Ma

KEY STAGE
3

TIER
6–8

2008

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 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	

Instructions

Answers

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

Calculators

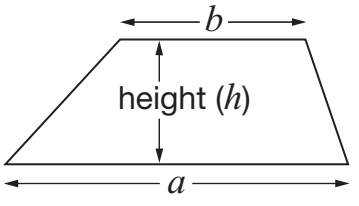
You **may** use a calculator to answer any question in this test.

Formulae

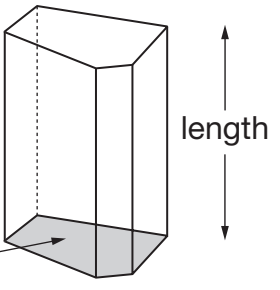
You might need to use these formulae

Trapezium

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



Prism



Volume = area of cross-section × length

1. (a) Look at the equation.

$$5x + 1 = 2x - 8$$

Complete the sentence below by ticking (✓) the correct box.

The value of x is …

- ☐ … one particular number.
- ☐ … any number less than zero.
- ☐ … any number greater than zero.
- ☐ … any whole number.
- ☐ … any number at all.

1 mark

(b) Now look at this equation.

$$y = 3x - 2$$

Complete the sentence below by ticking (✓) the correct box.

The value of x is …

- ☐ … one particular number.
- ☐ … any number less than zero.
- ☐ … any number greater than zero.
- ☐ … any whole number.
- ☐ … any number at all.

1 mark

2. Gita threw three darts.

Use the information in the box to work out what numbers she threw.

> The lowest number was 10
>
> The range was 10
>
> The mean was 15

Gita's numbers were _____, _____ and _____

1 mark

---

3. A cookery book shows this conversion table.

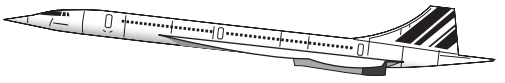
Mass in ounces	Mass in grams
1	25
2	50
3	75
4	110
5	150
10	275

Use the table to explain how you can tell the conversions **cannot all be exact**.

1 mark

4. Concorde could travel **1 mile every 3 seconds**.

How many miles per hour (mph) is that?



_____ mph

2 marks

5. In a bag, there are only red, white and yellow counters.

I am going to take a counter out of the bag at random.

> The probability that it will be **red** is **more than** $\frac{1}{4}$
>
> It is **twice as likely** to be **white** as **red**.

Give an example of how many counters of each colour there could be.

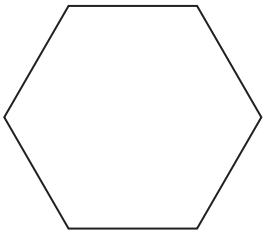
Write numbers in the sentence below.

There could be _____ red, _____ white and _____ yellow counters.

2 marks

6. (a) The **perimeter** of a regular hexagon is $42a + 18$

Write an expression for the length of **one** of its sides.



_____

1 mark

(b) The **perimeter** of a different regular polygon is $75b - 20$

The length of one of its sides is $15b - 4$

How many sides does this regular polygon have?

_____

1 mark

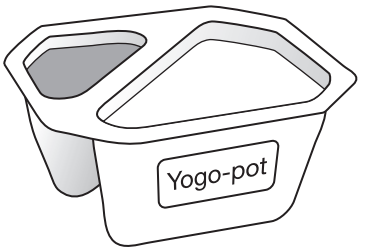
(c) The **perimeter** of a square is $4(c - 9)$

Find the perimeter of the square when $c = 15$

_____

1 mark

7. A dessert has both fruit and yoghurt inside.



Altogether, the mass of the fruit and yoghurt is **175g**.

The **ratio** of the mass of **fruit** to the mass of **yoghurt** is **2 : 5**

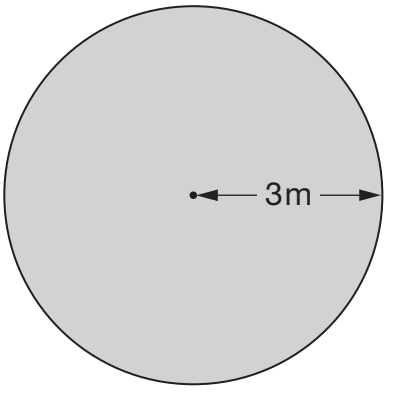
What is the mass of the yoghurt?

