Ma

KEY STAGE
3

TIER
5–7

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



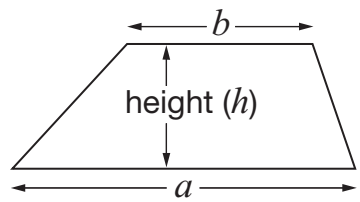
You **may** use a calculator to answer any question in this test.

Formulae

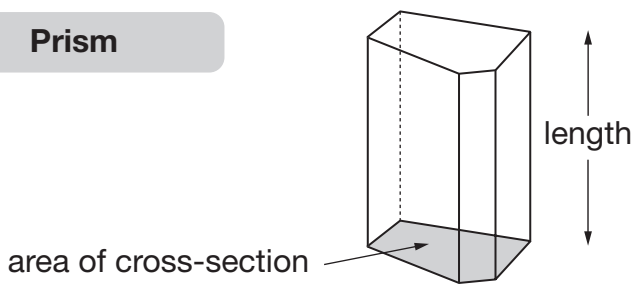
You might need to use these formulae

Trapezium

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

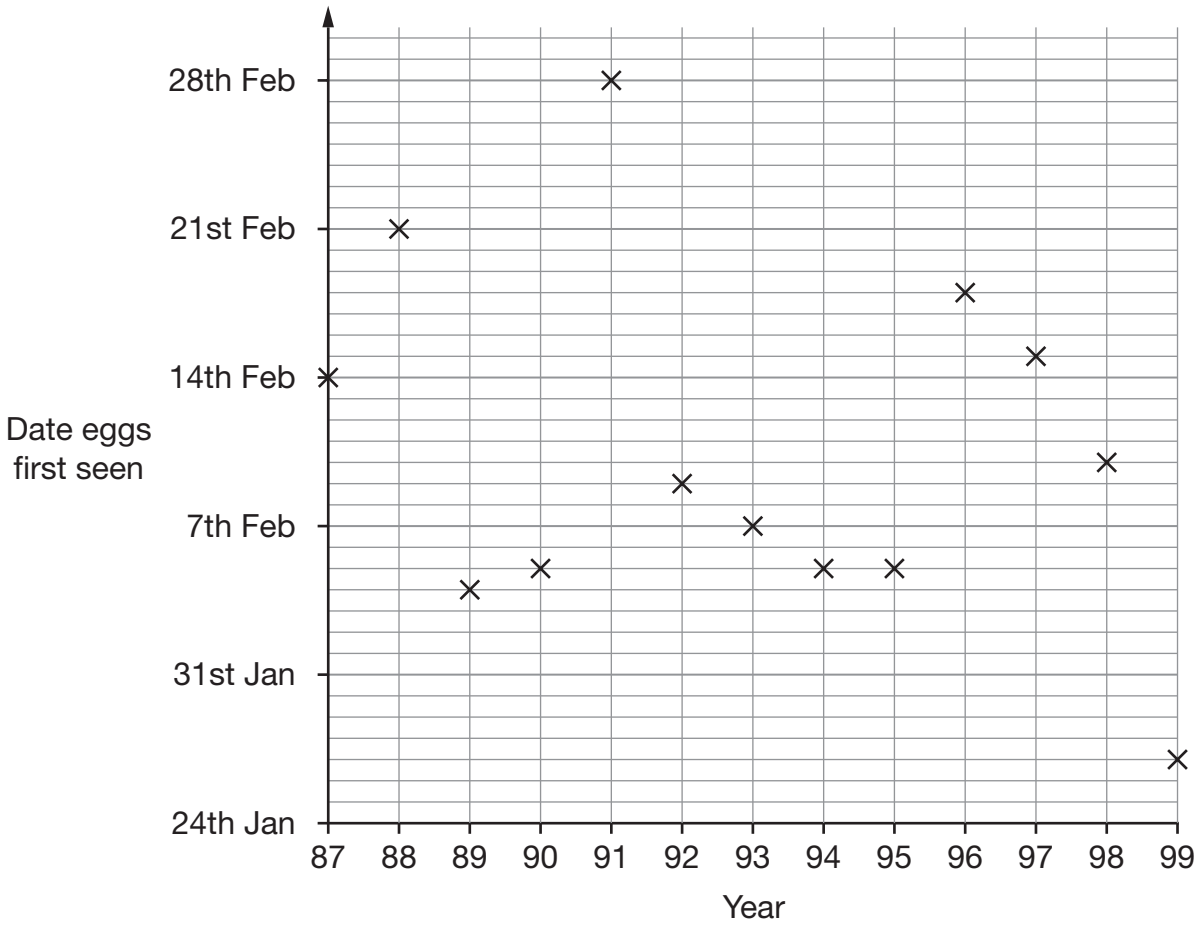


Prism



Volume = area of cross-section × length

1. 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

Source: British Wildlife, August 2000

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.



