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 **may not** use a calculator for any question in this test.
- You will need: a pen, pencil, rubber and a ruler. You may find tracing paper useful.
- 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

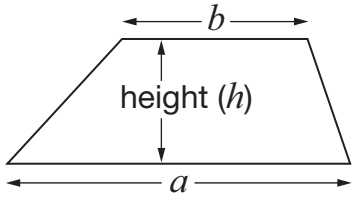
You **may not** use a calculator to answer any question in this test.

Formulae

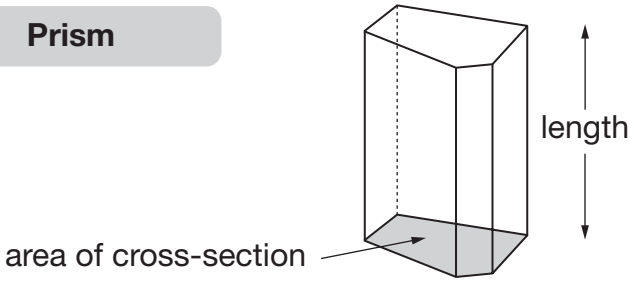
You might need to use these formulae

Trapezium

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



Prism



Volume = area of cross-section × length

1. The table shows the time difference between the UK and cities around the world.

City	Time difference from the UK (hours)
Hong Kong	+ 8
Dhaka	+ 6
Dubai	+ 4
Harare	+ 2
London	0
Brasilia	– 2
San Juan	– 4
Chicago	– 6
Los Angeles	– 8

(a) The time difference between Harare and London is 2 hours.

What is the time difference between **Dubai** and **Brasilia**?

_____ hours

1 mark

(b) Write two cities that have a time difference of **12 hours**.

_____ and _____

1 mark

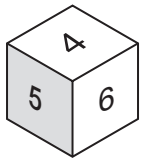
(c) Now write a **different** two cities that have a time difference of **12 hours**.

_____ and _____

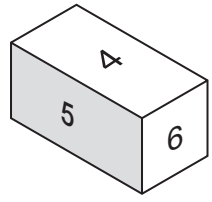
1 mark

2. Look at these three dice, A, B and C.

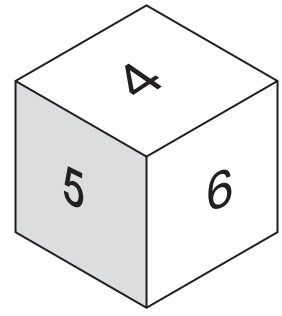
Each dice is numbered 1 to 6



Dice A



Dice B



Dice C

What can you say about the probability of rolling a **5** when you use…

…Dice A

…Dice B

…Dice C

2 marks

3. Here are two equations.

$a + b = 10$ $a - b = 2$

Write the values of a and b that make **both** equations true.

$a =$ _____ $b =$ _____

1 mark

4. Write the missing information in this table.

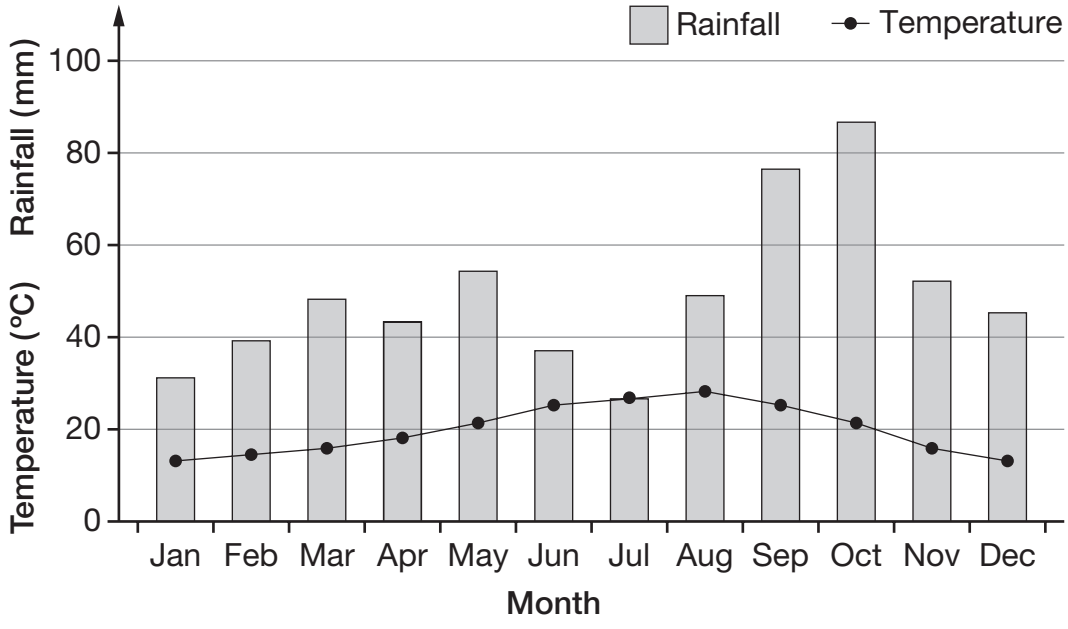
Name of shape	Side length	Perimeter
Regular hexagon	8 cm	_____ cm
Regular octagon	_____ cm	56 cm
Regular _____	8 cm	40 cm

