Ma

KEY STAGE 3

TIER 5–7

Year 9 mathematics test

Paper 1

Calculator **not** allowed

First name _____

Last name _____

Class _____

Date _____

Please read this page, but do not open your booklet until your teacher tells you to start. Write your name, the name of your class and the date in the spaces above.

Remember:

- The test is 1 hour long.
- You **must not** use a calculator for any question in this test.
- You will need: pen, pencil, rubber and a ruler.
- 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 marking use only	Total marks	

Instructions

Answers

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

Calculators

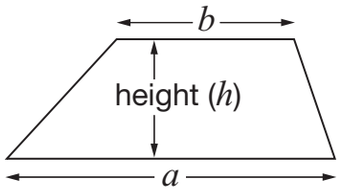
You **must not** use a calculator to answer any question in this test.

Formulae

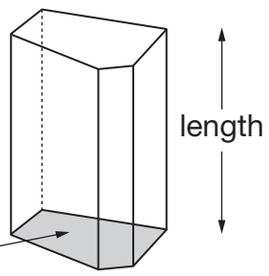
You might need to use these formulae

Trapezium

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

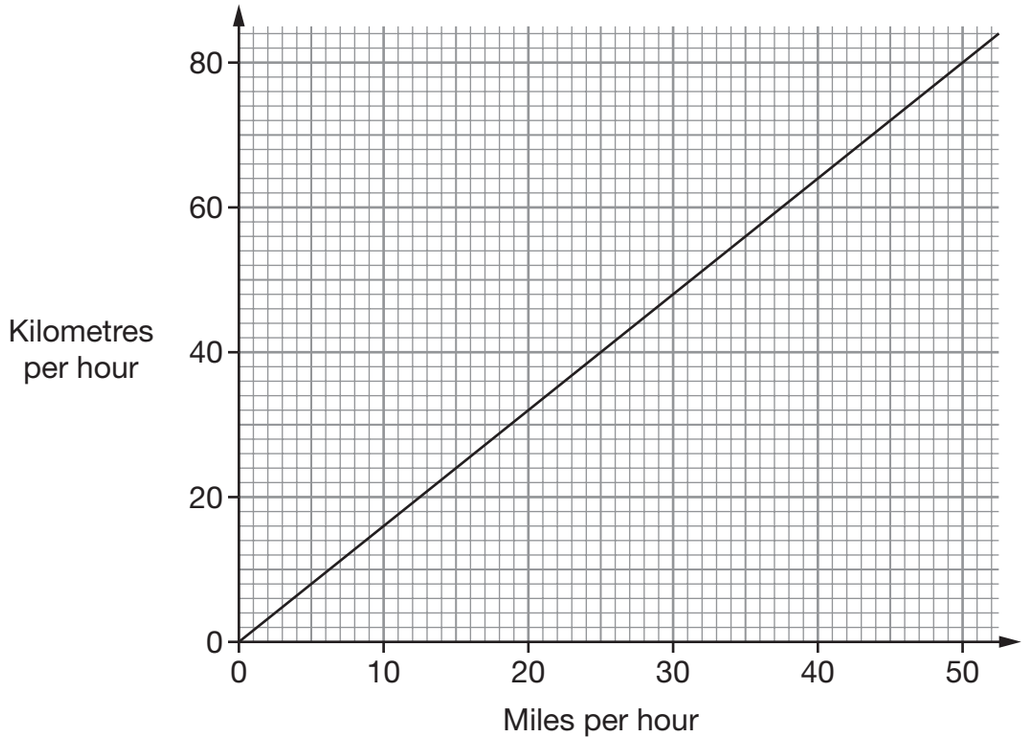


Prism



Volume = area of cross-section × length

1. The graph shows the relationship between miles per hour and kilometres per hour.



Use the graph to write the missing numbers in the sentences below.

In England, the speed limit in towns is

30 miles per hour, which is _____ kilometres per hour.

1 mark

In a different country, the speed limit in towns is

70 kilometres per hour, which is _____ miles per hour.

1 mark

2. (a) Work out the answer.

2 + (16 ÷ 2) + 6 = _____

1 mark

(b) Put brackets in the calculation below to make it correct.

2 + 16 ÷ 2 + 6 = 4

1 mark

3. Here is part of a train timetable.

Paddington	07 45	13 35
Redruth	12 47	_____

(a) How long is the journey time from Paddington to Redruth on the 07 45 train?

_____ hours and _____ minutes

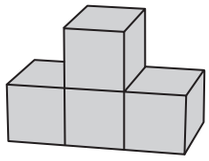
1 mark

(b) The 13 35 train from Paddington takes 4 hours 26 minutes to travel to Redruth.

