Ma

KEY STAGE 3

TIER 5–7

2004

Mathematics test

Paper 2

Calculator 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 may use a calculator for any question in this test.
- You will need: pen, pencil, rubber, ruler, a pair of compasses and a scientific or graphic calculator.
- 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	
	Borderline check	

QCA/04/1200

Instructions

Answers

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

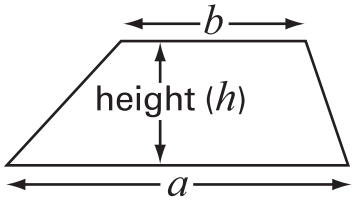
Calculators

You **may** use a calculator to answer any question in this test.

Formulae

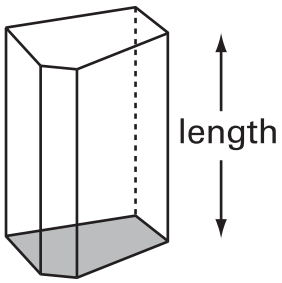
You might need to use these formulae

Trapezium



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

Prism

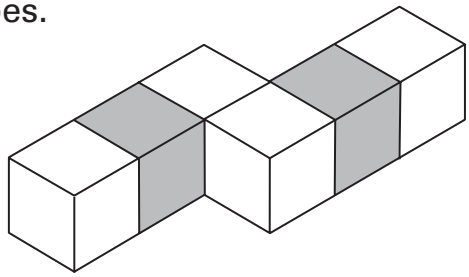


Volume = area of cross-section × length

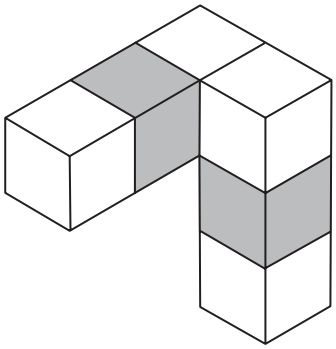
1. Look at this shape made from six cubes.

Four cubes are white.

Two cubes are grey.



Part of the shape is rotated through 90° to make the shape below.



After another rotation of 90°, the shape is a cuboid.

Draw this cuboid on the grid below.

Isometric grid

. . . . .

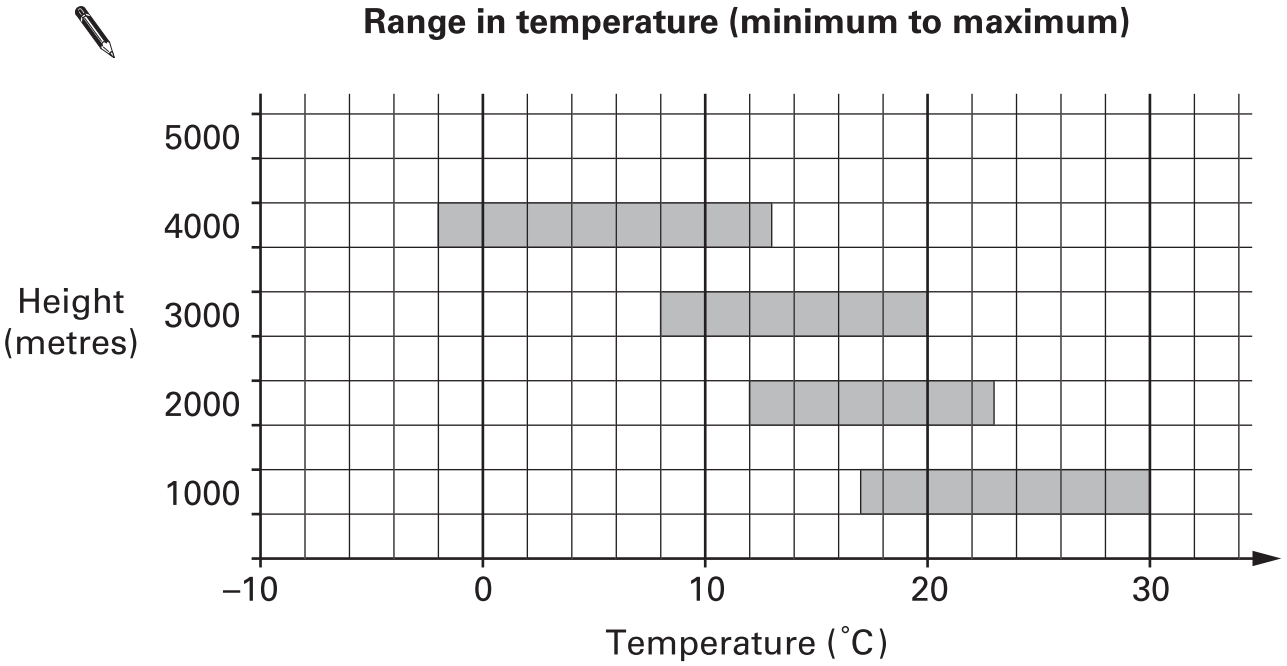
. . . . .