$7a$ $\quad$ $7 + a$ $\quad$ $2a + 5$

$4a + 3$ $\quad$ $4(a + 3)$

1 mark

(b) Here is a different expression.

$3b + 4 + 5b - 1$

Write this expression as simply as possible.



1 mark

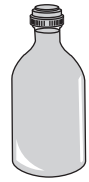
3. Here are two containers and the amounts they hold.

A



750 millilitres

B



0.5 litre

Not drawn accurately

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**.

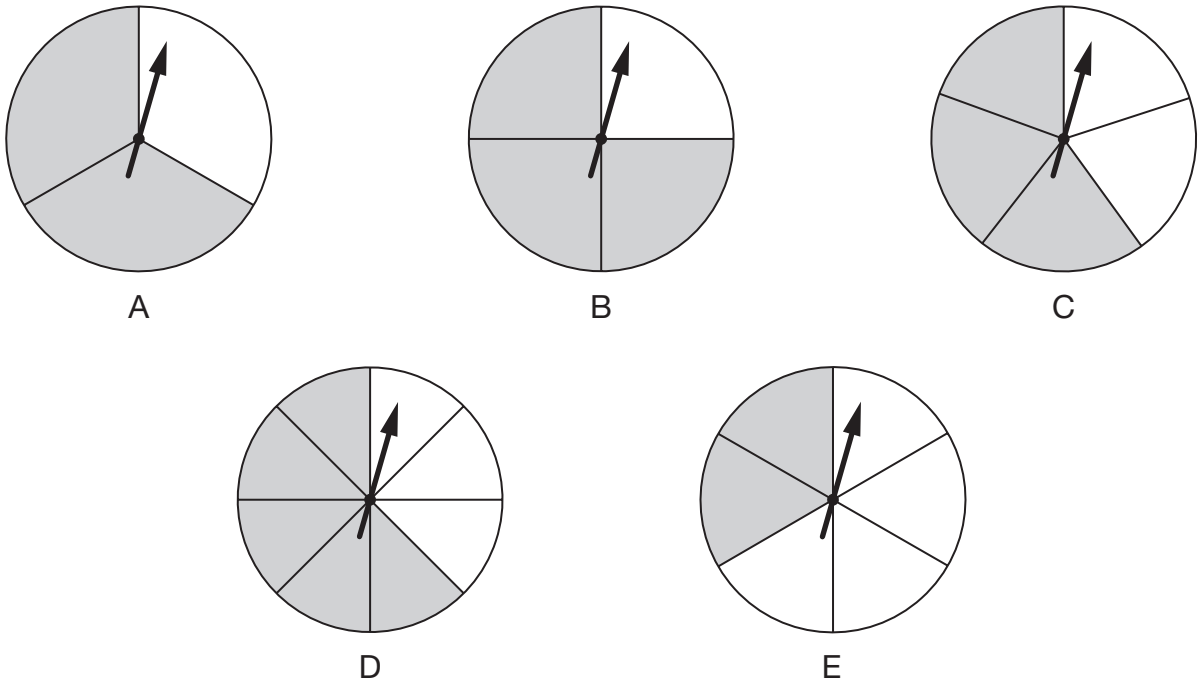
Write the sizes of the **angles** in this triangle.

_____ ° , _____ ° , _____ °

1 mark

5. The diagram shows five fair spinners with grey and white sectors.

Each spinner is divided into equal sectors.



