

Ma

KEY STAGE

3

TIER

5–7

# 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 |  |

2007

## Instructions

### Answers



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

### Calculators



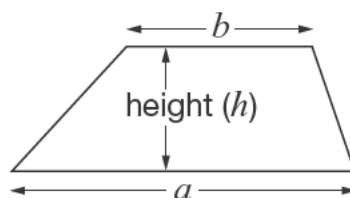
You **may** use a calculator to answer any question in this test.

## Formulae

You might need to use these formulae

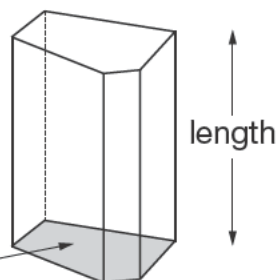
### Trapezium

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



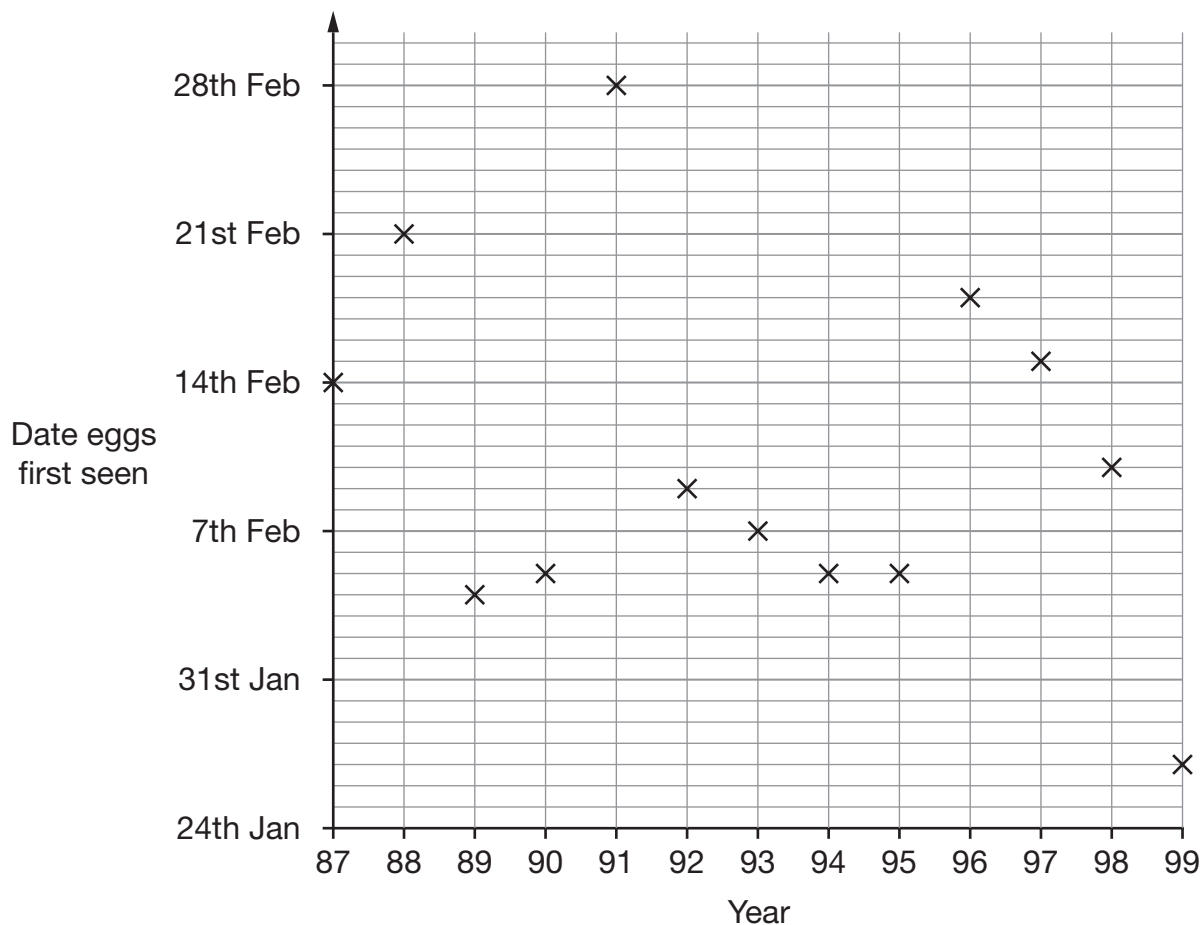
### Prism

area of cross-section



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

1. The graph shows the date each year that frogs' eggs were first seen.



- (a) On what date in **1997** were frogs' eggs first seen?