2 marks

2. There are high mountains in Nepal.

At different heights, the temperature is different.

The graph shows information about temperatures in one month.



For example:

At 1000 metres, the maximum temperature is 30°C.

(a) At **3000** metres, what is the **minimum** temperature?

..... °C

1 mark

(b) At **5000** metres, the minimum temperature is **–3°C**.

The **range** in temperature is **15°C**.

On the graph above, draw a bar to show this information.

2 marks

3. (a) A pupil measured the angles in a triangle.

She said:

> The angles are 30°, 60° and 100°

Could she be correct? Tick (✓) Yes or No.

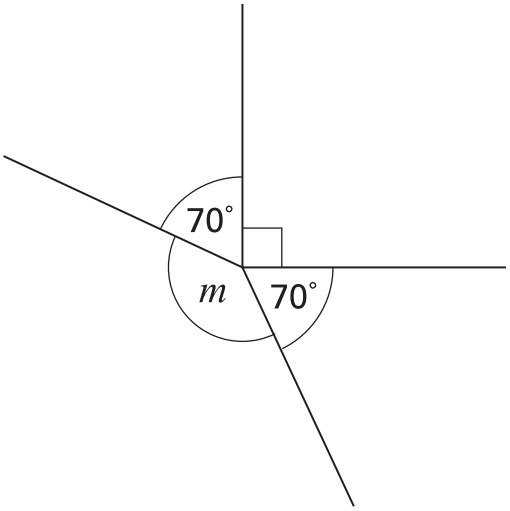
☐ Yes ☐ No

Explain your answer.

. . . . .

1 mark

(b) This diagram is not drawn accurately.



Calculate the size of angle m

Show your working.

. . . . .