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

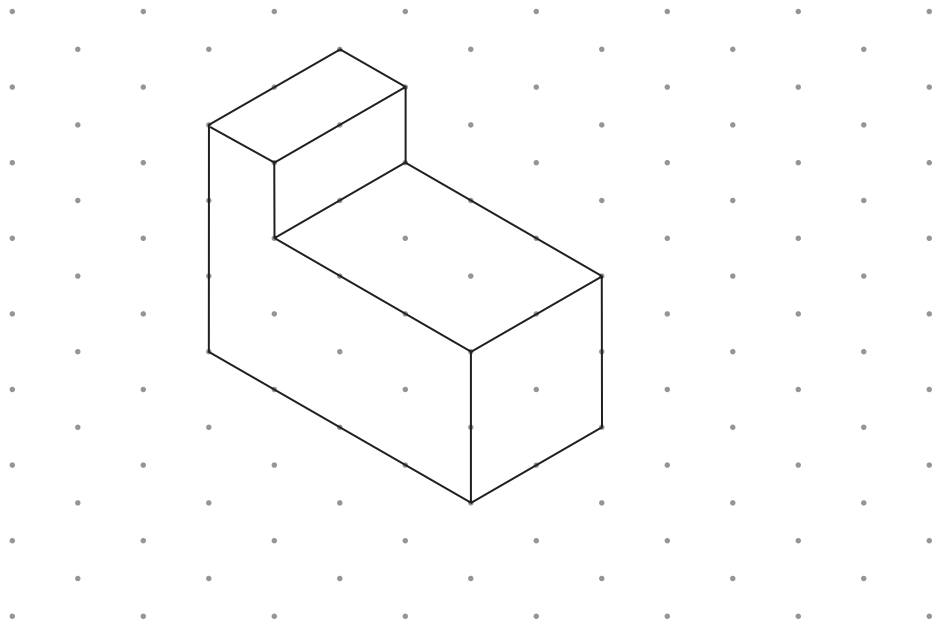
(b) For two of the spinners, the probability of spinning **grey** is **more than 60%** but **less than 70%**

Which two spinners are these? Write their letters.

_____ and _____

1 mark

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



Isometric grid

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

_____

1 mark

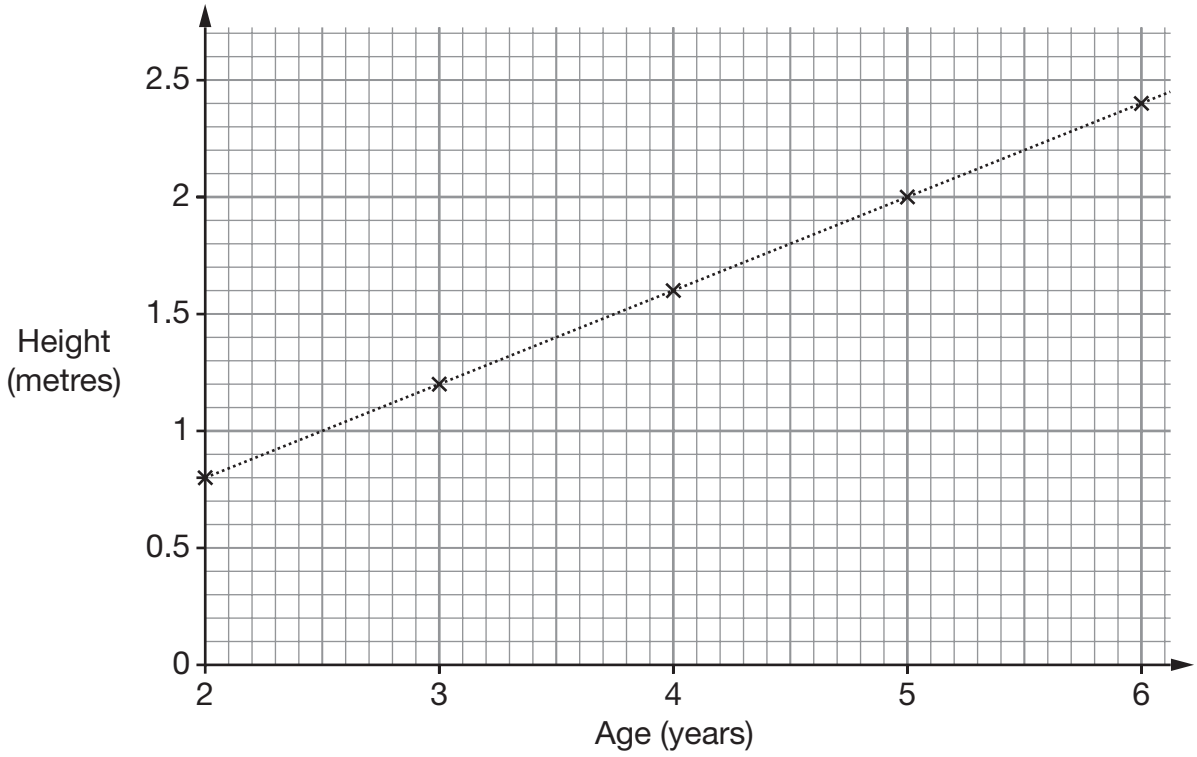
(b) Use the grid below to draw a solid with **6 faces**.