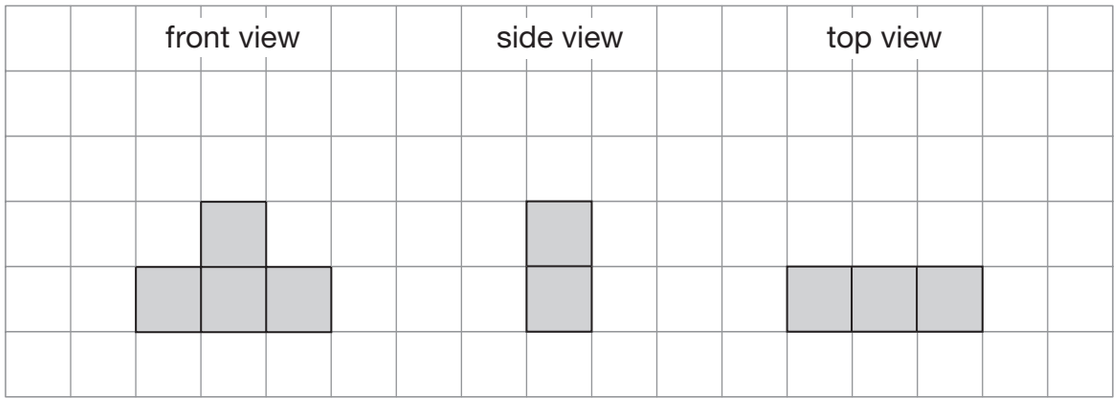
Write the missing time in the timetable.

1 mark

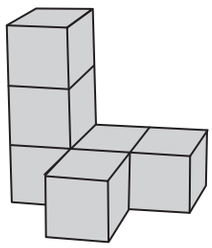
4. Alison builds a shape with some cubes.



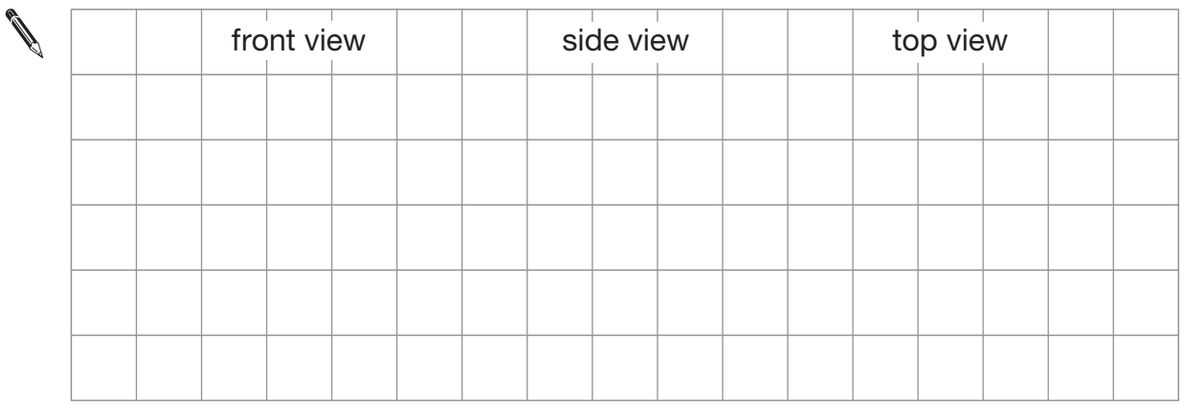
These are the front view, side view and top view of her shape.



Tariq builds a different shape with some cubes.



Draw the front view, side view and top view of his shape.



2 marks

5. (a) When $y = 1$, which expression below has the **largest value**?

Put a ring round it.

$3 + y$ $\quad$ $10 - y$ $\quad$ y^2

$3y$ $\quad$ $\frac{y}{2}$

1 mark

(b) When $y = 4$, which expression below has the **largest value**?

Put a ring round it.

