Ma

KEY STAGE
3

TIER
6–8

2007

Mathematics test

Paper 2

Calculator allowed

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, an angle measurer or protractor 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	

Instructions

Answers



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

Calculators



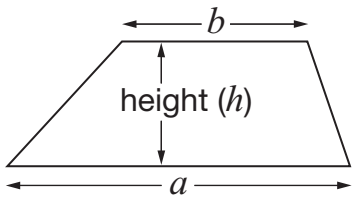
You **may** use a calculator to answer any question in this test.

Formulae

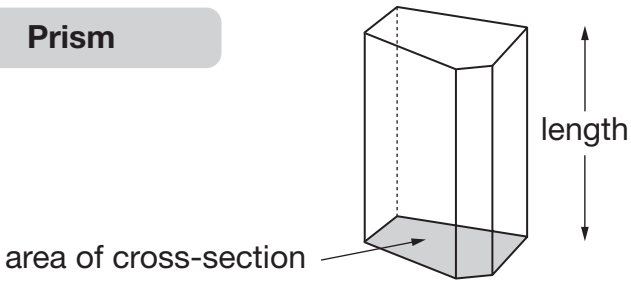
You might need to use these formulae

Trapezium

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



Prism



Volume = area of cross-section × length

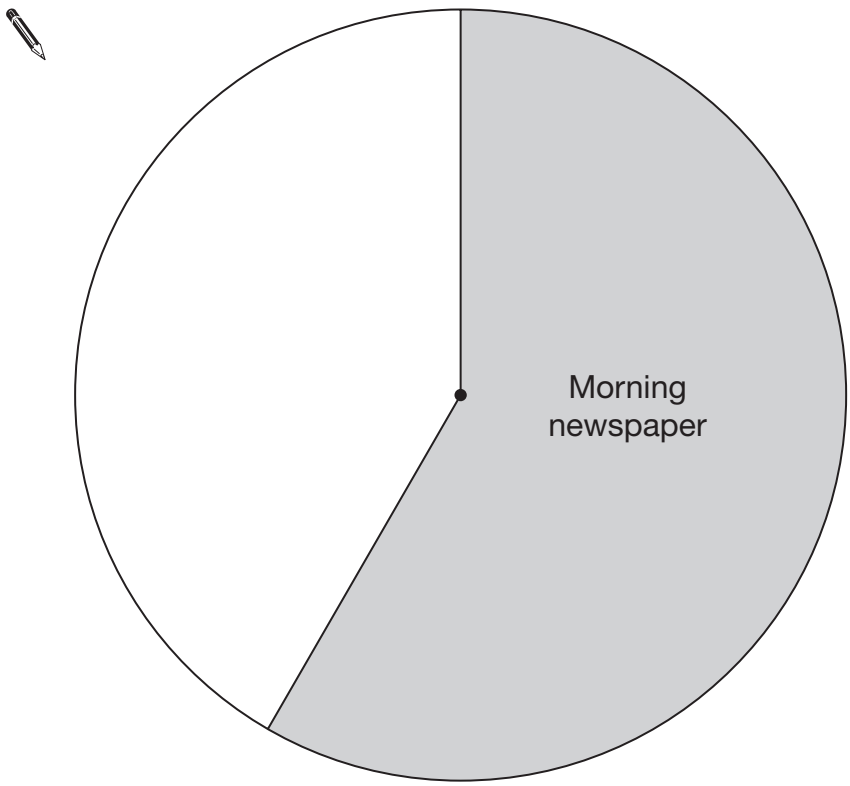
1. In a survey, 60 people were asked:

> What kind of newspaper did you buy today?

Here are the results.

Type of newspaper	Number of people
Morning newspaper	35
Evening newspaper	10
No newspaper	15

Complete the pie chart to show this information.



2 marks

2. Look at the information.

$x = 4$	$y = 13$

Complete the rules below to show **different** ways to get y using x

The first one is done for you.