Isometric grid

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.

	120 cm to 159 cm	160 cm to 199 cm	200 cm to 239 cm
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

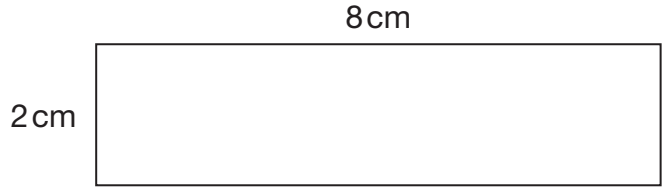
(b) One of these fir trees costs **£25.00**

How old is the tree likely to be?

Between _____ and _____ years old

1 mark

8. Here is a rectangle.



Not drawn accurately

(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

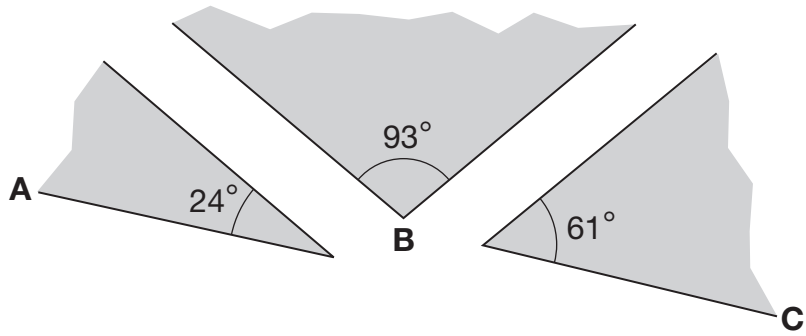
Kate pays more for her 24 cans than Steve pays for his 24 cans.

How much more?

_____ p

2 marks

10. Three shapes fit together at point B.



Not drawn accurately

Will ABC make a straight line?

☐ Yes ☐ No

Explain your answer.

1 mark

11. Solve these equations.

$32x + 53 = 501$

$x =$ _____

1 mark

$375 = 37 + 26y$

$y =$ _____

1 mark

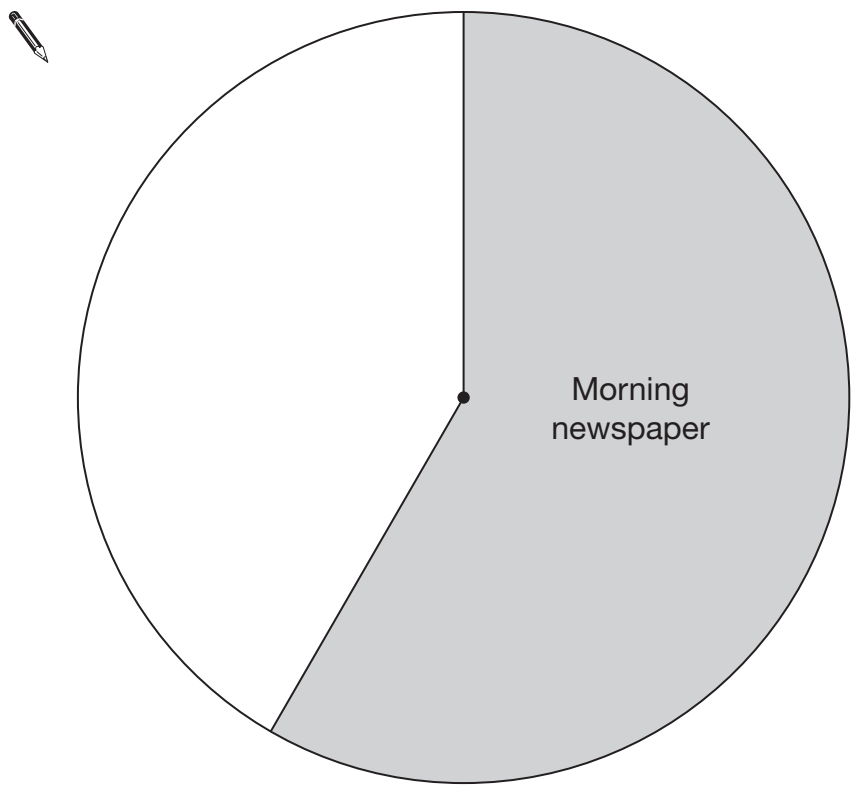
12. In a survey, 60 people were asked:

> 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.