$3 + y$ $\quad$ $10 - y$ $\quad$ y^2

$3y$ $\quad$ $\frac{y}{2}$

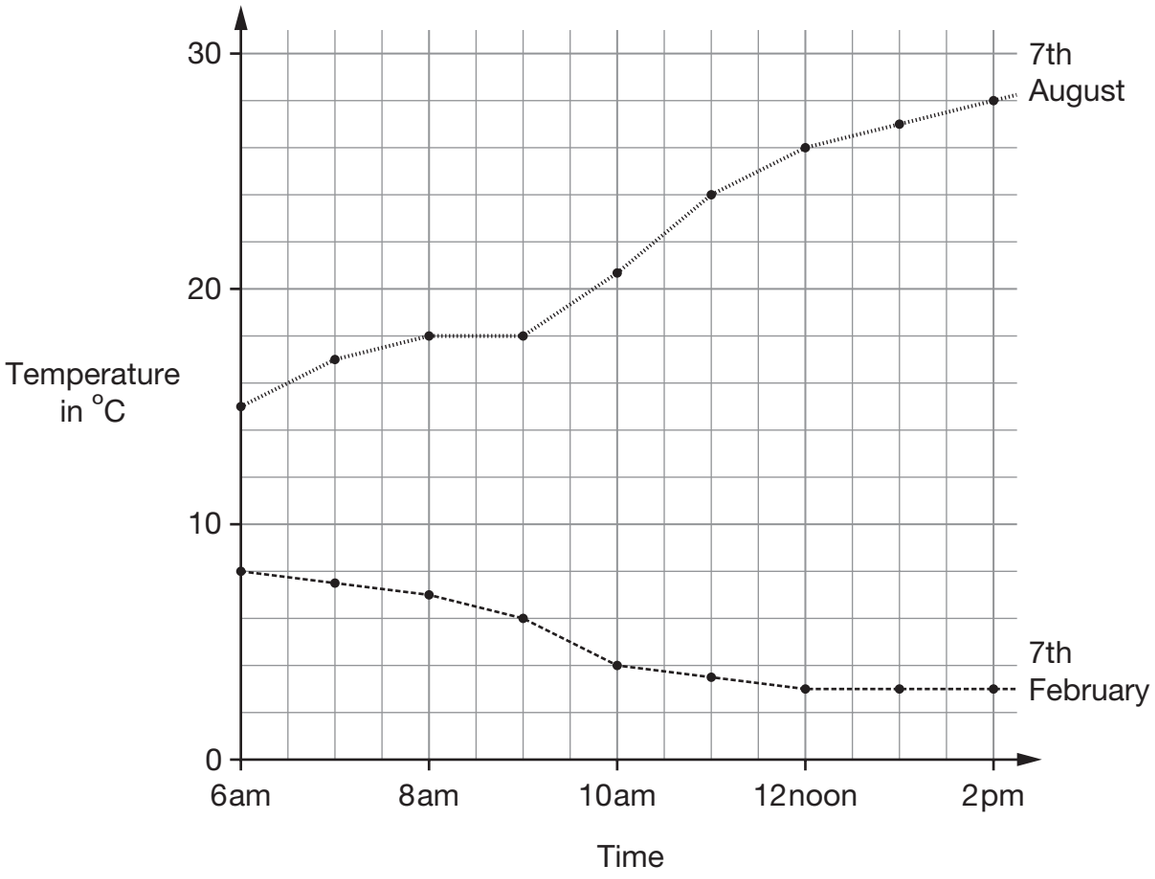
1 mark

(c) Write a number to make the sentence below true.

When $y =$ _____, the expression $3 + y$ has a **larger value** than the expression $3y$

1 mark

6. The graph shows the temperature in a town between 6am and 2pm on 7th February and 7th August one year.



(a) Estimate as accurately as you can the time when the temperature reached 20°C on 7th August.

_____ am

1 mark

(b) What was the difference between the temperatures at 12 noon on the two days?

_____ °C

1 mark

(c) On 7th February between 6am and 2pm the temperature dropped.

How many degrees did the temperature drop?

_____ °C

1 mark

7. In 2005, about 60.2 million people lived in the UK.

Look at the information about these people.

- 50.4 million lived in England.
- 5.1 million lived in Scotland.
- 3 million lived in Wales.
- The rest lived in Northern Ireland.

(a) In 2005, about how many people lived in Northern Ireland?

million

1 mark

(b) In 2005, about what percentage of people in the UK lived in Wales?

Tick (✓) the correct value.

☐ 1% ☐ 5% ☐ 20% ☐ 63%

1 mark

8. (a) What number is halfway between **–2** and **6**?