_____ g

2 marks

8. The diagram shows a plan of Luke's new lawn.

The lawn is a circle with radius 3m.



Work out the area of the lawn.

_____ m^2

2 marks

9. To find the nth triangular number, you can use this rule.

$$n\text{th triangular number} = \frac{n}{2}(n + 1)$$

Example: 3rd triangular number $= \frac{3}{2}(3 + 1)$

$= 6$

(a) Work out the **10th** triangular number.

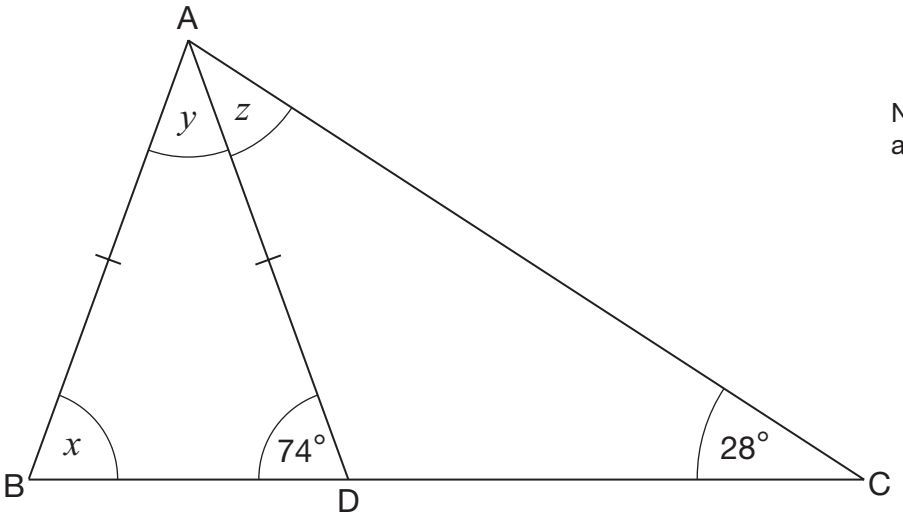
1 mark

(b) Now work out the **100th** triangular number.

1 mark

10. Look at triangle ABC.

ABD is an **isosceles** triangle where AB = AD.



Not drawn accurately

Work out the sizes of angles x, y and z

Give reasons for your answers.