$x = 4$	$y = 13$

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 $y =$ _____

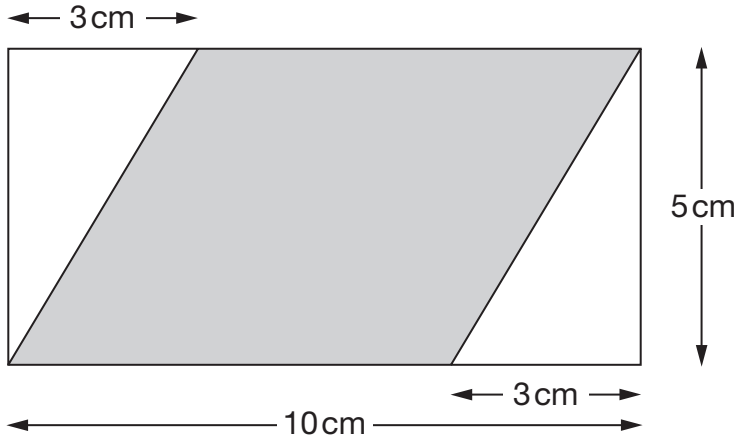
1 mark

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

This can be written as $y =$ _____

1 mark

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 π correct to 7 decimal places is:

3.1415927

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

1 mark

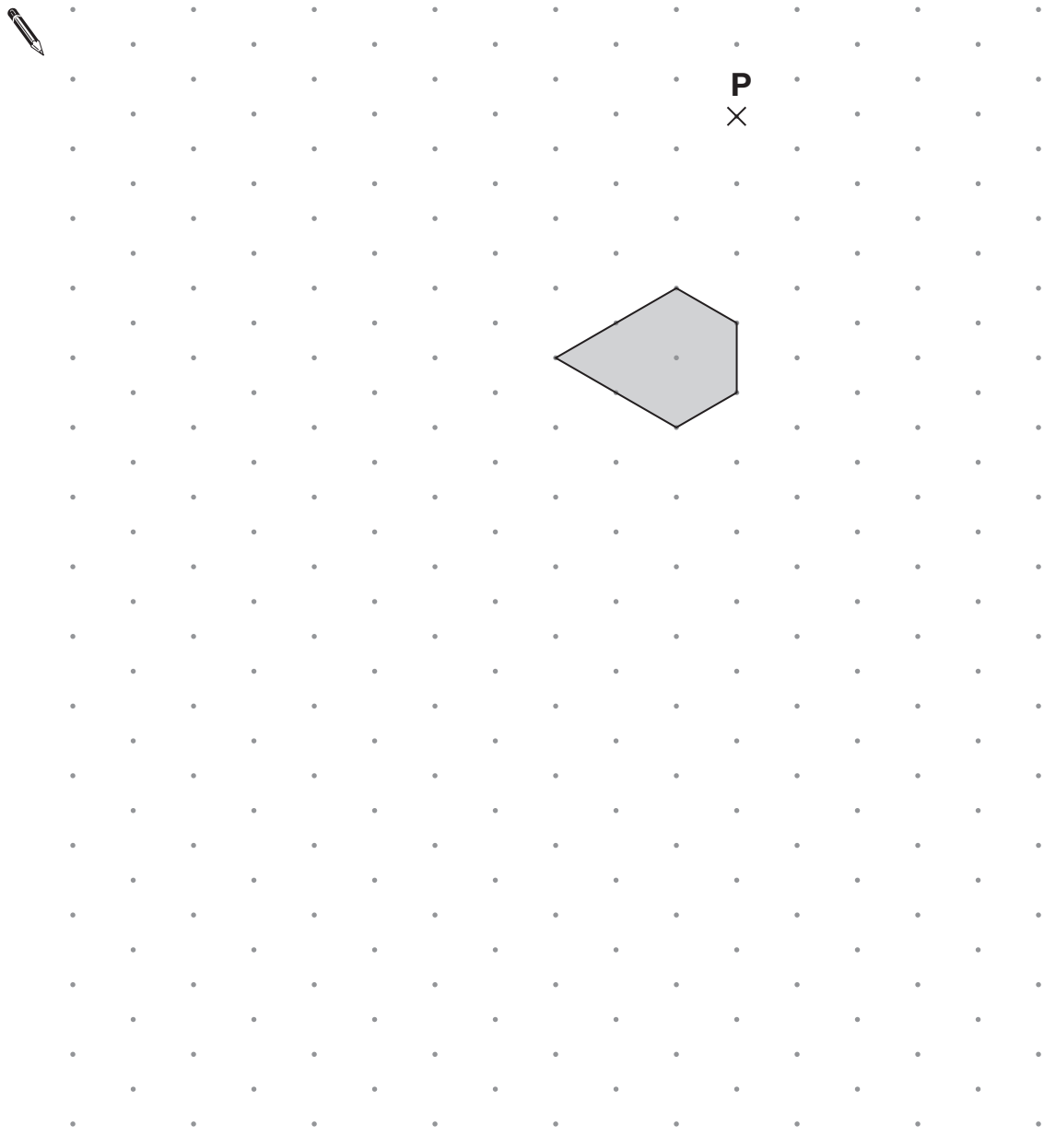
(b) Which value below is closest to the value of π?

