 weeks** each year.

How much do I pay to travel to work each year?

Show your working.



.....
.....
2 marks

(b) I could buy one season ticket that would let me travel for **all 45 weeks**.

It would cost **£630**

How much is that per week?



.....
1 mark



16. Solve these equations.

Show your working.



$$8k - 1 = 15$$

$$k = \dots\dots\dots$$

.....
1 mark

$$2m + 5 = 10$$

$$m = \dots\dots\dots$$

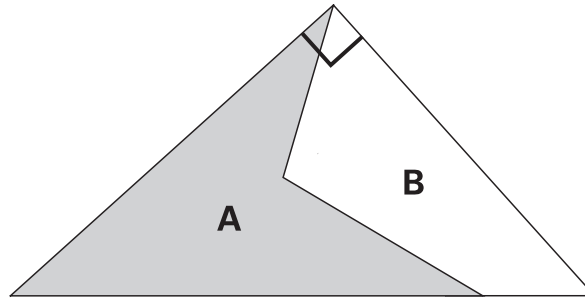
.....
1 mark

$$3t + 4 = t + 13$$

$$t = \dots\dots\dots$$

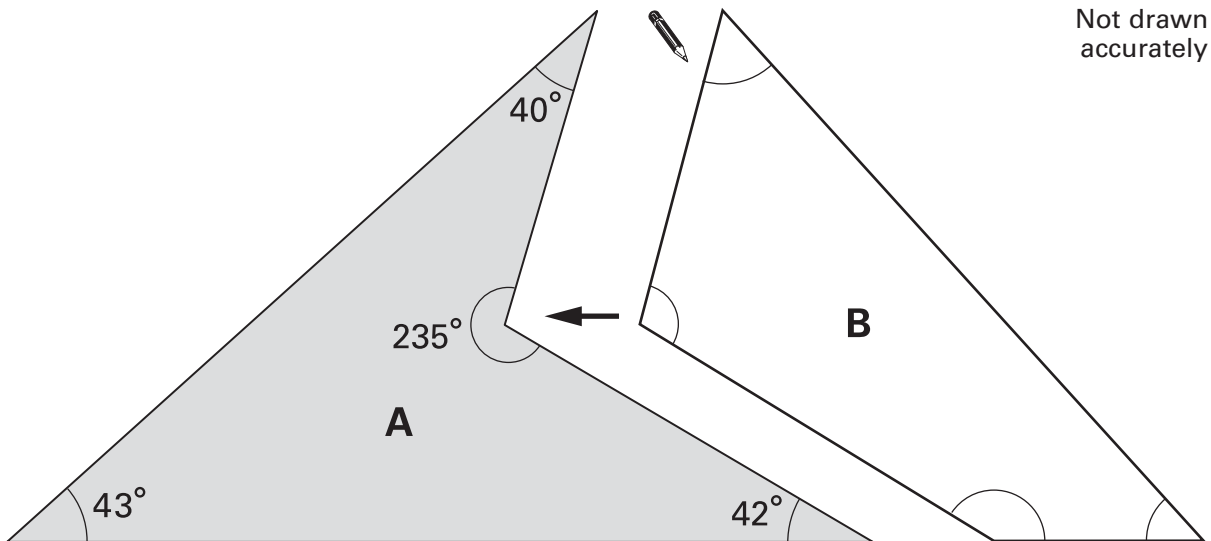
.....
.....
2 marks

17. The drawing shows how shapes A and B fit together to make a **right-angled triangle**.



Work out the size of each of the angles in shape B.

Write them in the correct place in shape B below.



Not drawn accurately

.....

 3 marks



18. (a) Add $\frac{6}{10}$ and $\frac{6}{5}$



.....

.....
1 mark

Now use an arrow (\downarrow) to show the result on the number line.



.....
1 mark

(b) How many **sixths** are there in $3\frac{1}{3}$?



.....

.....
1 mark

(c) Work out $3\frac{1}{3} \div \frac{5}{6}$

Show your working.