To get y, **multiply** x by *2* and **add** *5*

This can be written as $y =$ *2x + 5*



To get y, **multiply** x by _____ and **add** _____

This can be written as $y =$ _____

1 mark

To get y, **multiply** x by _____ and **subtract** _____

This can be written as $y =$ _____

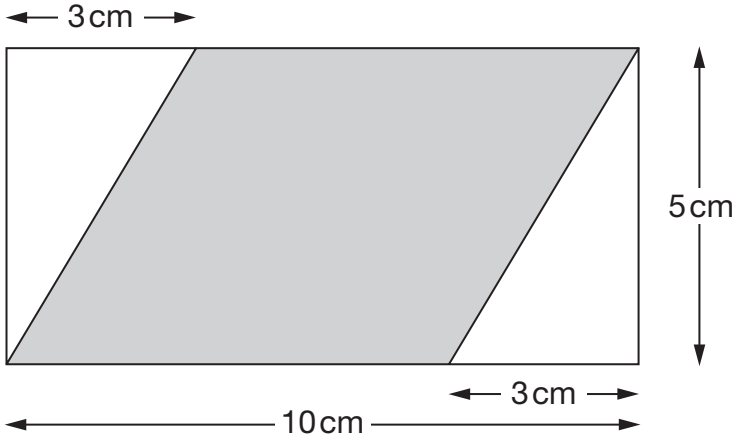
1 mark

To get y, **divide** x by _____ and **add** _____

This can be written as $y =$ _____

1 mark

3. The diagram shows a shaded parallelogram drawn inside a rectangle.



Not drawn accurately

What is the **area** of the shaded parallelogram?

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

2 marks

4. Write the missing numbers.

$6x + 2 = 10$

so $6x + 1 =$ _____ 1 mark

$1 - 2y = 10$

so $(1 - 2y)^2 =$ _____ 1 mark

5. The value of π correct to 7 decimal places is:

3.1415927

(a) Write the value of π correct to **4 decimal places**.