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

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



2 marks

Isometric grid

18. (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

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 **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

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

She writes:

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

Show why Jenny is **wrong**.

1 mark

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

He writes:

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

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

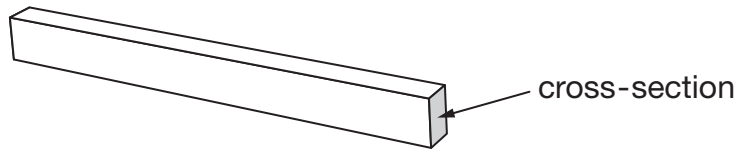
What is the probability that it will **not** choose a vowel?



2 marks

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

The cross-section of the beam is a rectangle.

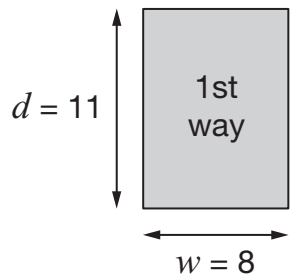


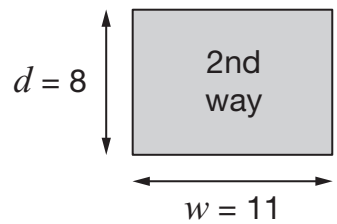
The formula below gives the greatest load, Mkg, that a beam of this length can support.

$M = 5d^2w$ 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

23. 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.

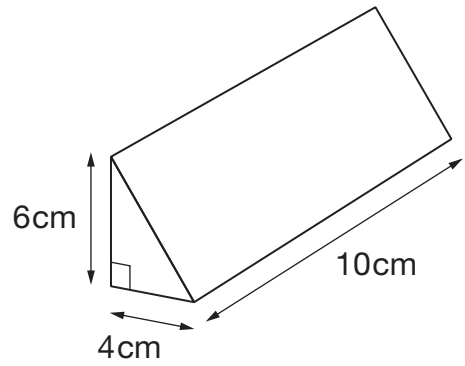
Number of £1 coins	**136**
Number of 50p coins	**208**

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

_____ %

3 marks

24. (a) Look at the triangular prism.



Not drawn accurately

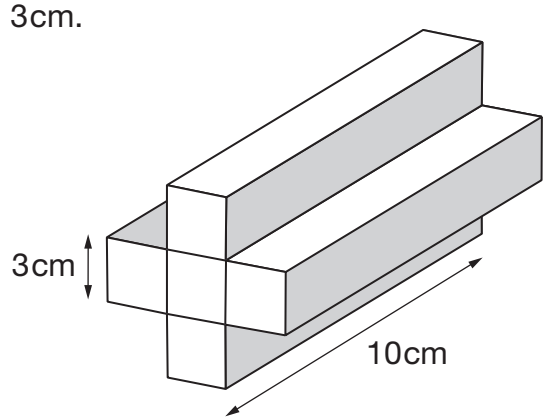
Work out the volume of the prism.

_____ cm^3

1 mark

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

Each square has side length 3cm.