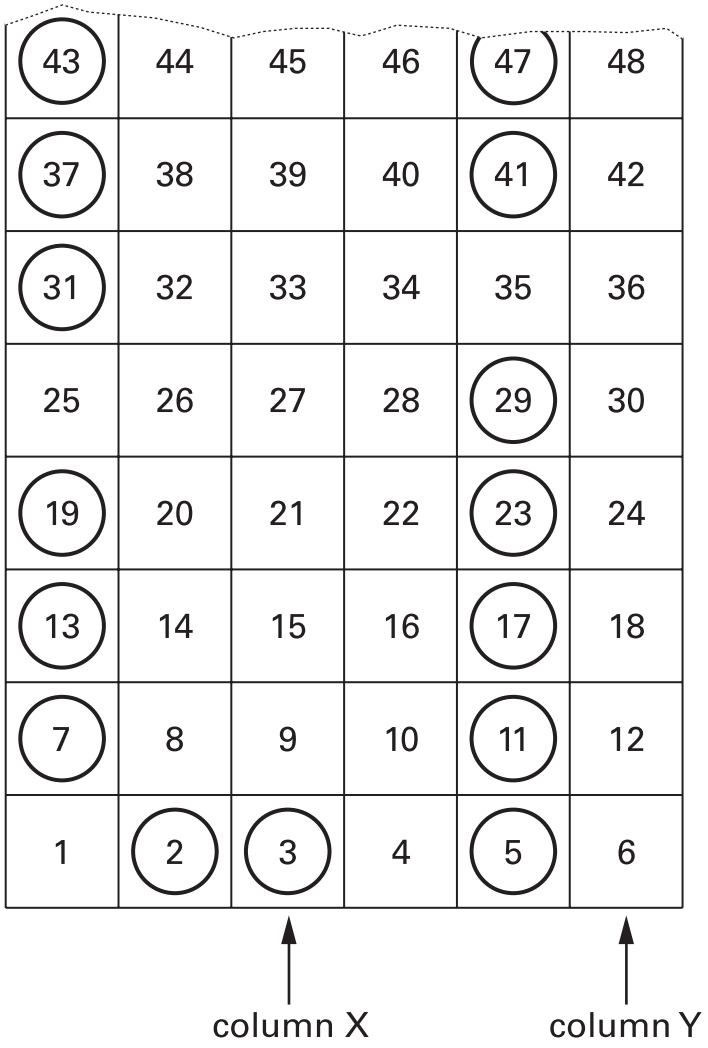
. . . . . °

. . . . .

2 marks

4. The diagram shows part of a number grid. The grid has 6 columns.

All the **prime numbers** in the grid are **circled**.



(a) 35 is not circled.

Explain why 35 is **not** a prime number.

. . . .

1 mark

(b) There are no prime numbers circled in column Y.

Explain how you know there will **never** be a prime number in column Y.

. . . . .
1 mark

(c) There is one prime number circled in column X.

Explain how you know there will **never** be another prime number in column X.

. . . . .
1 mark

5. A box contains bags of crisps.

Each bag of crisps weighs **25 grams**.

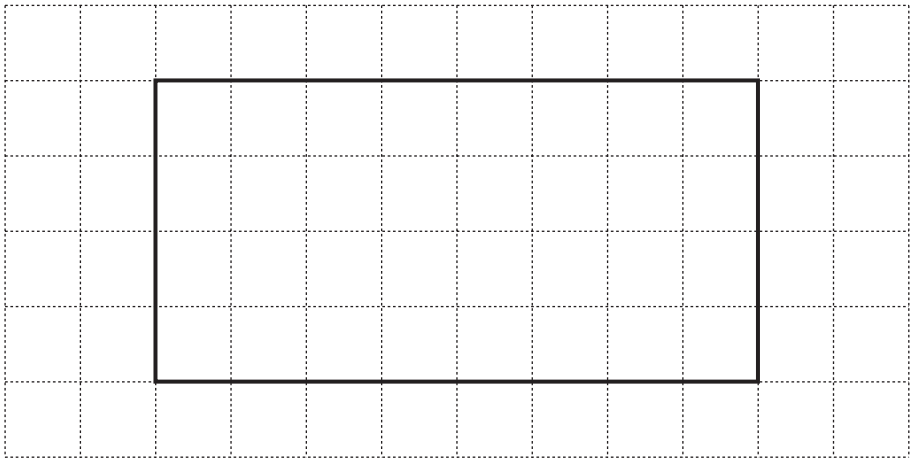
Altogether, the bags of crisps inside the box weigh **1 kilogram**.

How many bags of crisps are inside the box?

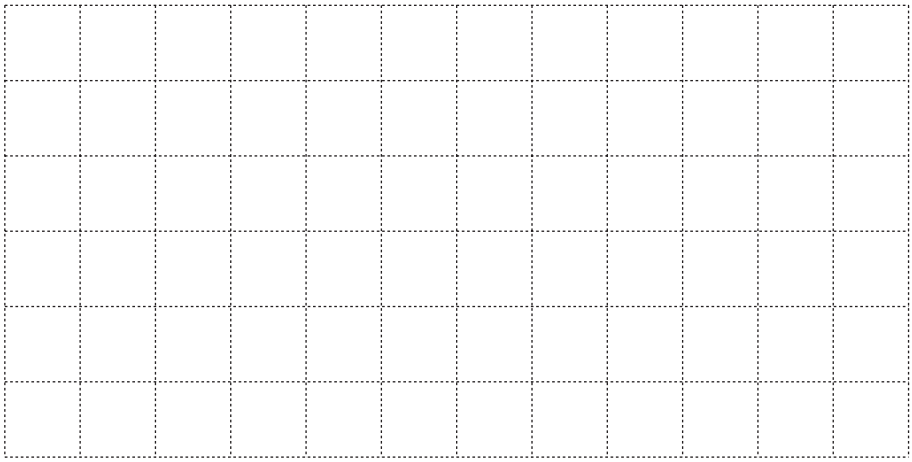
. . . . . .