1 mark

- (b) At the beginning of each year, the warmer the weather, the earlier frogs' eggs are first seen.

What can you say about the weather at the beginning of **1991**?



1 mark



2. (a) Here is an expression.

$$2a + 3 + 2a$$

Which expression below shows it written as simply as possible?

Put a ring round the correct one.



$7a$

$7 + a$

$2a + 5$

$4a + 3$

$4(a + 3)$

1 mark

- (b) Here is a different expression.

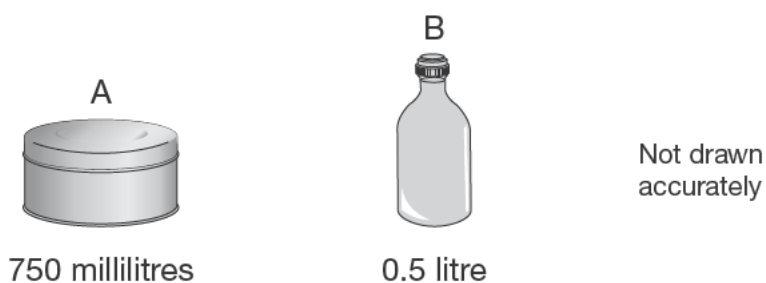
$$3b + 4 + 5b - 1$$

Write this expression as simply as possible.



1 mark

3. Here are two containers and the amounts they hold.



Which container holds the greater amount?


 A

 B

How much **more** does it hold?

Give your answer in millilitres.



\_\_\_\_\_ millilitres

1 mark

4. (a) A triangle has **three equal sides**.

Write the sizes of the **angles** in this triangle.



\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

1 mark

- (b) A **right-angled triangle** has **two equal sides**.

Write the sizes of the **angles** in this triangle.

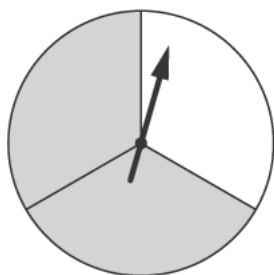


\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

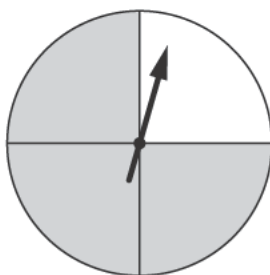
1 mark



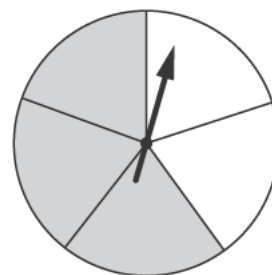
5. The diagram shows five fair spinners with grey and white sectors.  
Each spinner is divided into equal sectors.



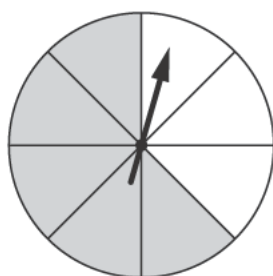
A



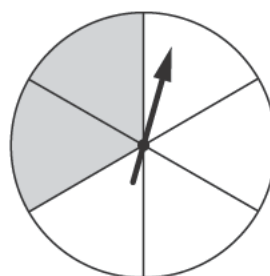
B



C



D



E

I am going to spin all the pointers.

- (a) For one of the spinners, the probability of spinning **grey** is  $\frac{3}{4}$   
Which spinner is this? Write its letter.