1 mark

1 mark

1 mark

5. This graph shows the average total rainfall and the average maximum daily temperature in Barcelona.



(a) In which months is the rainfall less than 40 mm and the temperature more than 20 °C?

_____

1 mark

(b) Compare the weather conditions in May and October.

1 mark

(c) Jo says:

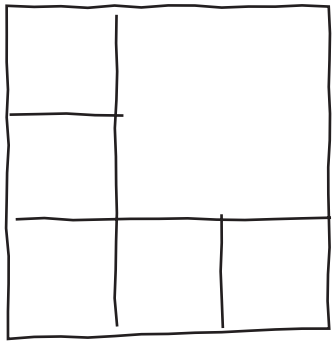
'*In July, the rainfall and the temperature are the same*.'

Explain why Jo is **wrong**.

1 mark

6. Sue wants to split a large square into 6 smaller squares.

She has this sketch showing how to do it.



(a) On the grid below, join dots to make an **accurate** drawing of a large square split into 6 smaller squares.

Use Sue's sketch to help you.

2 marks

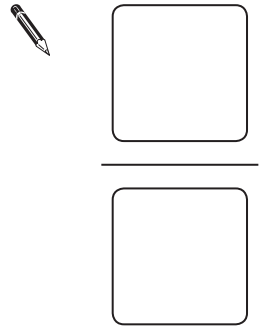
(b) Now join dots on the grid below to make an **accurate** drawing of a large square split into **8** smaller squares.

2 marks

7. Here are five numbers.

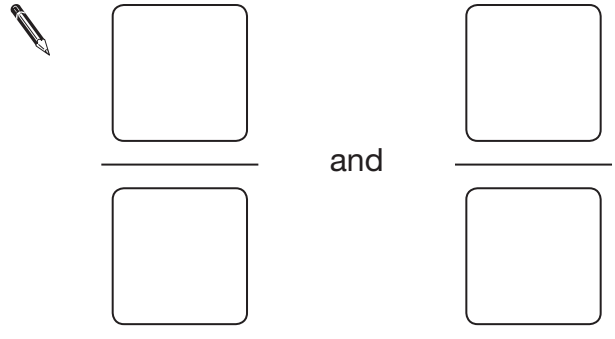
2 11 5 15 7

(a) Use two of these numbers to make the **smallest** fraction you can.



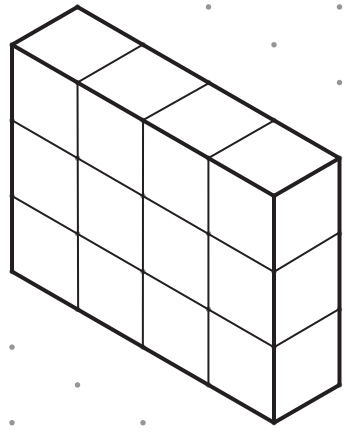
1 mark

(b) Use **three** of these numbers, and **one other**, not in the list, to make two **equivalent** fractions.



2 marks

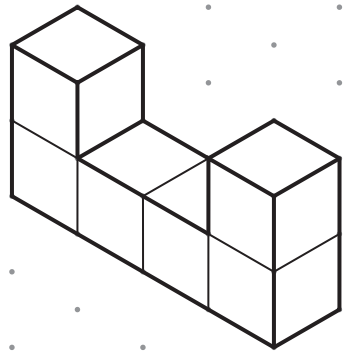
8. The diagram shows a cuboid.



Isometric grid

The cuboid is cut into two pieces.

This diagram shows one of the pieces.



Isometric grid

Draw the other piece on this grid.