. . . . .
1 mark

6. The square grid below shows a **quadrilateral** that has **four right angles**.

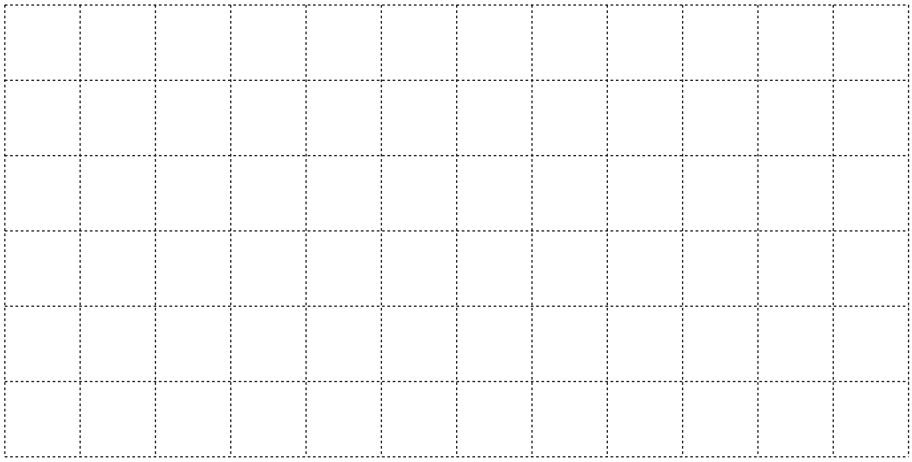


(a) Draw a quadrilateral that has exactly **two** right angles.



1 mark

(b) Draw a quadrilateral that has exactly **one** right angle.



1 mark

7. Shoe sizes in Britain and Germany are different.

The rule below shows how to change a British shoe size to a German shoe size.

> **Multiply** the British shoe size by **1.25**,
> then **add 32**,
> then **round** the answer to the nearest whole number.

Tom's British shoe size is **7**, Karl's British shoe size is $\mathbf{7\frac{1}{2}}$

They say:

'The rule shows that we have the same **German** shoe size'.

Are they correct? Tick (✓) Yes or No.

☐ Yes ☐ No

Show working to explain your answer.

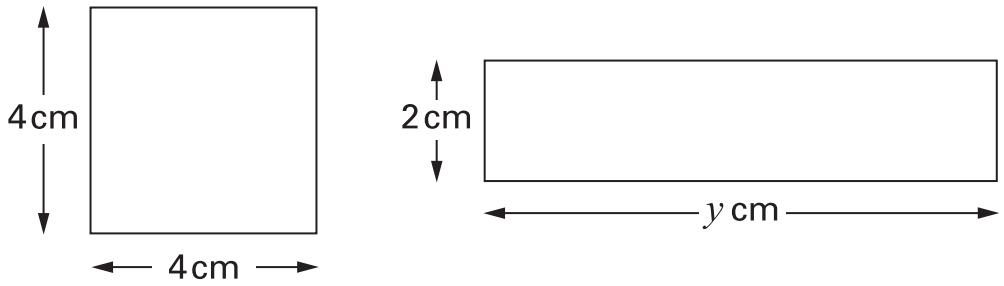
. . . .

. . . .

. . . .

3 marks

8. (a) The square and the rectangle below have the **same area**.



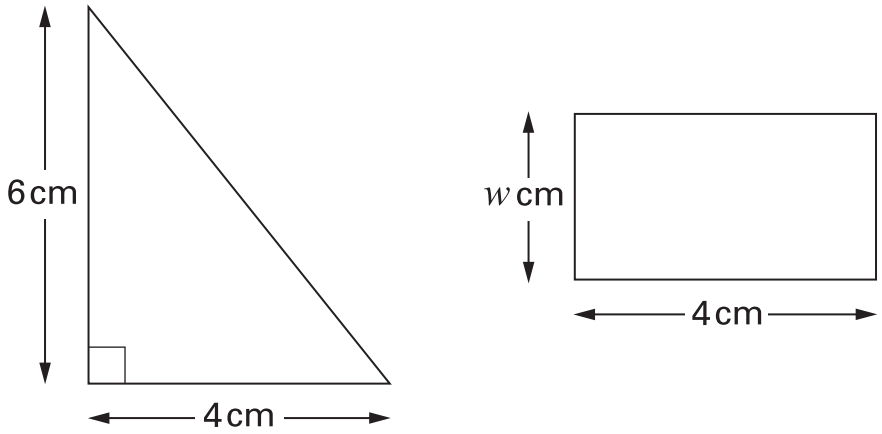
Not drawn accurately

Work out the value of y

y = ... cm

1 mark

(b) The triangle and the rectangle below have the **same area**.