_____

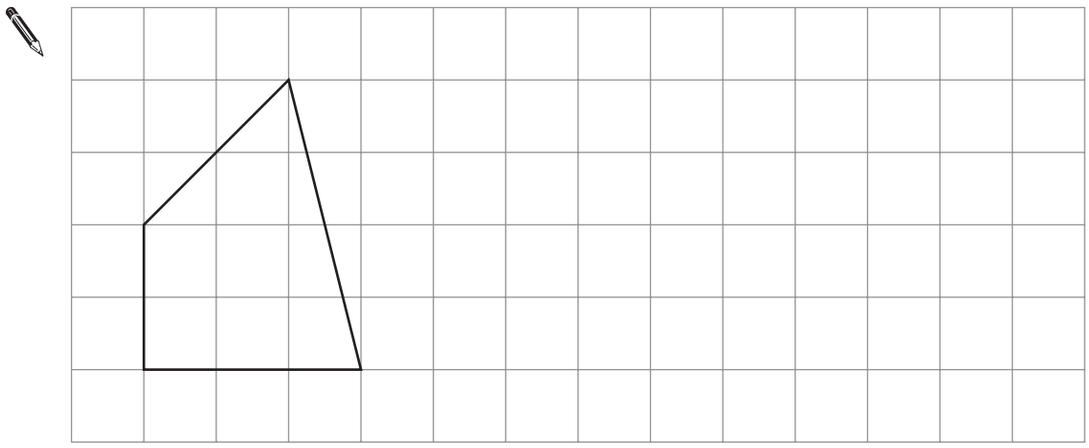
1 mark

(b) Complete the sentence.

–10 is halfway between _____ and **8**

1 mark

9. Here is a quadrilateral drawn on a square grid.



2 marks

On the same grid, draw a **different quadrilateral** which has the **same area**.

10. Look at the equation.

$$14n = 98$$

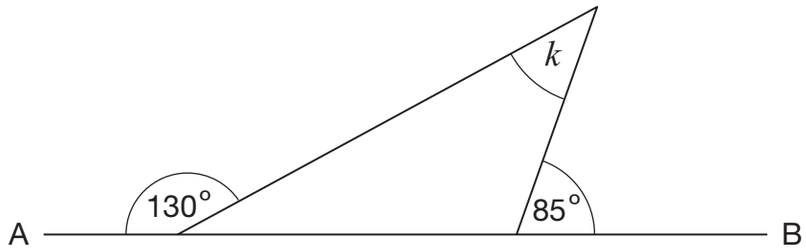
(a) Work out the value of **140*n***

1 mark

(b) Work out the value of **14(*n* + 1)**

1 mark

11. Look at the diagram.



Not drawn accurately

AB is a straight line.

Work out the size of angle k

$k =$ _____ °

2 marks

12. Look at the sequence below.

To get the next term in the sequence, **subtract 90** from the term before.

500 410 320 …

Write the first two terms of the sequence that are **less than zero**.

_____ , _____

2 marks

13. (a) Look at this information.

$$x \leq 0$$

Give an example of what the value of x could be.

Give a **different** example of what the value of x could be.

1 mark

(b) Now look at this information.

$$2y + 3 \leq 11$$

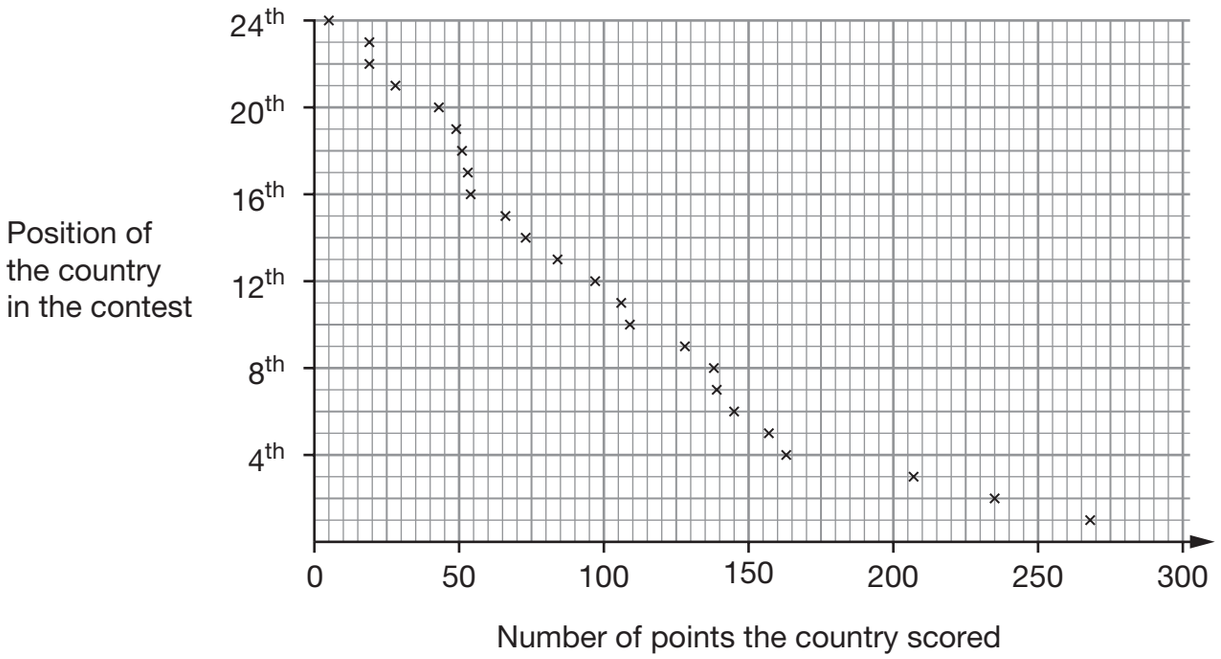
What is the **largest** value that y could be?