x = _____ ° because _____

_____

y = _____ ° because _____

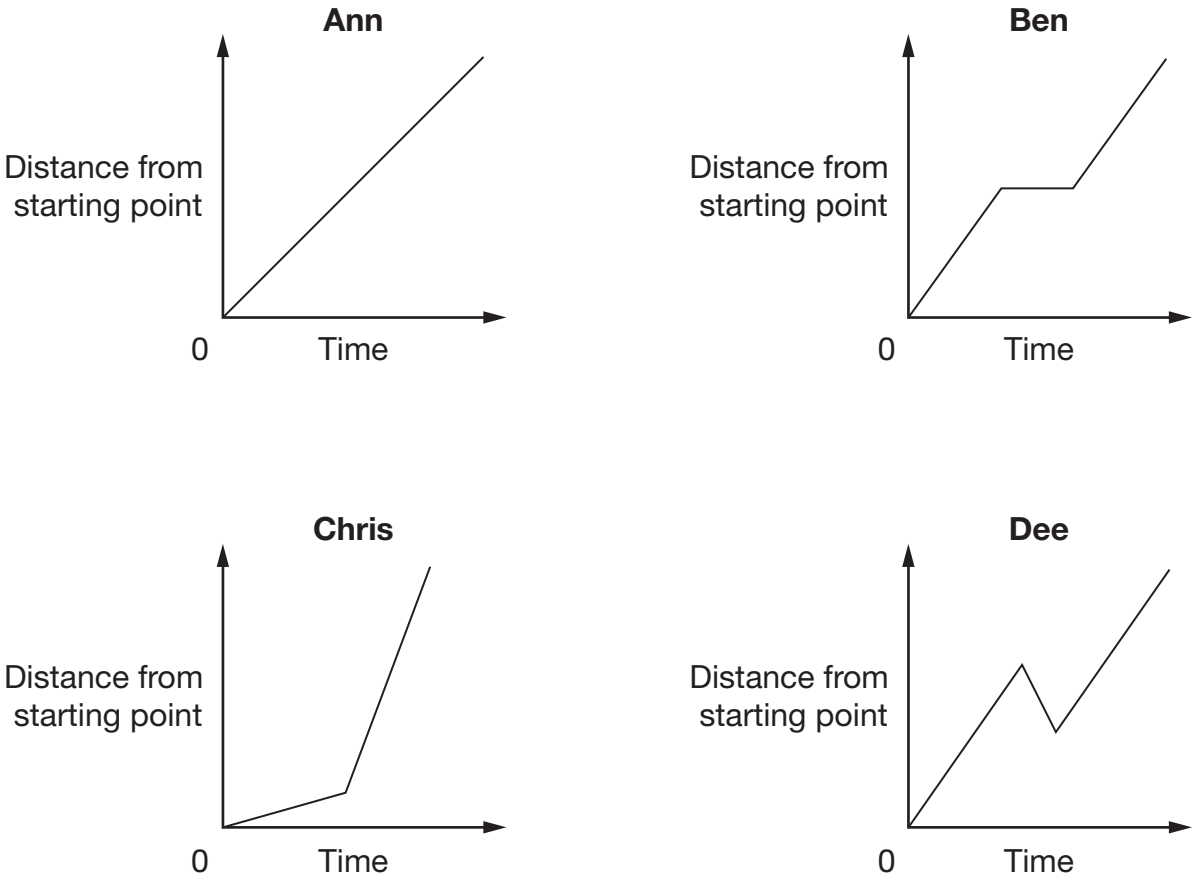
_____

z = _____ ° because _____

_____

2 marks

11. (a) The graphs show information about the different journeys of four people.



Write the correct names next to the journey descriptions in the table below.

Name	Journey description
	This person walked slowly and then ran at a constant speed.
	This person walked at a constant speed but turned back for a while before continuing.
	This person walked at a constant speed without stopping or turning back.
	This person walked at a constant speed but stopped for a while in the middle.

1 mark

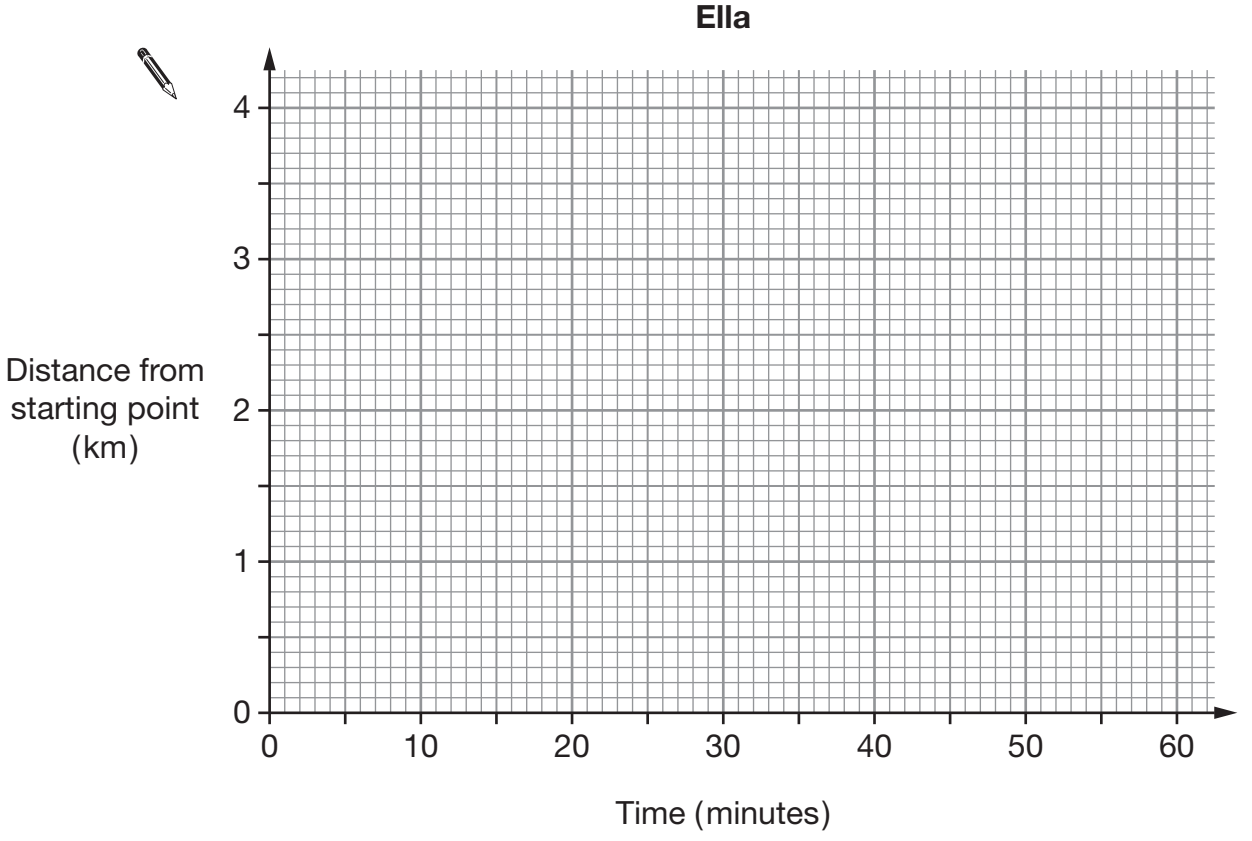
(b) Ella made a different journey of **4km**.