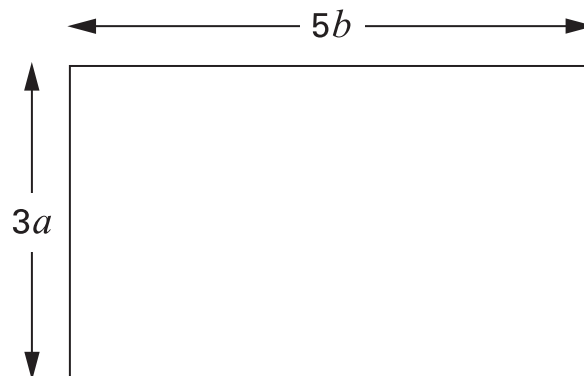


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2 marks

19. (a) The diagram shows a rectangle.

Its dimensions are $3a$ by $5b$



Write **simplified expressions** for the area and the perimeter of this rectangle.



Area:

.....
1 mark

Perimeter:

.....
1 mark

(b) A different rectangle has **area $12a^2$** and **perimeter $14a$**

What are the dimensions of this rectangle?

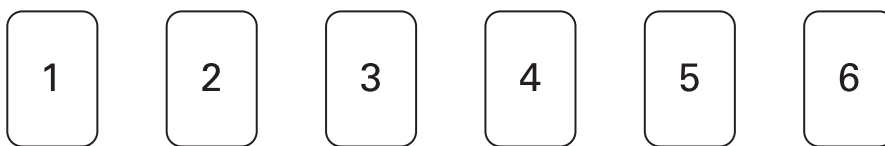


Dimensions: by

.....
1 mark



20. Here are six number cards.



(a) Arrange these six cards to make the calculations below.

The first one is done for you.

$$939 = \begin{array}{|c|c|c|} \hline 4 & 2 & 3 \\ \hline \end{array} + \begin{array}{|c|c|c|} \hline 5 & 1 & 6 \\ \hline \end{array}$$



$$1164 = \begin{array}{|c|c|c|} \hline & & \\ \hline \end{array} + \begin{array}{|c|c|c|} \hline & & \\ \hline \end{array}$$

1 mark

$$750 = \begin{array}{|c|c|c|} \hline & & \\ \hline \end{array} + \begin{array}{|c|c|c|} \hline & & \\ \hline \end{array}$$

1 mark

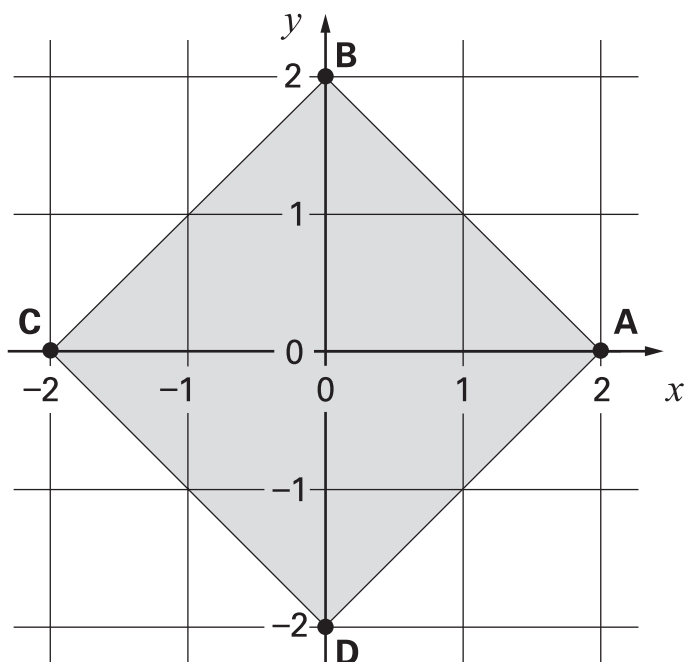
(b) Now arrange the six cards to make a **difference** of 115



$$115 = \begin{array}{|c|c|c|} \hline & & \\ \hline \end{array} - \begin{array}{|c|c|c|} \hline & & \\ \hline \end{array}$$

1 mark

21. The diagram shows a square drawn on a square grid.



The points A, B, C and D are at the vertices of the square.

Match the correct line to each equation.

One is done for you.