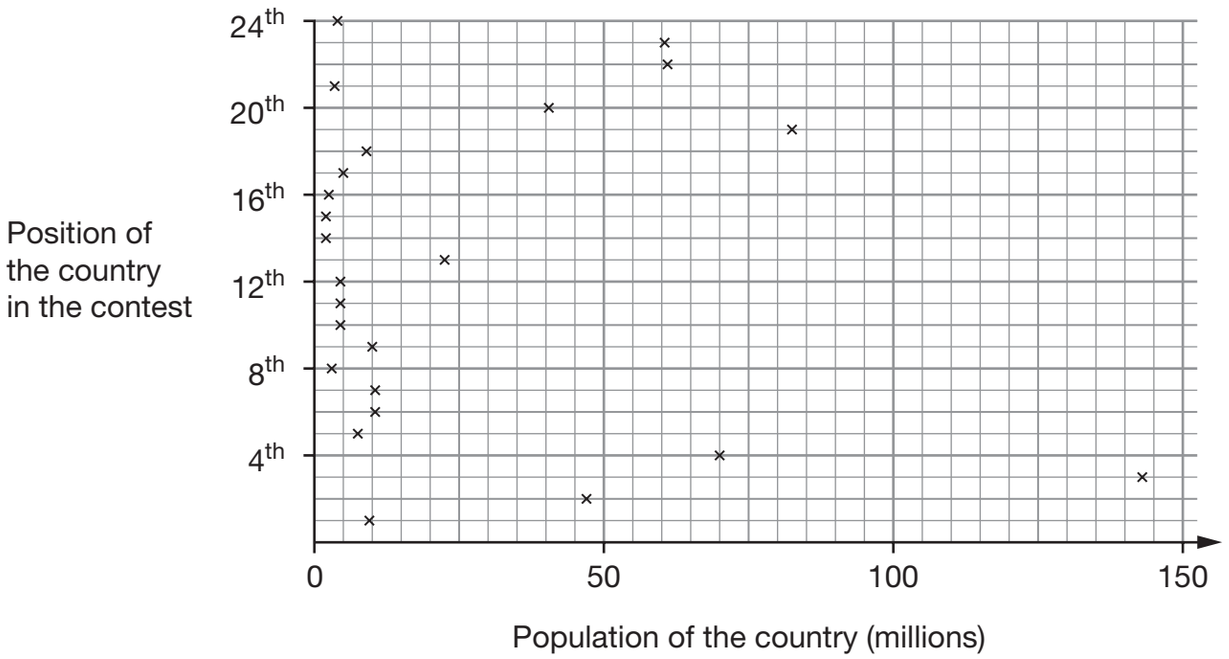
1 mark

14. Each year a song contest is held in Europe.

The country with the greatest number of points wins.

The scatter graphs show information about the contest in 2007.





Use the graphs to answer these questions.

(a) About how many points did the winning country score?

_____ 1 mark

(b) How many countries scored **fewer than 60** points?

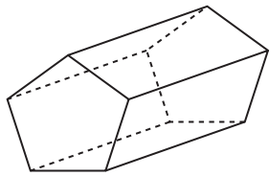
_____ 1 mark

(c) What is the population of the country that scored **84** points?

_____ million 1 mark

15. The table shows information about a **pentagonal** prism.

	Pentagonal prism
Number of **vertices**	10
Number of **rectangular faces**	5
Total number of **faces**	7



Pentagonal prism

(a) Complete the table to show information about a **triangular** prism.

	Triangular prism
Number of **vertices**	
Number of **rectangular faces**	
Total number of **faces**	

1 mark

(b) Complete the table.

	_____ prism	_____ prism
Number of **vertices**	12	
Number of **rectangular faces**	6	
Total number of **faces**	8	10

3 marks

16. Write numbers in the boxes so that the fractions are in size order.

$\frac{1}{4}$ $\quad$ $\frac{\square}{7}$ $\quad$ $\frac{1}{\square}$ $\quad$ $\frac{3}{5}$ $\quad$ $\frac{2}{\square}$

2 marks

17. (a) I **add** the expressions $\boldsymbol{n}$ and $\boldsymbol{n + 2}$

Put a ring round the expression that shows the result.

$2n$ $\qquad$ $4n$ $\qquad$ $n(n + 2)$

$n^2 + 2$ $\qquad$ $2n + 2$

1 mark

(b) Now I **multiply** the expressions $\boldsymbol{n}$ and $\boldsymbol{n + 2}$

Put a ring round the expression that shows the result.