She walked to a place 4km away from her starting point.

Here is the description of her journey.

> For the first 15 minutes she walked at 4km per hour.
>
> For the next 15 minutes she walked at 2km per hour.
>
> For the last 30 minutes she walked at a constant speed.

Show Ella's journey **accurately** on the graph below.



2 marks

(c) For the last 30 minutes of her journey, what was Ella's speed?

_____ km per hour

1 mark

12. A shop has this special offer.

> Reduction of 10% when your bill is between £50 and £100
> Reduction of 20% when your bill is more than £100

Before the reductions, Marie's bill is **£96** and Richard's bill is **£108**

After the reductions, who paid more?

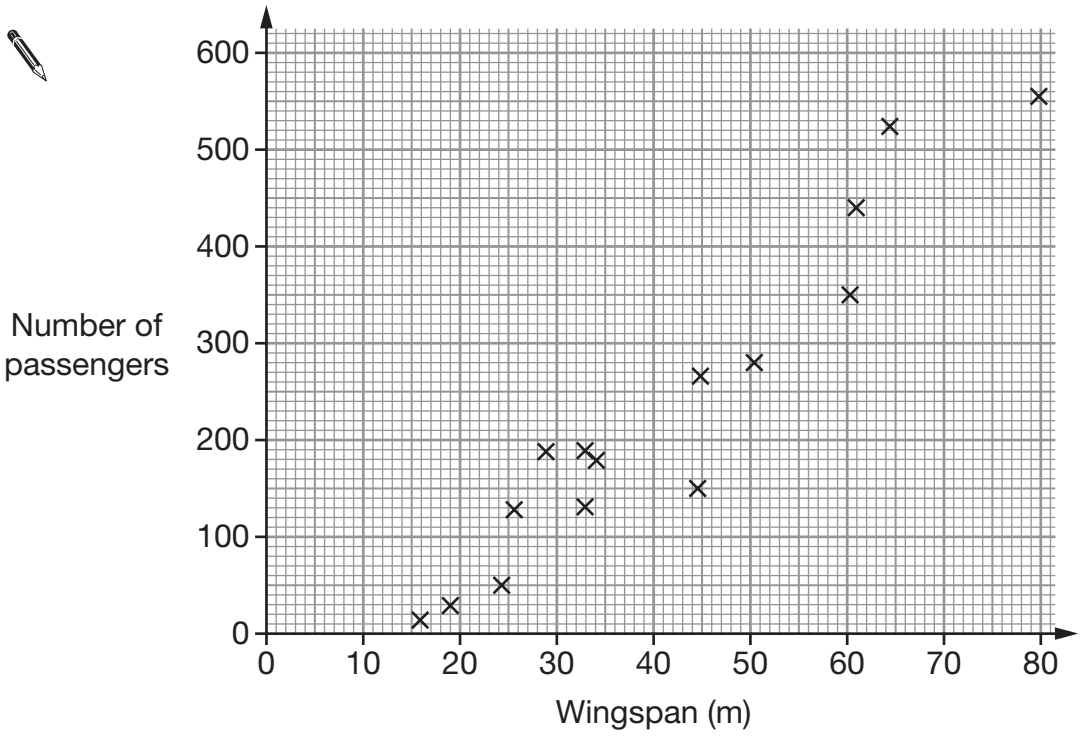
You **must** show working to explain your answer.