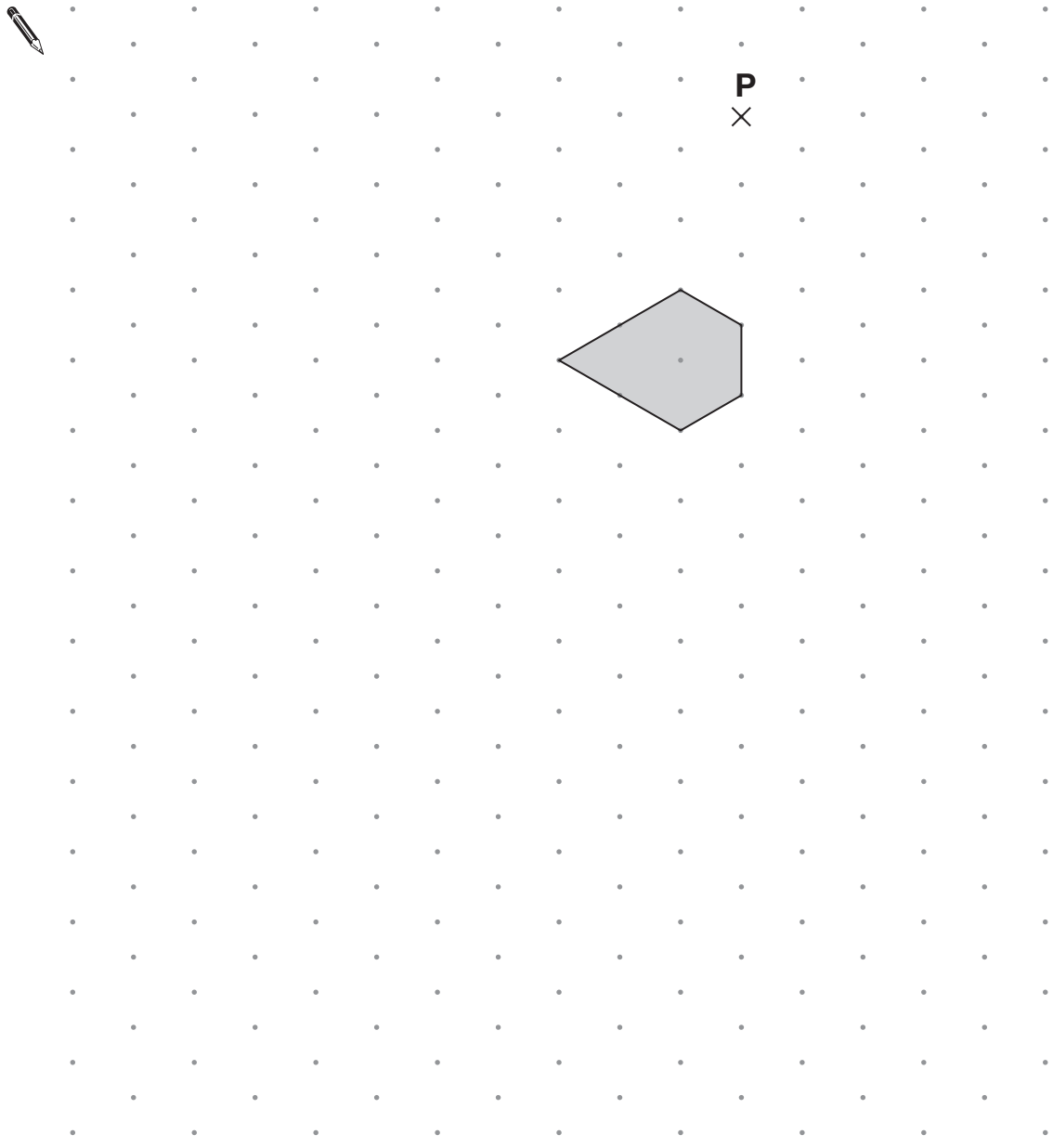
1 mark

(b) Which value below is closest to the value of π?

Put a ring round the correct one.

$\frac{179}{57}$ $3\frac{1}{7}$ $\left(\frac{16}{9}\right)^2$ $\frac{355}{113}$ 1 mark

6. Enlarge the shaded shape by a **scale factor of 2**, using **P** as the centre of enlargement.



2 marks

Isometric grid

7. (a) Here are two equations.

$k = a + b$

$a + b + k = 30$

What is the value of k?

$k =$ _____

1 mark

(b) Look at this information.

$10 = c + d$

c is one more than d

What is the value of c?

$c =$ _____

1 mark

(c) Now look at this information.

$10 = e + f$

e is more than f

What else can you say about the value of e?

1 mark

8. A pupil investigated how the teachers at his school travel to work.

The table shows the results.

Number of teachers who travel by car	Number of teachers who do **not** travel by car
18	7

(a) What **percentage** of these teachers travel by car?



_____ %

1 mark

(b) **18 teachers** travel by car. Some of these teachers travel together.

Write the missing frequency in the table below.



Number of teachers in one car	Number of cars
1	
2	4
3	2

1 mark

(c) What is the **mean** number of teachers in each car?



_____

2 marks

9. (a) Jenny wants to multiply out the brackets in the expression $3(2a + 1)$

She writes:

$$3(2a + 1) = 6a + 1$$

Show why Jenny is **wrong**.

1 mark

(b) Sandeep wants to multiply out the brackets in the expression $(k + 4)(k + 7)$

He writes:

$$(k + 4)(k + 7) = k^2 + 28$$

Show why Sandeep is **wrong**.

1 mark

10. A computer is going to choose a letter at random from an English book.

The table shows the probabilities of the computer choosing each vowel.

Vowel	A	E	I	O	U
Probability	0.08	0.13	0.07	0.08	0.03

(a) What is the probability that it will **not** choose a vowel?



2 marks

(b) The probability that the computer will choose the letter **T** is **0.09**

The computer chooses a letter at random, and then another, and then another.

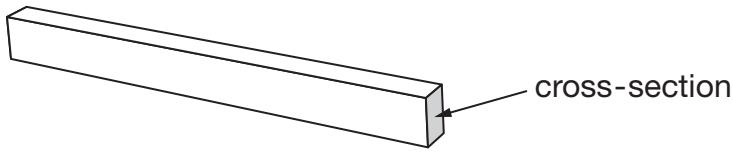
What is the probability that these letters will be **E, then A, then T**?



2 marks

11. I am going to use a wooden beam to support a load.

The cross-section of the beam is a rectangle.

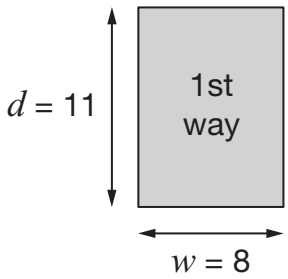


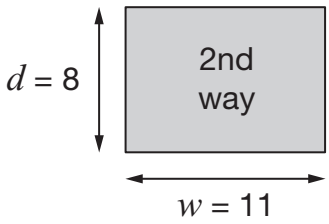
The formula below gives the greatest load, M kg, that a beam of this length can support.