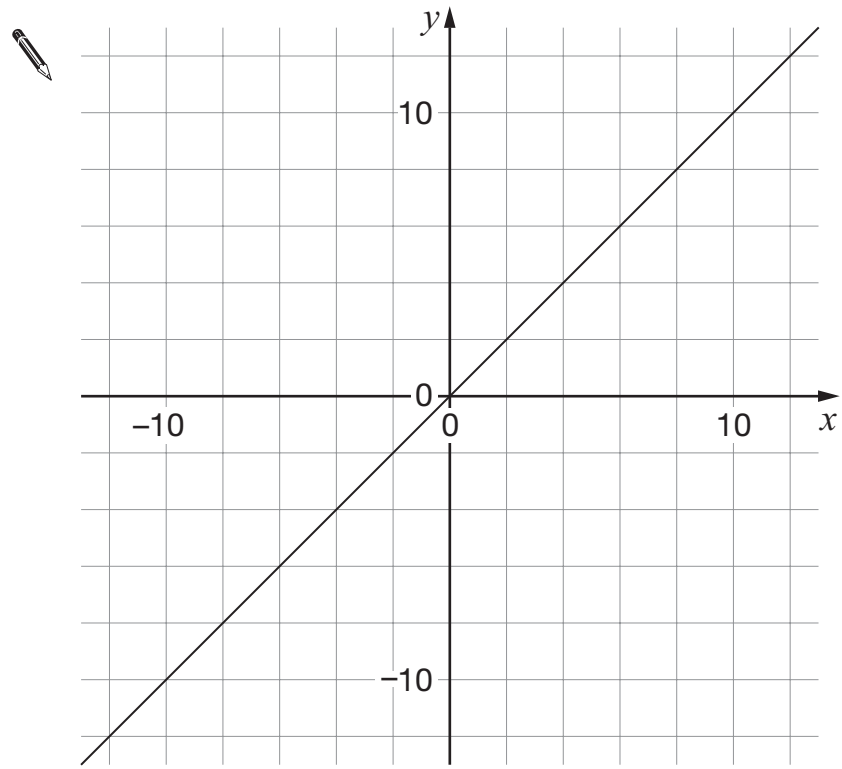
Not drawn accurately

Work out the volume of the prism.

_____ cm^3

1 mark

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, _____)

1 mark

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

It passes through the point (0, 10)

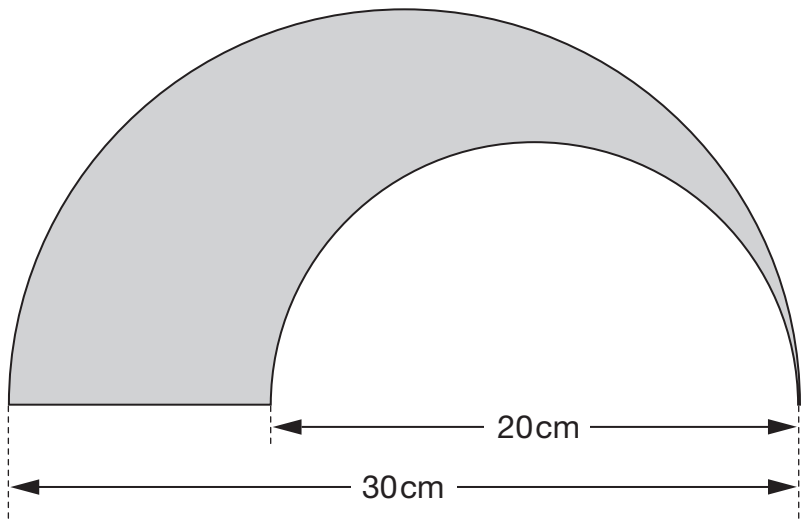
What is the equation of this straight line?

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.

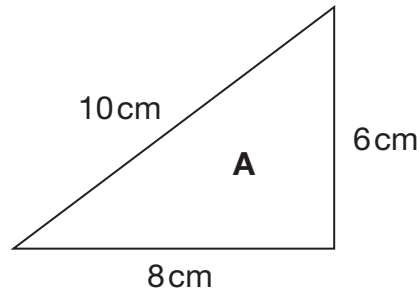
Tick (✓) your answer.

☐ 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

© Qualifications and Curriculum Authority 2007

QCA/06/2784 (Pupil pack)
QCA/06/2778 (Mark scheme pack)
275665