Tick (✓) the correct answer.

☐ Marie ☐ Richard ☐ Both paid the same

2 marks

13. The scatter graph shows the maximum number of passengers plotted against the wingspans of some passenger planes.



(a) What type of correlation does the scatter graph show?

_____

1 mark

(b) Draw a **line of best fit** on the scatter graph.

1 mark

(c) Another passenger plane has a **wingspan** of **40 m**. The plane is full of passengers.

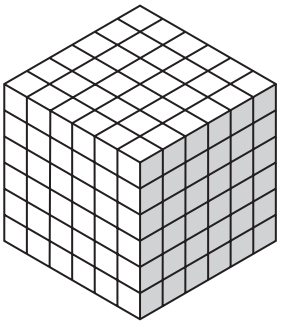
If each passenger takes **20 kg** of bags onto the plane, estimate how much their bags would weigh altogether.

_____ kg

2 marks

14. Kaylee has some 1cm cubes.

She makes a solid cube with side length **6cm** out of the cubes.



Not drawn accurately

Then she uses all these cubes to make some cubes with side length **2cm**.

How many of these **2cm** cubes can Kaylee make?

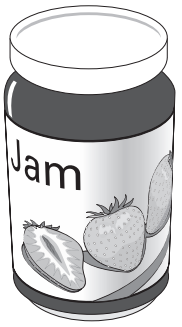
_____

_____

2 marks

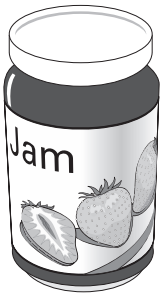
15. You can buy jars of the same jam in two sizes.

A



454g for £1.59

B



340g for £1.25

Which jar is better value for money?

You **must** show working to explain your answer.

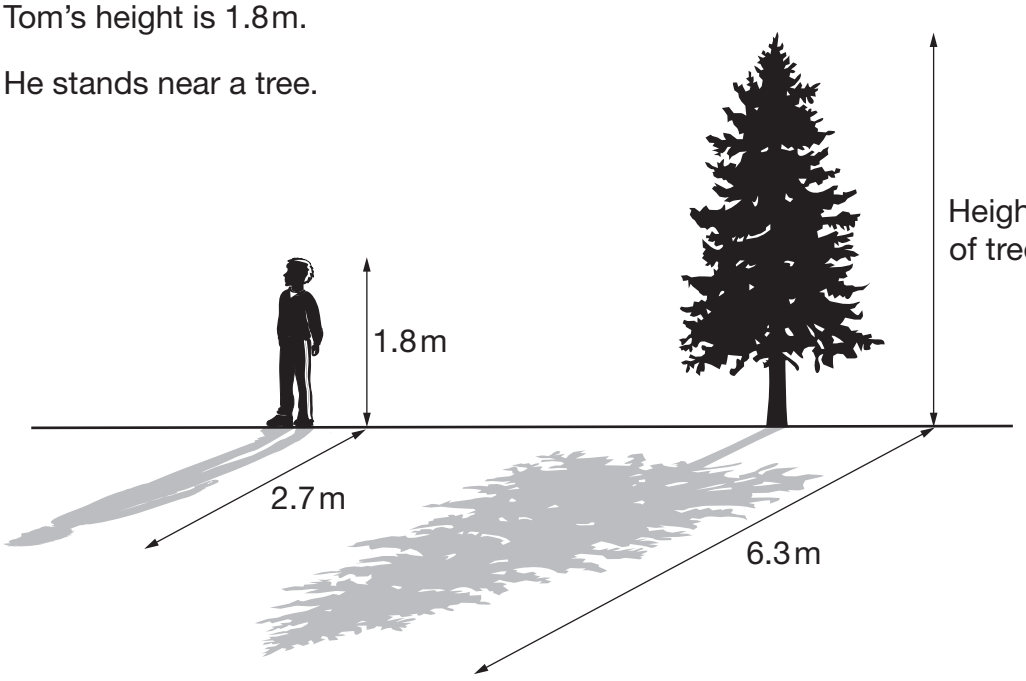
Tick (✓) your answer.