$M = 5d^2w$ where d is the depth of the beam in cm,

w is the width of the beam in cm.

I can place the cross-section of the beam in two different ways.





In which way will the beam be able to support the greater load?

Calculate the difference.

The _____ way supports the greater load,

with a difference of _____ kg.

3 marks

12. One day, each driver entering a car park paid **exactly £1.50**

Car park
Pay exactly £1.50 to enter **Machine accepts only £1 coins and 50p coins**

Here is what was put into the machine that day.

Number of £1 coins	**136**
Number of 50p coins	**208**

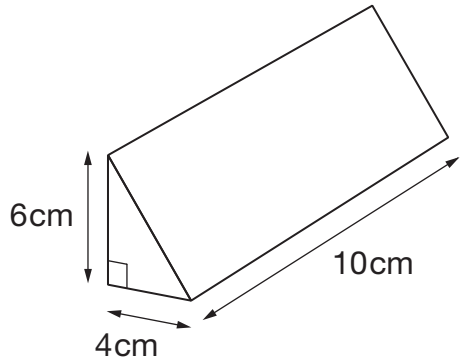
On that day, what percentage of drivers paid with **three 50p coins**?



_____ %

3 marks

13. (a) Look at the triangular prism.



Not drawn accurately

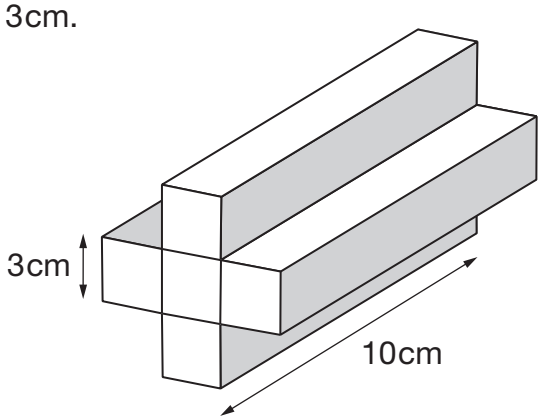
Work out the volume of the prism.

_____ cm^3

1 mark

(b) One face of another prism is made from 5 squares.

Each square has side length 3cm.



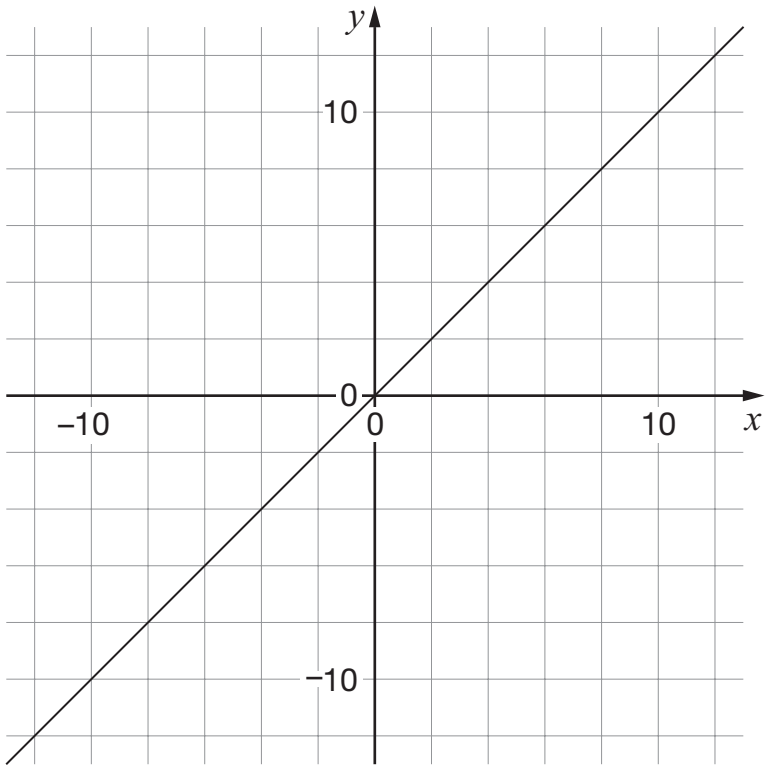
Not drawn accurately

Work out the volume of the prism.

_____ cm^3

1 mark

14. The graph shows a straight line with **gradient 1**



(a) On the graph, draw a different straight line with gradient 1

1 mark

(b) The equation of another straight line is $y = 5x + 20$

Write the missing number.