\_\_\_\_\_

1 mark

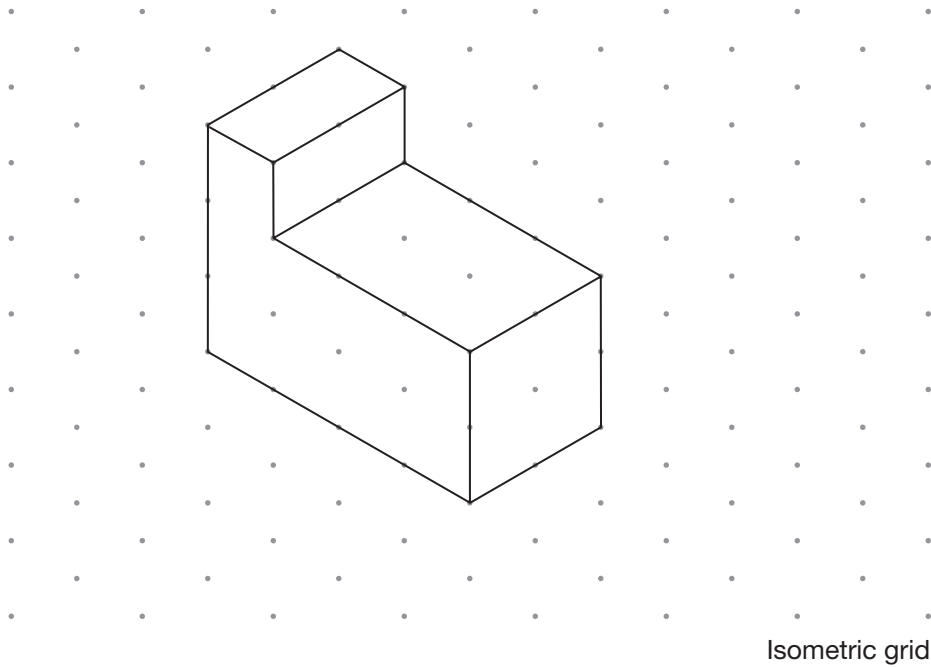
- (b) For two of the spinners, the probability of spinning **grey** is  
**more than 60%** but **less than 70%**  
Which two spinners are these? Write their letters.



\_\_\_\_\_ and \_\_\_\_\_

1 mark

6. (a) Look at the drawing of a prism on the grid.



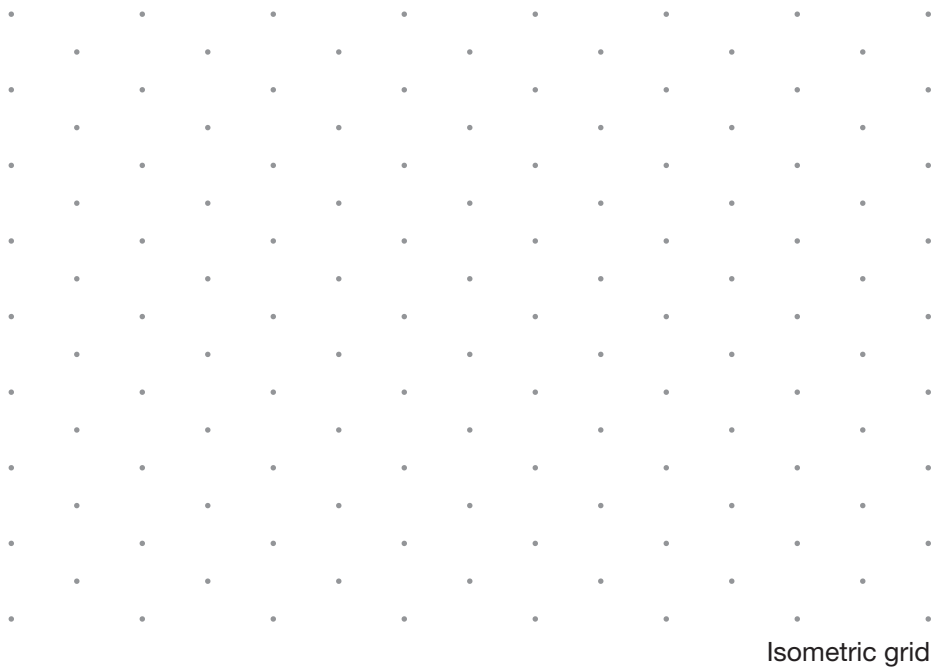
How many **faces** does the prism have?