☐ A ☐ B

2 marks

16. Tom's height is 1.8m.

He stands near a tree.



Not drawn accurately

At 4pm, the length of Tom's shadow is 2.7m.

At 4pm, the length of the tree's shadow is 6.3m.

What is the height of the tree?

m

2 marks

17. Here are the nth term expressions for three different sequences.

Sequence A	Sequence B	Sequence C
$2^{(n-1)}$	$\frac{n^2 - n + 2}{2}$	$\frac{n(n^2 - 3n + 8)}{6}$

The first three terms of each sequence are 1, 2 and 4

What is the **4th term** of each sequence?

You **must** show your working.

Sequence A _____

Sequence B _____ _____

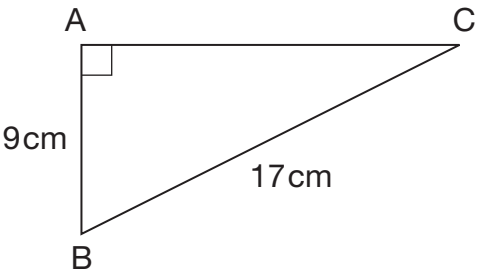
_____

Sequence C _____ _____

3 marks

18. (a) Look at this triangle.

Work out length AC.



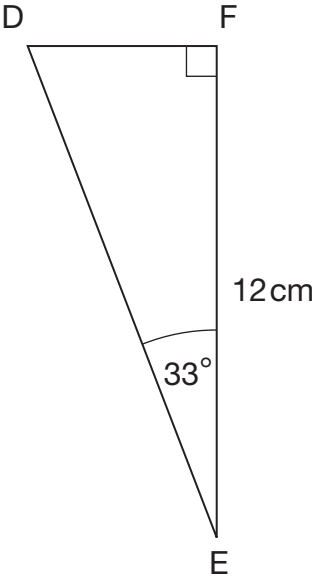
Not drawn accurately

AC = _____ cm

2 marks

(b) Look at this triangle.

Work out length DF.

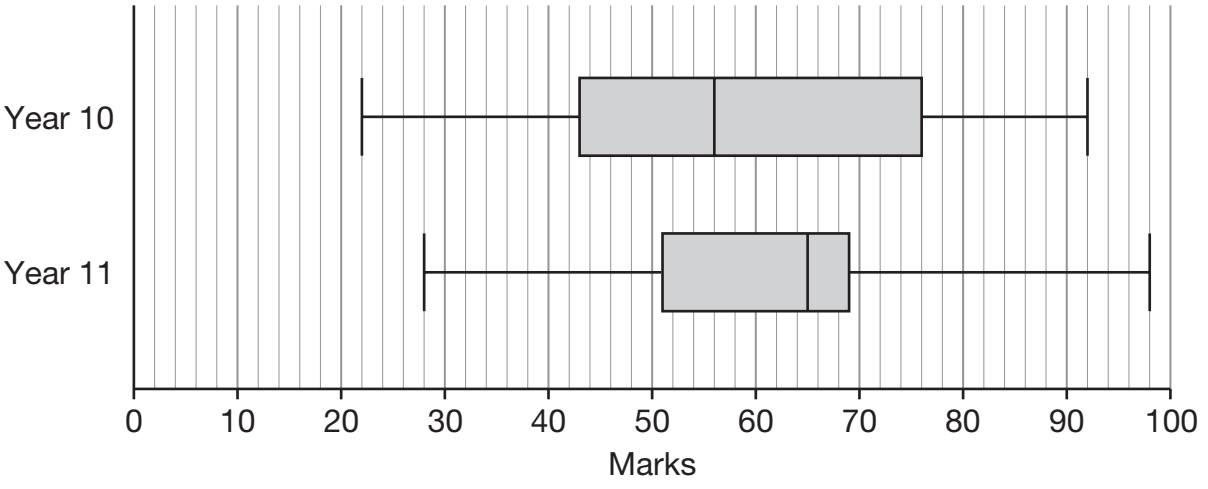


Not drawn accurately

DF = _____ cm

2 marks

19. The box plots show the marks in a test for pupils in Year 10 and Year 11.



(a) The **lowest** mark in Year 11 was greater than the lowest mark in Year 10.

How much greater?

_____ marks

1 mark

(b) Show that the **median** mark in Year 11 is **9 marks greater** than the median mark in Year 10.