2 marks

Isometric grid

9. Mark is going to play a game.

The probability that he will win the game is $\frac{7}{12}$

Is he more likely to win the game or lose the game?

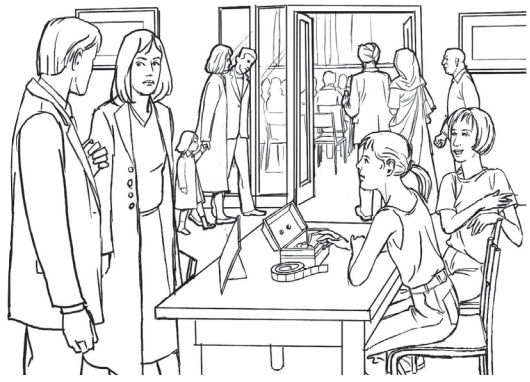
☐ Win ☐ Lose

Explain how you know.

1 mark

10. A school held a concert.

Tickets for adults cost more than tickets for children.



Mr and Mrs Evans went to the concert with 3 children.

Their tickets cost **£20.50**

Mr and Mrs Singh went to the concert with 2 children.

Their tickets cost **£17.00**

Work out the cost of one adult ticket and one child ticket.

One adult: £ One child: £

2 marks

11. This table shows some students' scores in a mathematics and a science test.

Student	A	B	C	D	E	F	G	H	I	J
Mathematics	29	33	17	44	21	18	30	31	12	18
Science	23	31	15	39	20	18	17	29	13	17

(a) One of the students was feeling ill during the science test.

Which student is that most likely to be?

Student _____

1 mark

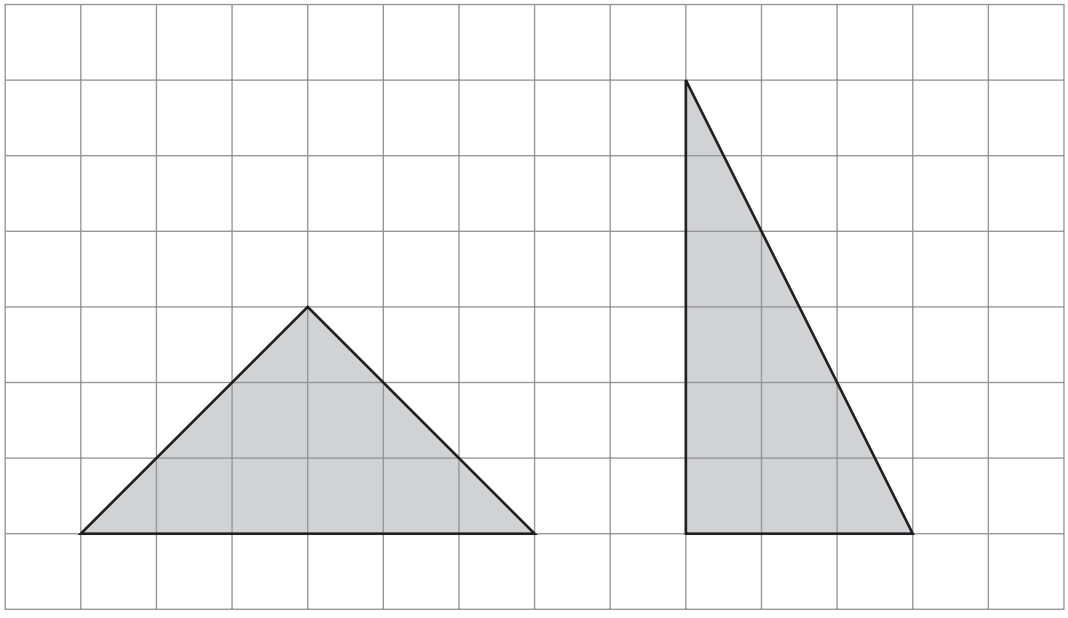
(b) Another student was absent from the science test, but scored **38** in the mathematics test.

What mark would you expect them to have scored in the science test if they had been able to take it?

_____

2 marks

12. Here are two shaded triangles on a square grid.



Steve says:

> The triangles have the same area.