Not drawn accurately

Work out the value of w

Show your working.

w = ... cm

2 marks

9. (a) In 1976 the average yearly wage was **£3275**

On average, people spent **17%** of £3275 on their family holiday.

How much is 17% of £3275?

Show your working.

£ . . . . .

2 marks

(b) In 2001 the average yearly wage was **£21842**

On average, people spent **£1644** on their family holiday.

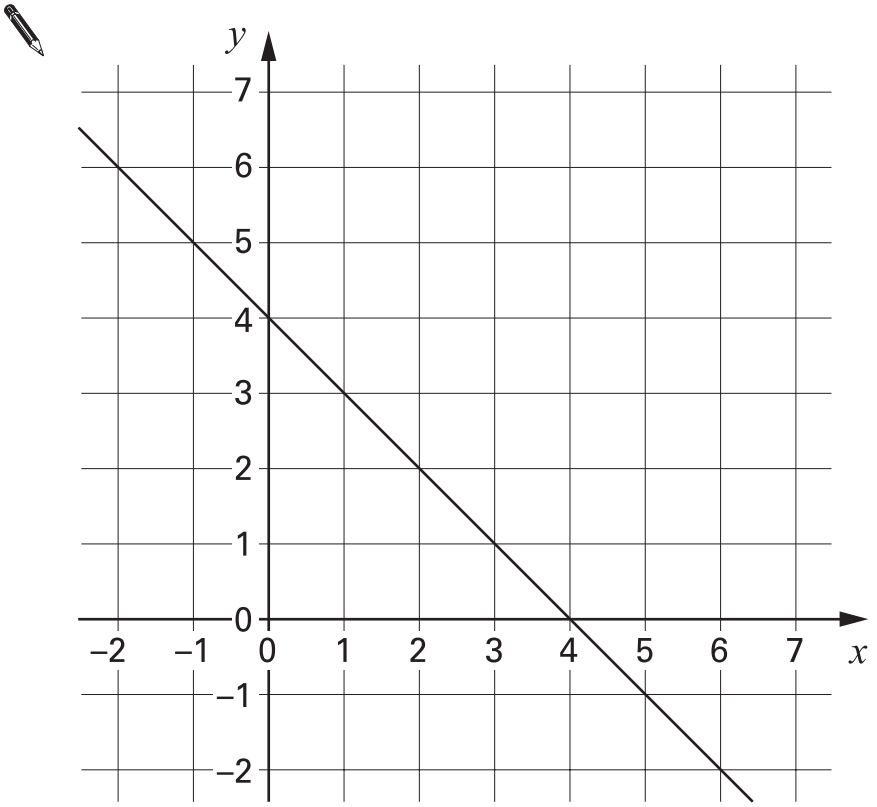
What percentage of the average yearly wage is that?

Show your working.

. . . . . % . . . . .

2 marks

10. The graph shows a straight line.



(a) Fill in the table for some of the points on the line.

(x, y)	(,)	(,)	(,)
$x + y$			

1 mark

(b) Write an equation of the straight line.

. . . . . .

1 mark

(c) On the graph, draw the straight line that has the equation $x + y = 6$

1 mark

11.

There are **20 questions** in a quiz.

A **correct** answer scores **2 points**. An **incorrect** answer **loses 1 point**.

A question not answered scores 0 points. A negative total is possible.

(a) What are the maximum and minimum points you could get on the quiz?

maximum ..... minimum .....

1 mark

(b) A pupil answers **10** of the 20 questions.

8 are correct.

How many points does he score?

.....

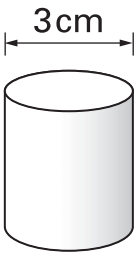
1 mark

(c) Complete the table to show 3 different ways to score **24 points**.