\_\_\_\_\_

1 mark

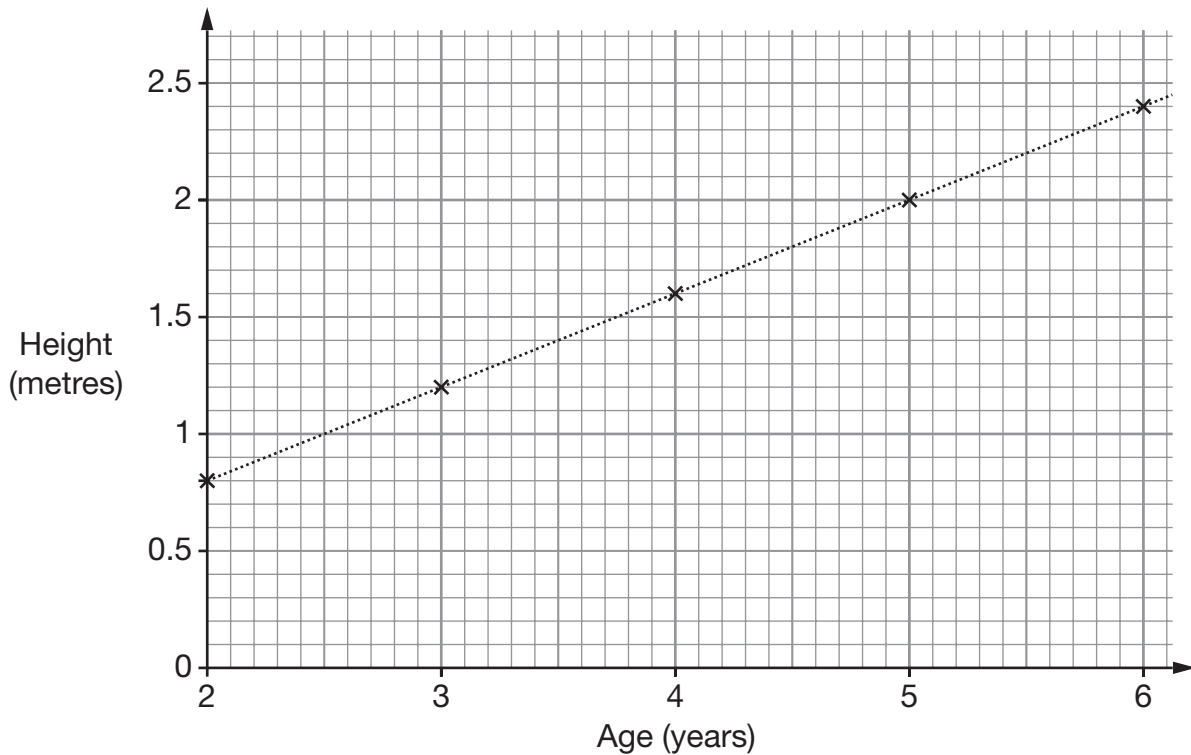
(b) Use the grid below to draw a solid with **6 faces**.



1 mark



7. The graph shows the average heights of fir trees of different ages.



The table shows the cost of fir trees of different heights.

|      | 120cm to 159cm | 160cm to 199cm | 200cm to 239cm |
|------|----------------|----------------|----------------|
| Cost | £20.00         | £25.00         | £30.00         |

(a) One of these fir trees is  $5\frac{1}{2}$  years old.

**How much** is it likely to cost?



£

1 mark

(b) One of these fir trees costs **£25.00**

**How old** is the tree likely to be?

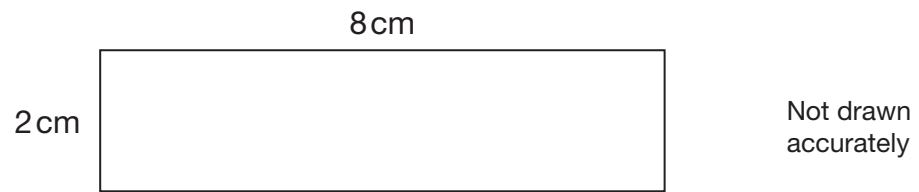


Between \_\_\_\_\_ and \_\_\_\_\_ years old

1 mark



8. Here is a rectangle.



- (a) A **square** has the **same area** as this rectangle.

What is the **side length** of this square?



\_\_\_\_\_ cm

\_\_\_\_\_ 1 mark

- (b) A **different square** has the **same perimeter** as this rectangle.

What is the **side length** of this square?



\_\_\_\_\_ cm

\_\_\_\_\_ 1 mark



9. Kate buys **24 cans** of lemonade.

She buys the cans in **packs of 4**

Each pack costs **£1.20**



Pack of 4  
Cost £1.20

Steve buys **24 cans** of lemonade.

He buys the cans in **packs of 6**

Each pack costs **£1.60**



Pack of 6  
Cost £1.60

Kate pays more for her 24 cans than Steve pays for his 24 cans.