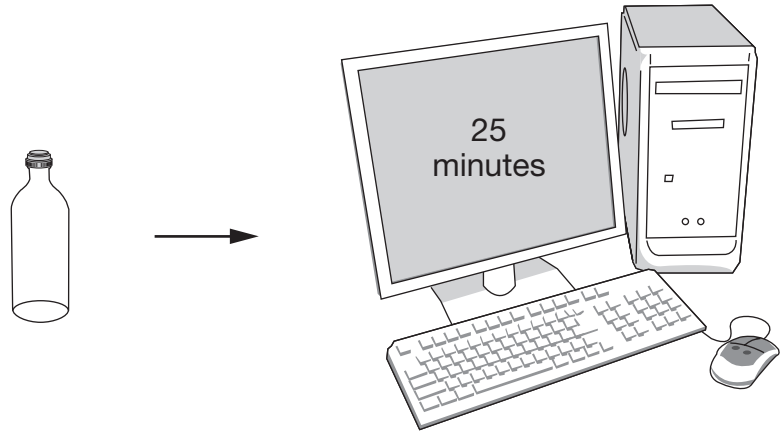
Is he correct?

☐ Yes ☐ No

Explain how you know.

1 mark

13. One recycled glass bottle saves enough energy to power a computer for 25 minutes.

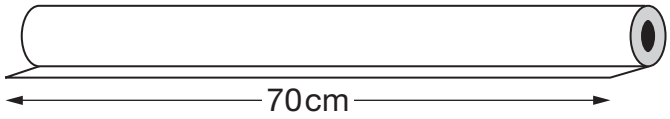


How many recycled glass bottles save enough energy to power a computer for **10 hours**?

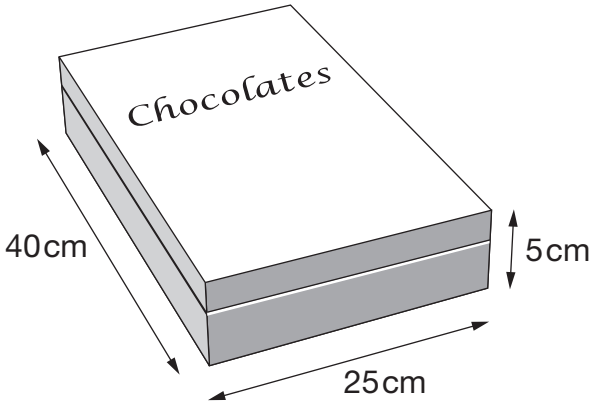
_____ bottles

2 marks

14. I have a roll of wrapping paper…



…and a box of chocolates.



I want to cut a suitable length of paper from the roll to wrap the box.

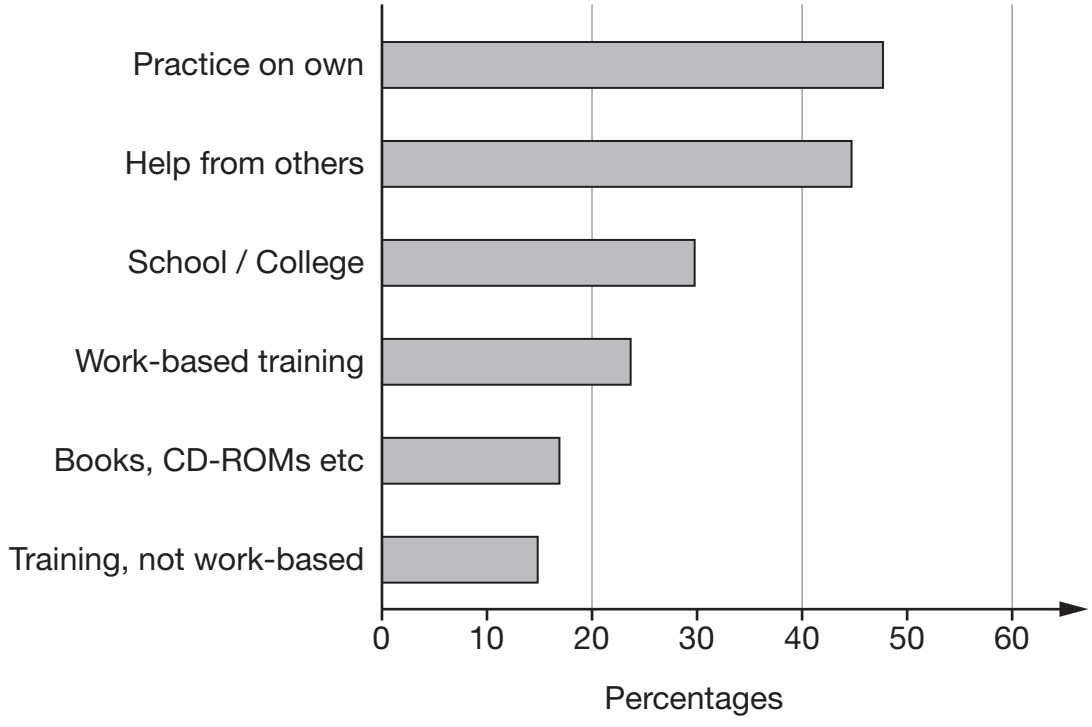
I don't want to waste paper.