The straight line $y = 5x + 20$ passes through (0, _____)

1 mark

(c) A straight line is **parallel** to the line with equation $y = 5x + 20$

It passes through the point (0, 10)

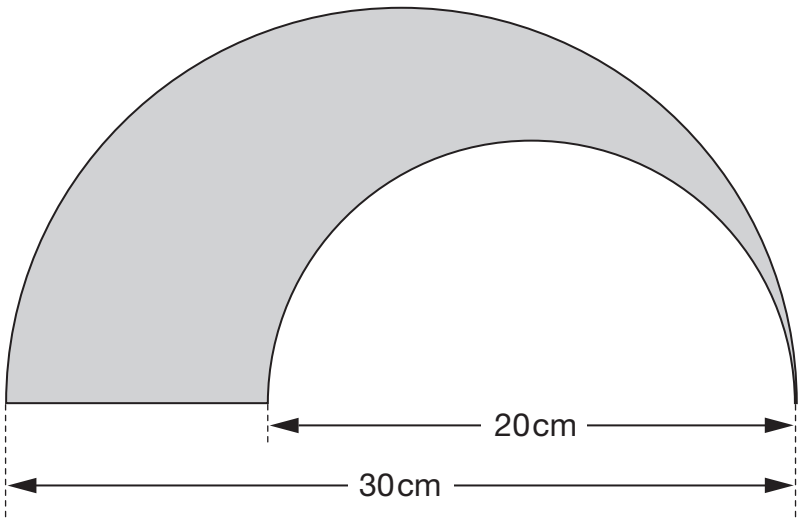
What is the equation of this straight line?

1 mark

15. This shaded shape is made using **two semicircles**.

One semicircle has a diameter of **20cm**.

The other has a diameter of **30cm**.



Not drawn accurately

Calculate the **perimeter** of the shaded shape.

_____ cm

2 marks

16. The table shows the number of boys and girls in two different classes.

	Class 9A	Class 9B
Boys	13	12
Girls	15	14

A teacher is going to choose a pupil at random from each of these classes.

In which class is she **more likely** to choose a **boy**?

You **must** show your working.

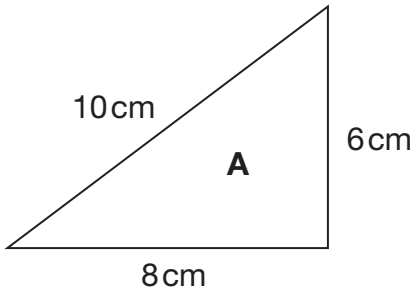
Tick (✓) your answer.

☐ Class 9A ☐ Class 9B

2 marks

17. The triangles in this question are not drawn accurately.

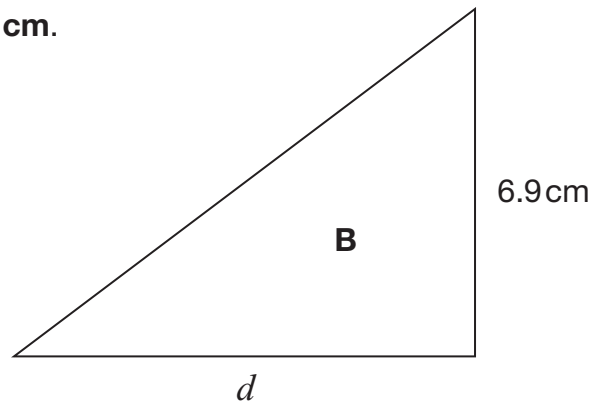
(a) Use Pythagoras' theorem to explain why triangle A must be right-angled.



1 mark

(b) Triangle A is enlarged to make triangle B.

Use similar triangles to show that d = **9.2 cm**.