1 mark

(c) The teacher says:

> The marks were **more consistent** in Year 11 than in Year 10.

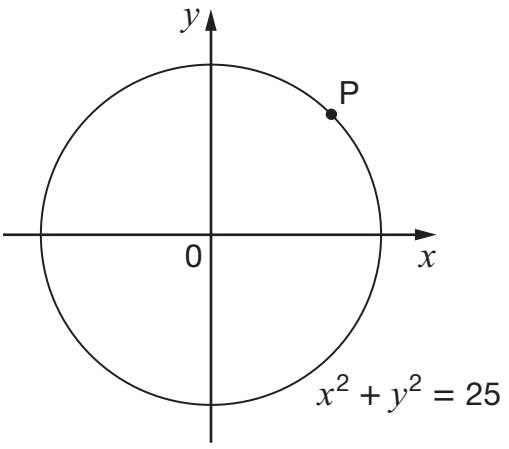
Do you agree?

☐ Yes ☐ No

Explain your answer.

1 mark

20. The graph shows a circle with centre (0, 0)



The circle has the equation:

$$x^2 + y^2 = 25$$

(a) There are two points on the circumference of the circle with an ***x*-coordinate of 3**

Complete the coordinates of these two points.

(3, _____) and (3, _____)

2 marks

(b) What is the **radius** of the circle?

_____

1 mark

(c) Point P is on the circumference of the circle.

Its x-coordinate is **equal** to its y-coordinate.

What are the coordinates of point P, correct to **1 decimal place**?

P is (_____ , _____)

2 marks

21. In 1988 there was a survey of giant pandas seen in the wild in China.

In 2004 the survey was repeated. There was a **40% increase**.

The table shows some of the results.

Year	Approximate number of giant pandas seen
1988	x
2004	1600

40% increase

About x giant pandas were seen in 1988.

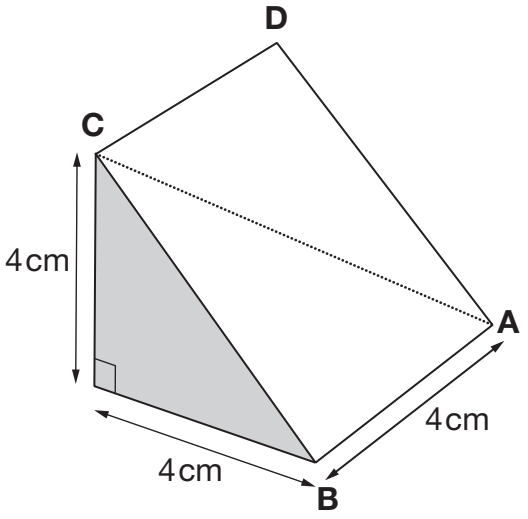
Work out the value of x and give your answer to the **nearest 100**

$x =$ _____

2 marks

22. A cube is cut through four of its vertices, A, B, C and D, into two identical pieces.

The diagram below shows one of the pieces.



Not drawn accurately

Find the length of the line **AC**.

_____ cm

3 marks

23. A teacher has number cards, numbered from 1 to n

The teacher says:

> I have $\boldsymbol{n}$ number cards, numbered from **1 to $\boldsymbol{n}$**
>
> $\frac{\mathbf{1}}{\mathbf{5}}$ of the cards show **square numbers**.

What could the value of $\boldsymbol{n}$ be?

There are three possible answers. Give them all.

$n =$ _____

or $n =$ _____

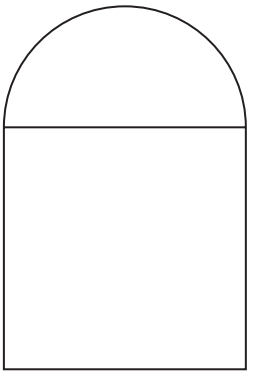
or $n =$ _____

2 marks

PLEASE TURN OVER

24. A window is made with two pieces of glass.

One piece is a square, the other is a semicircle.



Not drawn accurately

The area of the square is **1m^2**

What is the area of the semicircle?

Give your answer in **cm^2** to the **nearest whole number**.

_____ cm^2

3 marks

END OF TEST

QCA/08/3294 (Pupil pack)
QCA/08/3286 (Mark scheme pack) 282674