Number of answers that are correct	Number of answers that are incorrect	Number of questions that are not answered
12	0	8

2 marks

12. (a) The cross-section of a cylindrical cotton reel is a circle.



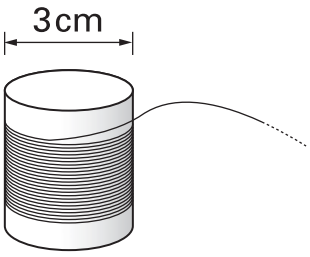
The **diameter** of this circle is **3cm**.

What is the **circumference** of this circle?

..... cm

1 mark

(b) **91 metres** of cotton goes round the cotton reel.



About how many times does the cotton go round the reel?

Show your working, and give your answer to the **nearest ten**.

.....

2 marks

13. Doctors sometimes use this formula to calculate how much medicine to give a child.

$$c = \frac{ay}{12 + y}$$

c is the correct amount for a child, in ml

a is the amount for an adult, in ml

y is the age of the child, in years

(a) A child who is **4 years old** needs some medicine.

The amount for an adult is **20 ml**.

Use the formula to work out the correct amount for this child.

You **must** show your working.

. . . . .

. . . .

. . . . .

2 marks

(b) Another child needs some medicine.

The amount for an adult is **30 ml**.

The correct amount for this child is **15 ml**.

How old is this child? Show your working.

. . . . .

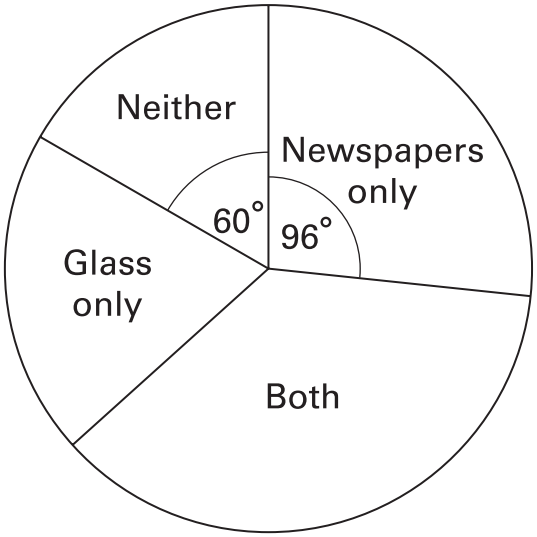
. . . .

. . . . .

2 marks

14. (a) A teacher asked her pupils if they recycled newspapers and glass.

The pie chart shows the results.



5 pupils answered 'Neither'.

How many pupils answered 'Newspapers only'?

Show your working.

..... pupils

2 marks

(b) The teacher asked a **different class** if they recycled newspapers and glass.

There were **24 pupils** in the class.

9 pupils answered 'Newspapers only'.

On a pie chart, what would the angle be for the sector 'Newspapers only'?

Show your working.

° . . . .

. . . .

2 marks

15. The heights of Russian dolls are in the ratio **4 : 6 : 7**

(a) In a set of dolls, the height of the **middle** doll is **9 cm**.

What are the heights of the other dolls?

..... cm ..... 9 cm ..... cm . . . .
smallest middle tallest 1 mark

(b) In another set of dolls, the height of the **tallest** doll is **9 cm**.

What are the heights of the other dolls?

Show your working, and give your answers to **1 decimal place**.

..... cm ..... cm ..... 9 cm . . . .
smallest middle tallest . . . .
2 marks

16. Altogether, I have **10** bags of sweets.

The **mean** number of sweets in the bags is **41**

The table shows how many sweets there are in **9** of the bags.

Number of sweets in a bag	Frequency
39	3
40	2
41	1
42	1
43	0
44	2

Calculate how many sweets there are in the 10th bag.

You **must** show your working.

. . . . .

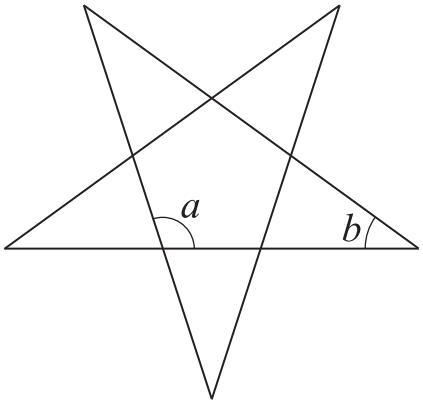
. . . .