$2n$ $\qquad$ $4n$ $\qquad$ $n(n + 2)$

$n^2 + 2$ $\qquad$ $2n + 2$

1 mark

18. Jerry has a bag of counters.

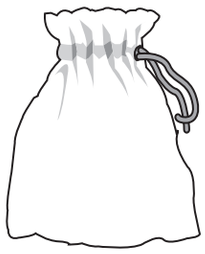
Inside his bag are

2 blue,

4 green,

5 red, and

9 yellow counters



Jerry is going to take a counter at random from his bag.

Write the correct **colours** to complete these sentences.

The probability that it will be _____ is **0.2**

The probability that it will **not** be _____ is $\frac{3}{4}$

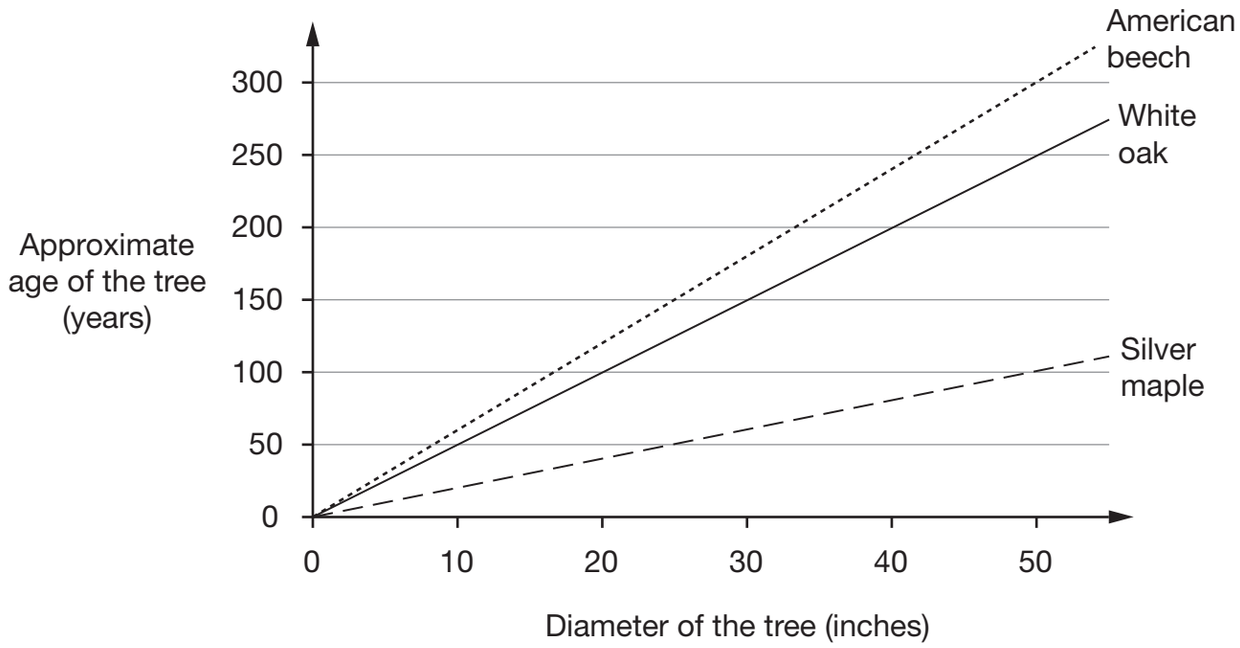
1 mark

The probability that it will be _____ **or** _____ is **70%**

1 mark

19. You can work out the approximate age of a tree if you know its diameter.

The graph shows information about three types of trees.



An American beech, a silver maple and a white oak all have the **same diameter**.

Complete these sentences.

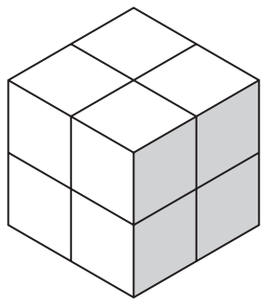
The age of the American beech is about _____ times the age of the silver maple.

1 mark

The age of the American beech is about _____ times the age of the white oak.

1 mark

20. (a) Eight small cubes of side length 1 cm are used to make a larger cube.



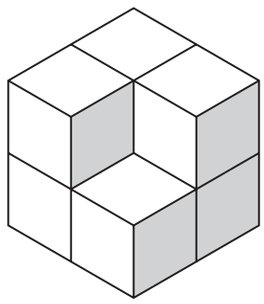
Complete the table to show the information for the larger cube.

Larger cube	
Volume	_____
Surface area	_____
Total length of its edges	_____

2 marks

1 mark

(b) One of the small cubes is removed to make this new shape.