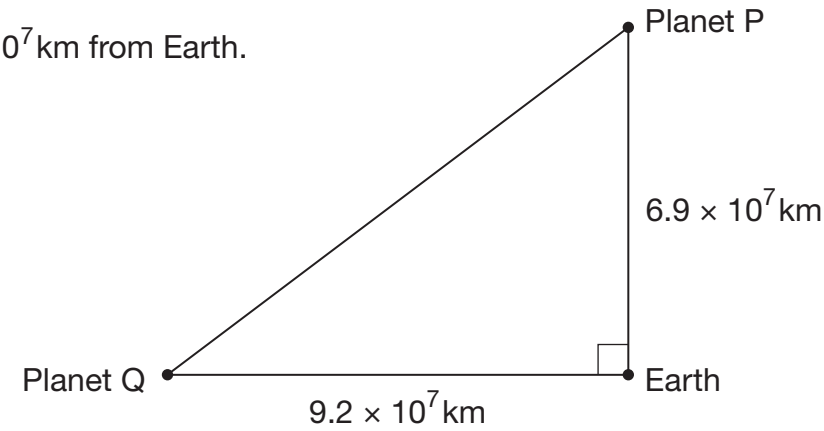


1 mark

(c) The diagram shows the Earth and two other planets.

Planet P is 6.9×10^7 km from Earth.

Planet Q is 9.2×10^7 km from Earth.



How far is Planet P from Planet Q?

Give your answer in standard form.

1 mark

_____ km

1 mark

18. Look at the equation in the box.

$$x + (x + 1) + (x + 2) = y$$

Use it to help you write the missing expressions **in terms of** y

The first one is done for you.

$5 + x + (x + 1) + (x + 2) =$ $y + 5$



$(x + 5) + (x + 6) + (x + 7) =$ _____

$2x + 2(x + 1) + 2(x + 2) =$ _____

$(x + a) + (x + 1 + a) + (x + 2 + a) =$ _____

2 marks

19. Here is part of a newspaper report about wildlife in a country in Africa.



> The number of gorillas has **fallen by 70%** in the last ten years.
>
> Only about **5000 gorillas** are left.

About how many gorillas were there in this country ten years earlier?

2 marks

20. On a street, there are **100 houses**.

60 are terraced houses.

30 are semi-detached.

The rest are detached.

The table shows the mean number of bedrooms in each type of house.

Type of house	Mean number of bedrooms
Terraced	2.5
Semi-detached	3.3
Detached	4.1

What is the mean number of bedrooms per house on this street?



2 marks

21. I am thinking of a number.

When I subtract 25 from my number, then square the answer,

I get the **same result as**

when I square my number, then subtract 25 from the answer.

What is my number?

You **must** show an algebraic method.



2 marks

22. (a) One **light year** is approximately 9 430 000 000 000 kilometres.

Write this distance in standard form.



_____ km

1 mark

(b) A star called Wolf 359 is approximately **7.8 light years** from Earth.

About how many **kilometres** is this?

Write your answer in standard form.

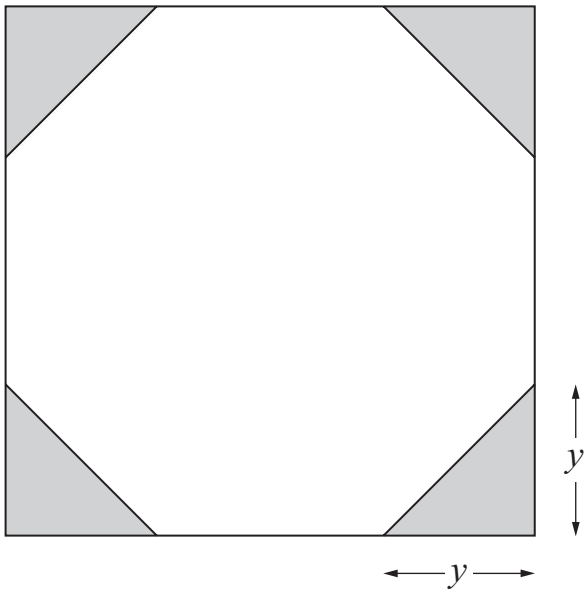


_____ km

1 mark

23. I have a square piece of card.

I cut a triangle from each corner so that the remaining card is in the shape of a **regular octagon**.



Not drawn accurately

The **perimeter** of the regular octagon is **32cm**.

Work out length y

y = _____ cm

2 marks

24. Look at the simultaneous equations.

$$x + 2y = a$$
$$x + y = b$$

(a) Write an expression for y in terms of a and b

$y =$ _____

1 mark

(b) Now write an expression for x in terms of a and b

Write your expression as simply as possible.

$x =$ _____

2 marks

END OF TEST

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QCA/06/2786 (Pupil pack)
QCA/06/2778 (Mark scheme pack)
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