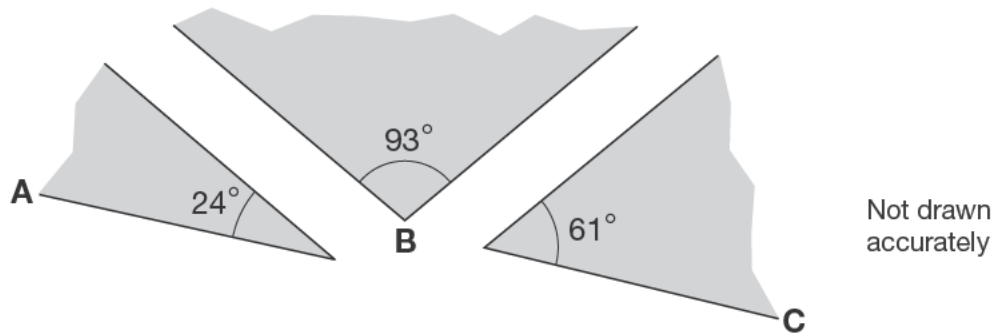
How much more?



\_\_\_\_\_ p

\_\_\_\_\_  
2 marks

10. Three shapes fit together at point B.



Will ABC make a straight line?




Yes

No

Explain your answer.



1 mark

11. Solve these equations.

$$32x + 53 = 501$$



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

1 mark

$$375 = 37 + 26y$$



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

1 mark



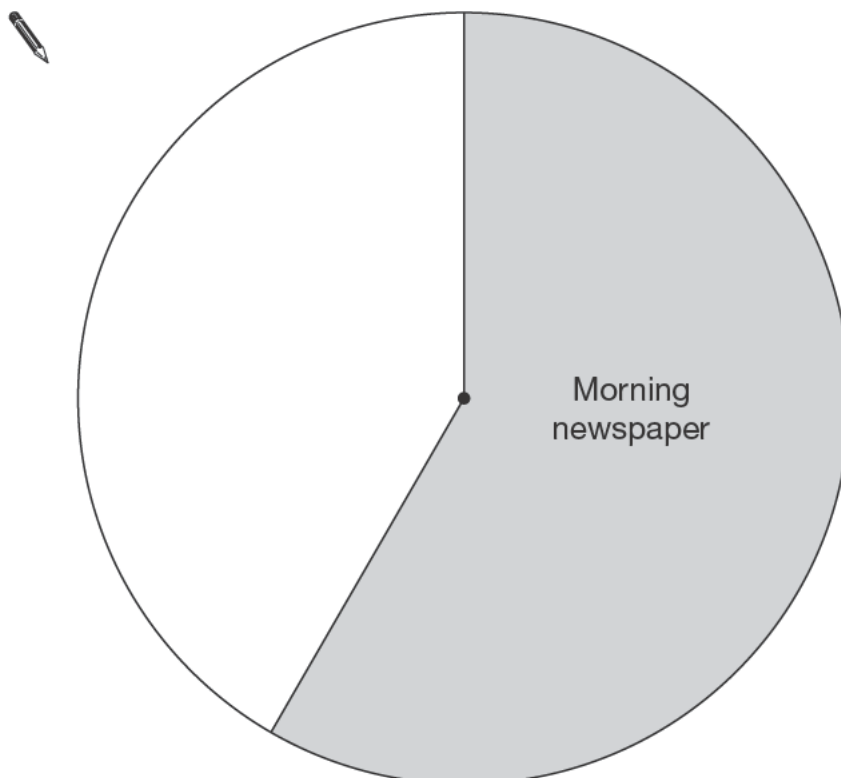
12. In a survey, 60 people were asked:

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

13. Look at the information.

$$x = 4 \quad y = 13$$

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  $y = \underline{2x + 5}$



To get  $y$ , **multiply**  $x$  by \_\_\_\_\_ and **add** \_\_\_\_\_

This can be written as  $y = \underline{\hspace{2cm}}$

1 mark

To get  $y$ , **multiply**  $x$  by \_\_\_\_\_ and **subtract** \_\_\_\_\_

This can be written as  $y = \underline{\hspace{2cm}}$

1 mark

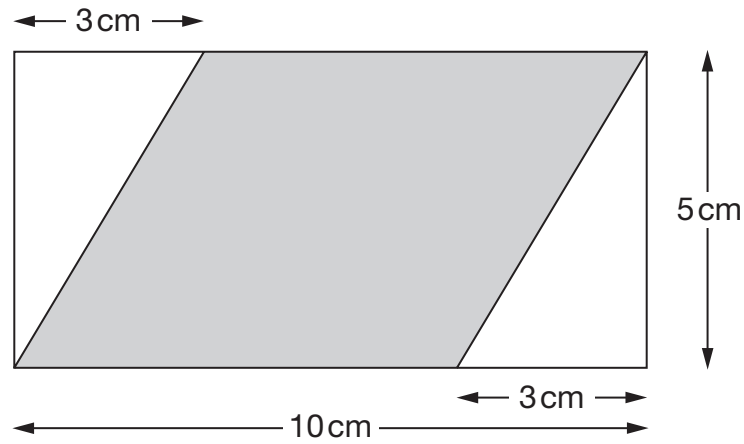
To get  $y$ , **divide**  $x$  by \_\_\_\_\_ and **add** \_\_\_\_\_

This can be written as  $y = \underline{\hspace{2cm}}$

1 mark



14. 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


15. Write the missing numbers.

$$6x + 2 = 10$$

 so  $6x + 1 =$  \_\_\_\_\_

1 mark

$$1 - 2y = 10$$

 so  $(1 - 2y)^2 =$  \_\_\_\_\_

1 mark

16. The value of  $\pi$  correct to 7 decimal places is:

3.1415927

- (a) Write the value of  $\pi$  correct to **4 decimal places**.



1 mark

- (b) Which value below is closest to the value of  $\pi$ ?

Put a ring round the correct one.