. . . . .

2 marks

17. The diagram shows the net for a right-pyramid with a regular pentagon as its base.

The net is constructed using five straight lines.



(a) Without measuring, explain why angle a must be 108°

. . . . .

1 mark

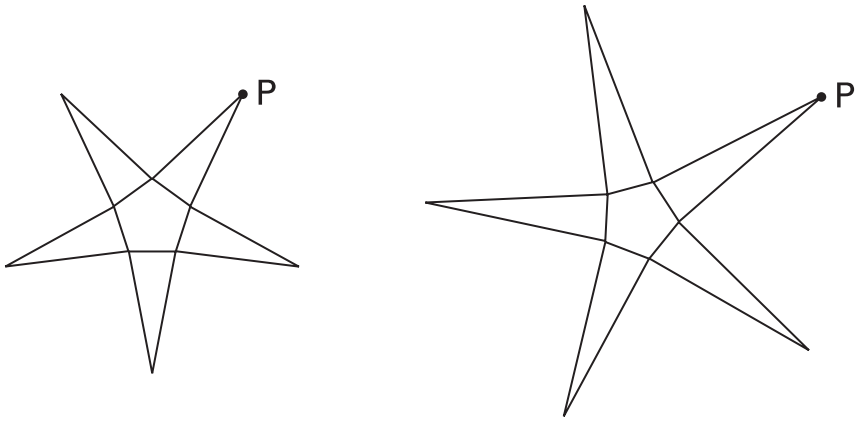
(b) Calculate the size of angle b.

You **must** show your working.

. . . . . °

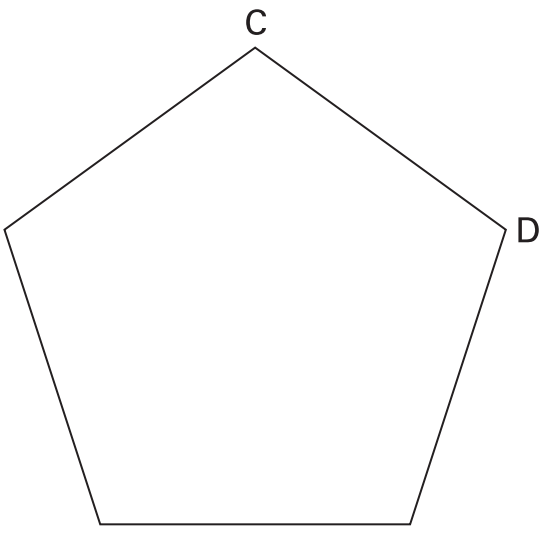
1 mark

(c) On these nets, the point marked P lies on the perpendicular bisector of a side of the pentagon.



On side CD of the regular pentagon below, use compasses and a straight edge to **construct** the **perpendicular bisector**.