Tick (✓) the correct box in each row below.

	Has increased	Has stayed the same	Has decreased
Volume			
Surface area			
Total length of its edges			

2 marks

21.

$(y + 3)$ is always **5 more** than $(y - 2)$

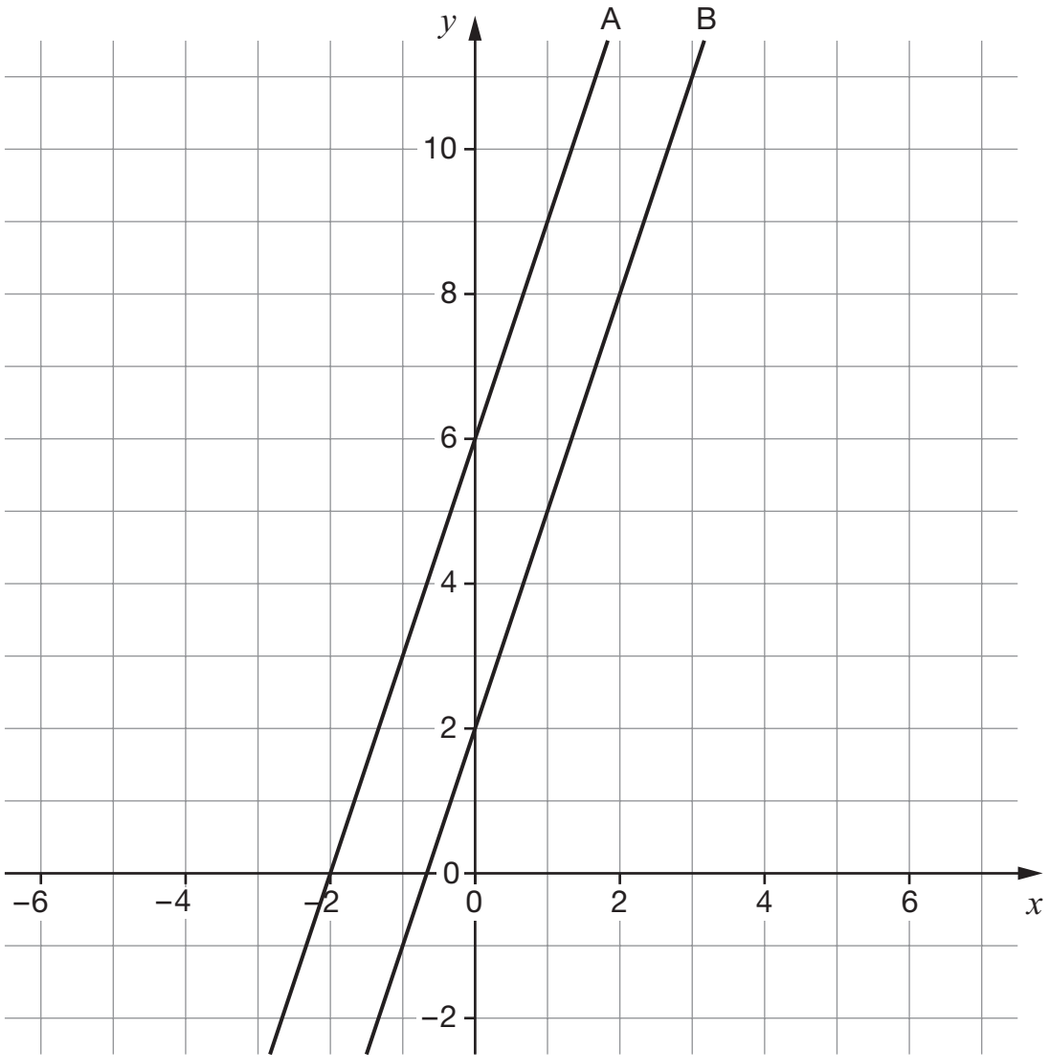
so $(y + 3) - (y - 2) = 5$

Complete the following.

$(y + 4) - (y - 3) =$ _____ 1 mark

$(y - 2) - (y - 3) =$ _____ 1 mark

22. (a) The graph shows two straight lines, A and B.