$$\frac{179}{57}$$

$$3\frac{1}{7}$$

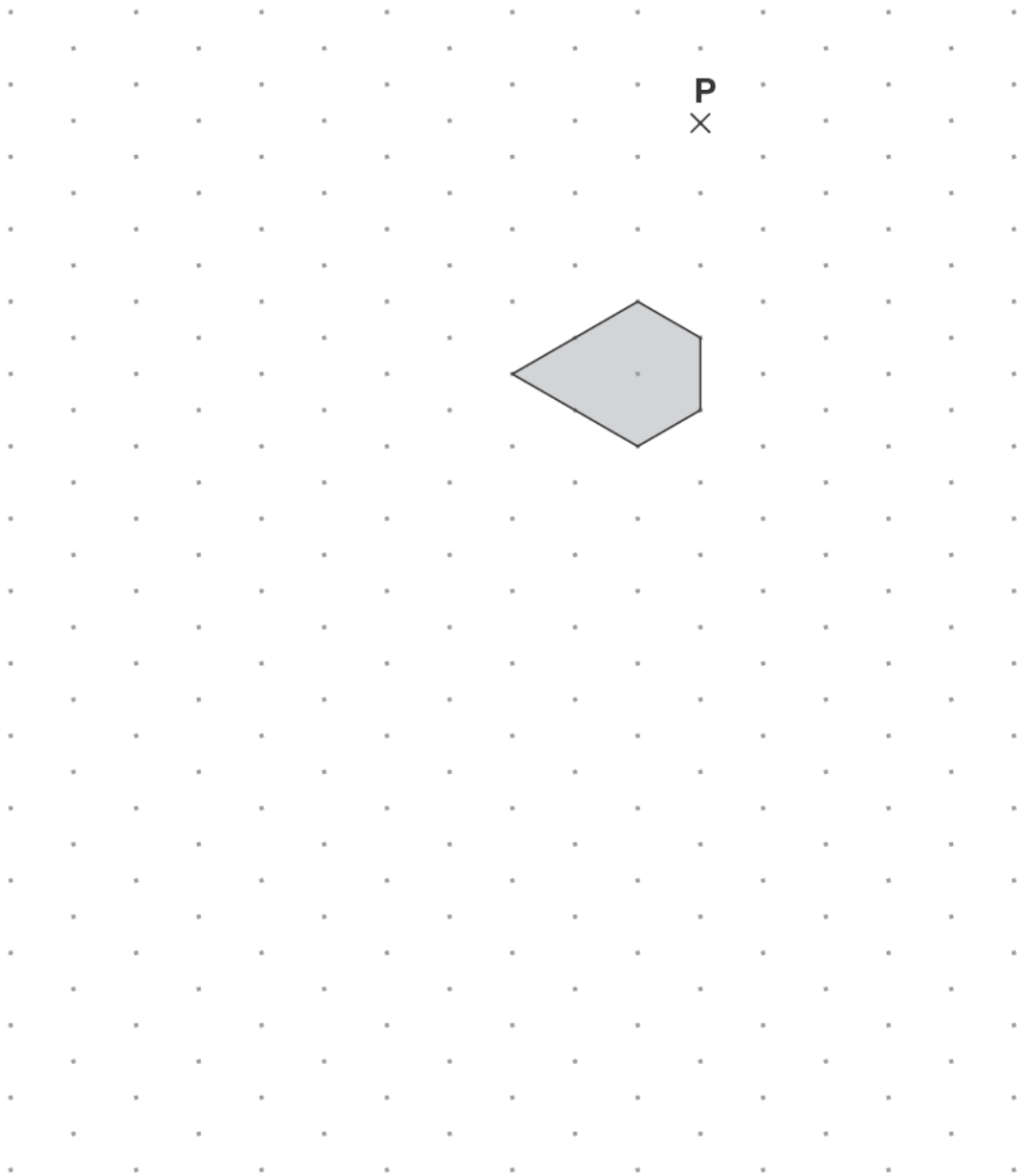
$$\left(\frac{16}{9}\right)^2$$

$$\frac{355}{113}$$

1 mark



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



Isometric grid

2 marks



18. (a) Here are two equations.

$$k = a + b$$

$$a + b + k = 30$$

What is the value of  $k$ ?



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

1 mark

- (b) Look at this information.

$$10 = c + d$$

$c$  is one more than  $d$

What is the value of  $c$ ?



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

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



19. 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 <b>not</b> 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

20. (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



21. 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 |

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



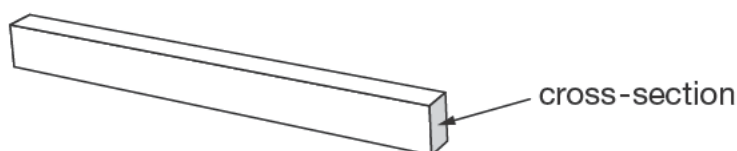
\_\_\_\_\_

\_\_\_\_\_

2 marks

22. 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, Mkg, that a beam of this length can support.

$$M = 5d^2w \quad \text{where} \quad d \text{ is the depth of the beam in cm,}$$

$$w \text{ is the width of the beam in cm.}$$

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



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

|  |
|--|
| Car park   |
| Pay exactly £1.50 to enter<br><b>Machine accepts only £1 coins and 50p coins</b> |

Here is what was put into the machine that day.

Number of £1 coins            **136**

Number of 50p coins        **208**

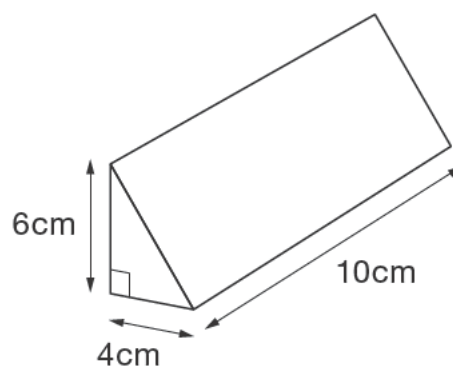
On that day, what percentage of drivers paid with **three 50p coins**?



\_\_\_\_\_ %

\_\_\_\_\_  
\_\_\_\_\_  
3 marks

24. (a) Look at the triangular prism.



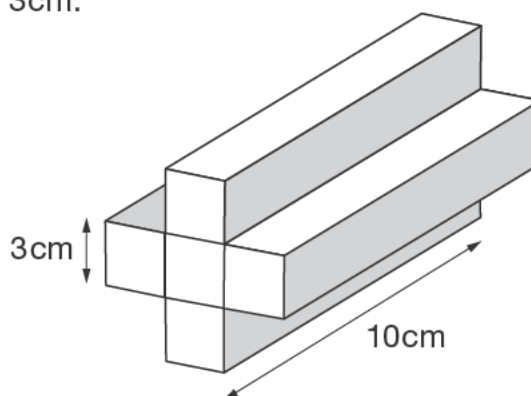
Not drawn accurately

Work out the volume of the prism.

 \_\_\_\_\_  $\text{cm}^3$

1 mark

- (b) One face of another prism is made from 5 squares.  
Each square has side length 3 cm.