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



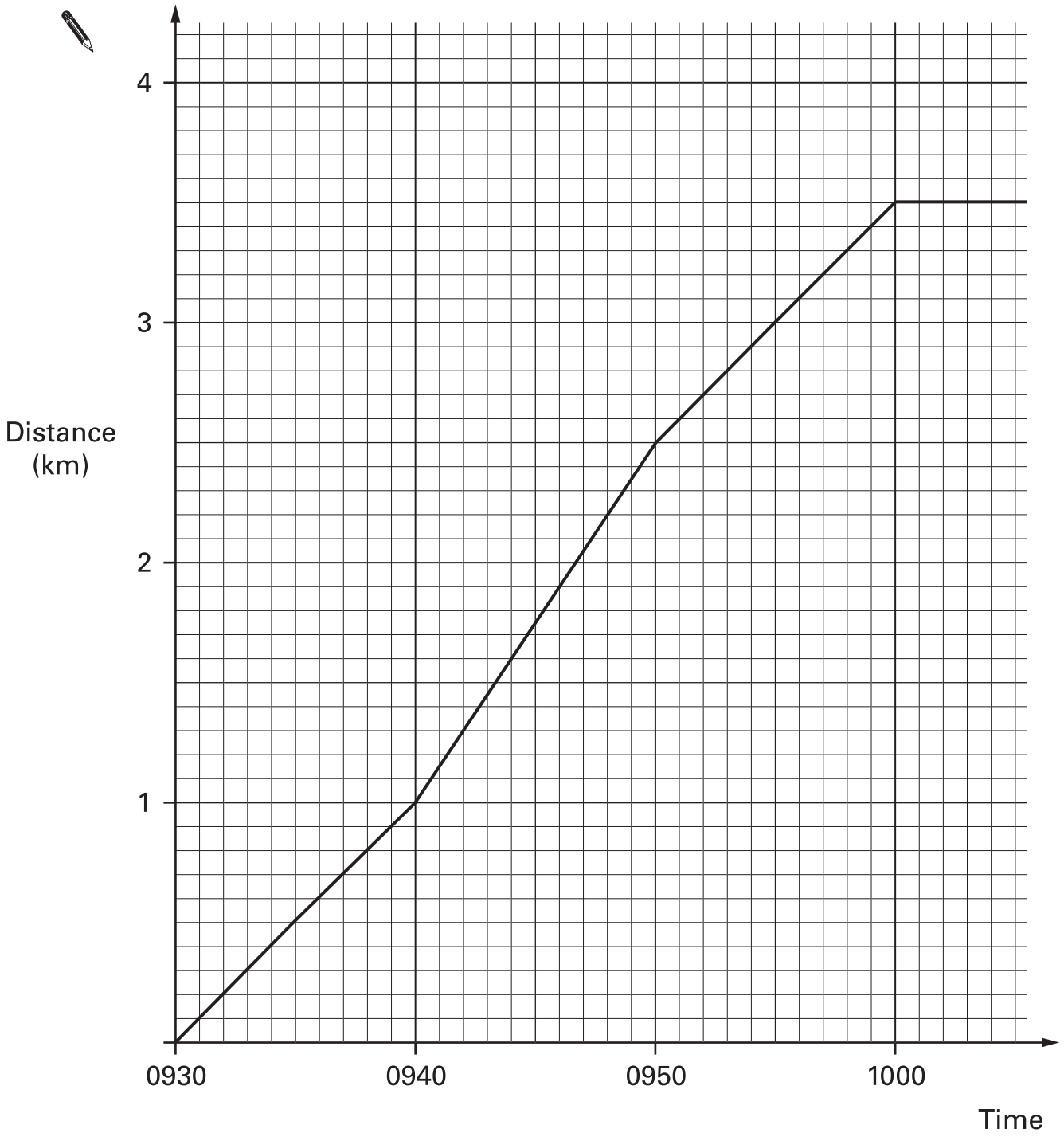
. . . .

. . . .

2 marks

18. Kali uses a running machine to keep fit.

The simplified distance-time graph shows how she used the machine during one run.



Use the graph to answer these questions.

(a) Between 0930 and 0940, what was her speed in **kilometres per hour**?

..... km/h

1 mark

(b) Throughout the run, for how many **minutes** did she travel at this speed?

..... minutes

1 mark

(c) At 0940, she increased her speed.

By how many kilometres per hour did she increase her speed?

..... km/h

1 mark

19. Some numbers are **smaller** than their squares.

For example: $7 < 7^2$

Which numbers are **equal to** their squares?

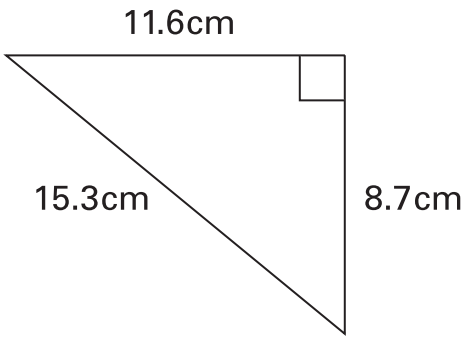
. . . .

. . . .

2 marks

20. **Is it possible** to have a triangle with the angle and lengths shown below?

Show calculations then tick (✓) Yes or No.



Calculations:

Decision: ☐ Yes ☐ No

. . . .

. . . .

2 marks

21. Look at these expressions.

first expression	second expression
$5y - 8$	$3y + 5$

What value of y makes the two expressions equal?

Show your working.

$y =$ .....

2 marks

END OF TEST

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