The equations of the lines are $y = 3x + 2$ and $y = 3(x + 2)$

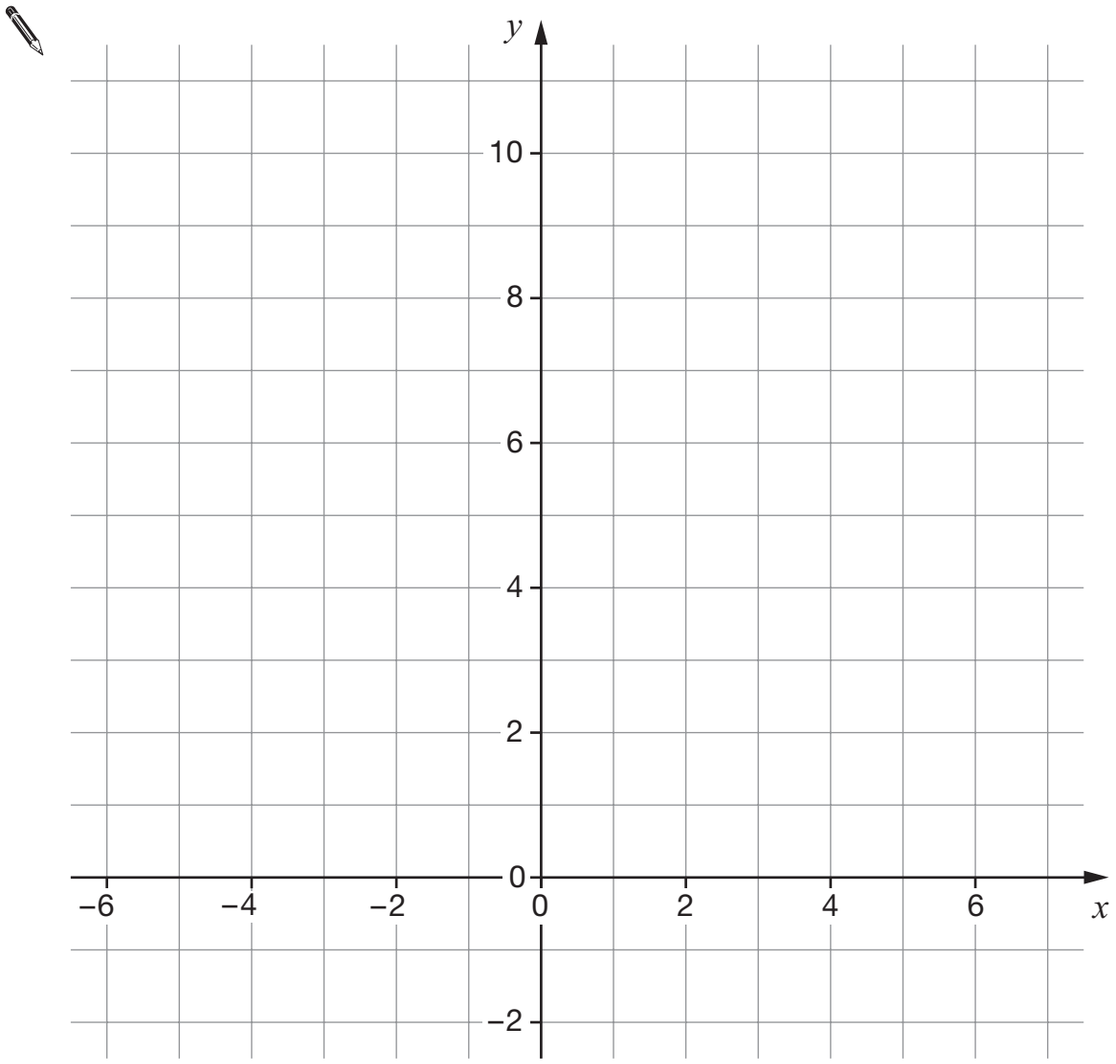
Tick (✓) the equation for **line A**.

☐ $y = 3x + 2$ ☐ $y = 3(x + 2)$

Explain how you know.

1 mark

(b) Draw the straight lines with equations $y = 2x + 2$ and $y = 2(x + 2)$ on the graph below.



2 marks

23. Here are the first seven terms in three number sequences.

Powers of 2	Powers of 3	Powers of 4
2	3	4
4	9	16
8	27	64
16	81	256
32	243	1024
64	729	4096
128	2187	16384

Use the number sequences to work out the answers.

$3^5 \times 9 =$ _____ 1 mark

$4^5 \div 2^2 =$ _____ 1 mark

$4^6 \div 2^{12} =$ _____ 1 mark

24. (a) Multiply out the brackets, then write this expression as simply as possible.

$x(5 - x) + 4(x^2 + 1)$

2 marks

(b) Factorise this expression.

$3x - x^2$

1 mark

25. Write the missing fractions.

The first one is done for you, with diagrams to help.

For any number, x 

Add half the number 

Then subtract *one third* of the result.

The answer is x 

For any number, y

Add one third of the number

Then subtract _____ of the result.

1 mark

The answer is y

END OF TEST

QCDA/10/4336 (Pupil pack)
QCDA/10/4333 (Teacher pack)
082009