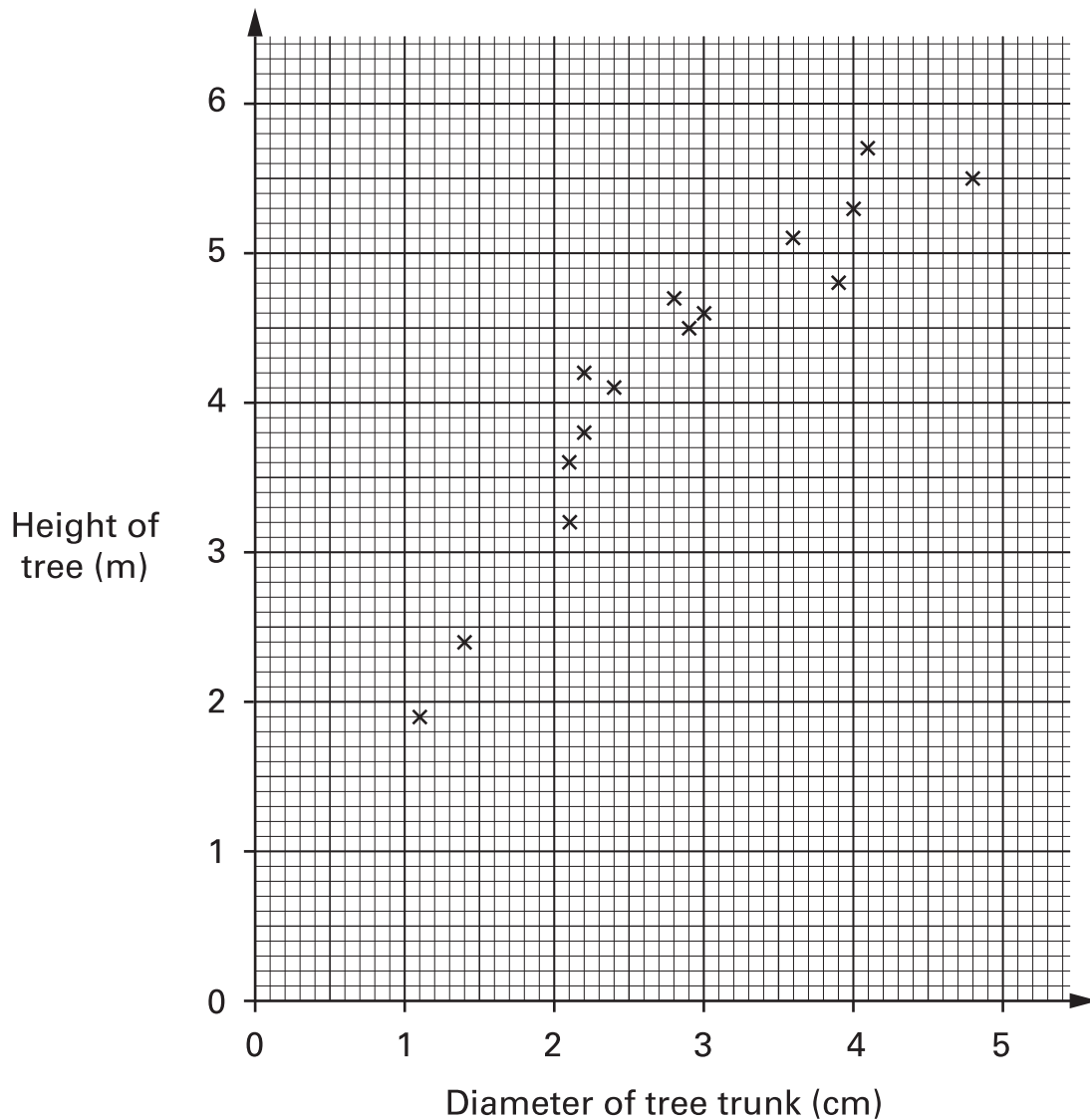


$y = 0$	Line through C and D
$x = 0$	Line through A and C
$x + y = 2$	Line through A and D
$x + y = -2$	Line through B and D
	Line through B and C
	Line through A and B

.....
.....
2 marks



22. The scatter graph shows information about trees called poplars.



- (a) What does the scatter graph show about the **relationship** between the diameter of the tree trunk and the height of the tree?



(b) The height of a different tree is 3m. The diameter of its trunk is 5cm.
Use the graph to explain why this tree is **not** likely to be a poplar.



.....
1 mark

(c) Another tree **is** a poplar. The diameter of its trunk is 3.2 cm.
Estimate the height of this tree.



..... m

.....
1 mark



END OF TEST

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