Not drawn accurately

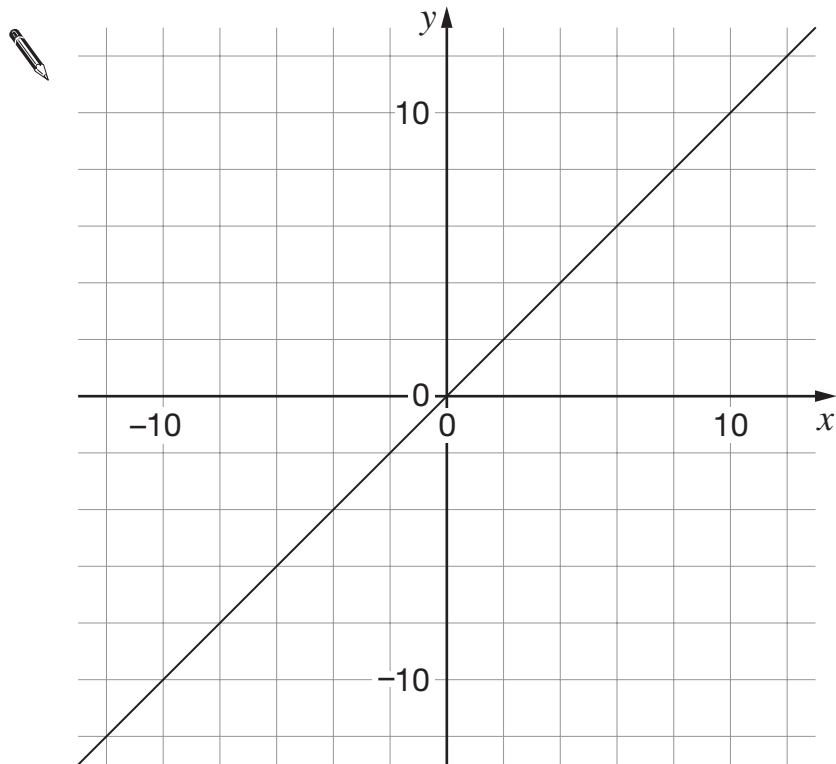
Work out the volume of the prism.

 \_\_\_\_\_  $\text{cm}^3$

1 mark



25. 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  $(0, \text{_____})$

\_\_\_\_\_ 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?



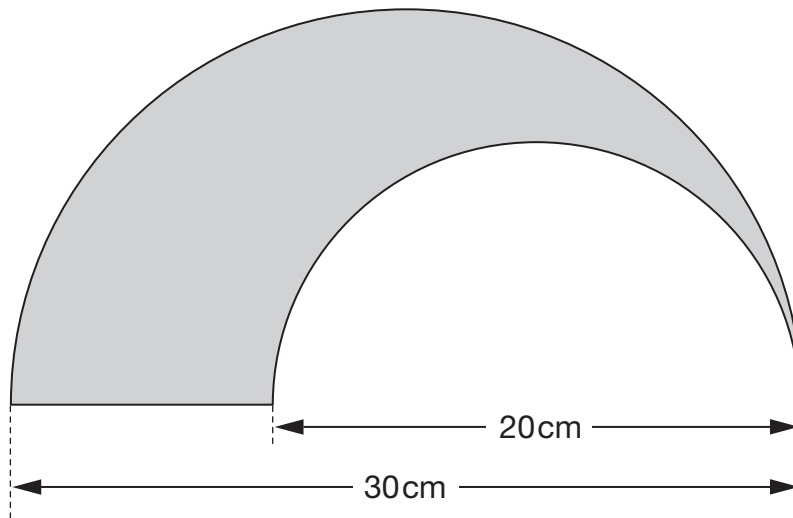
\_\_\_\_\_ 1 mark



26. 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



27. 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.



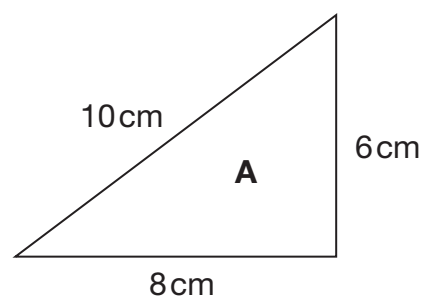
Class 9A

Class 9B

2 marks

28. The triangle in this question is not drawn accurately.

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



1 mark



**END OF TEST**