What length of paper should I cut?

_____ cm

3 marks

15. The graph shows six different ways that adults learn ICT.

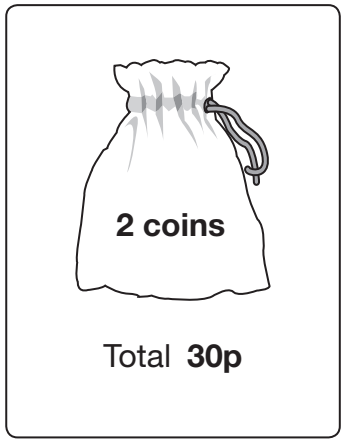


How can you tell from the graph that some adults use **more than one** of these six different ways?

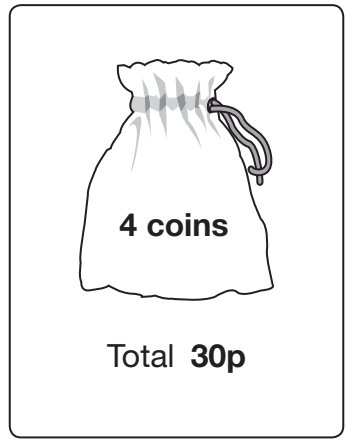
1 mark

16. Anna and Tom each have a small bag of coins.

Anna's bag



Tom's bag



Anna is going to take a coin at random from her bag.

Tom is going to take one at random from his.

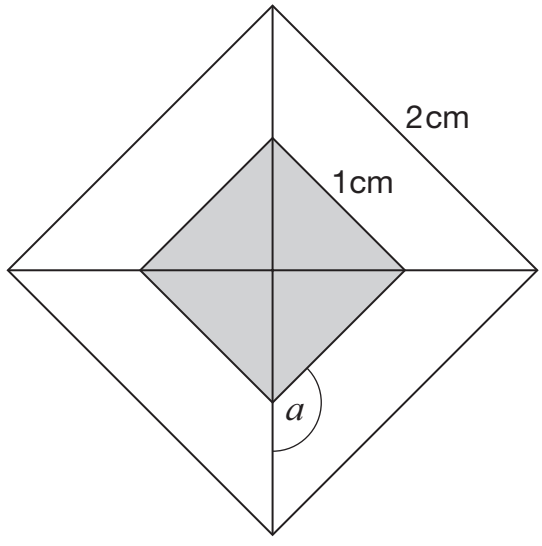
Who is most likely to take a **10p coin**?

☐ Anna ☐ Tom ☐ Both equally likely

Show working to explain your answer.

2 marks

17. The diagram shows a design made from **two squares** and their diagonals.
The squares have side lengths 2cm and 1cm.



Not drawn accurately

(a) Without measuring, explain why angle a must be **135°**

1 mark

(b) Some of the design is shaded grey. Some is white.

What is the **ratio** of the grey area to the white area?

_____ : _____

1 mark

18. Here are the equations of five straight lines.

A	B	C	D	E
$y = x - 1$	$y = x + 1$	$y = x - 2$	$y = x + 2$	$y = x$

(a) Which of the five straight lines goes through (0, 0)?

Write its letter.

Straight line _____

Choose one of the other four straight lines.

Complete this sentence.

Straight line _____ goes through (0, _____).

1 mark

(b) Now choose one of the other three straight lines.

Complete this sentence.

Straight line _____ goes through (_____ , 0).

1 mark

19. The table shows information about sequences A, B and C.

Write the missing information.

	1st term	2nd term	3rd term	4th term	nth term
Sequence A	20	19	18	17	$21 - n$
Sequence B	20	18	16	14	$22 -$ _____
Sequence C	20	_____	_____	_____	$26 - 6n$

1 mark

1 mark

20. A newspaper says:

Found in London taxis:

- 55 483 mobile phones (that's about 3 per taxi)
- 6 193 other devices such as laptops and mp3 players

…and that's only in the last six months!

Use the information to complete these sentences.

$55\,483 \div 3 = 18\,494.33$

…so there are about _____

_____

1 mark

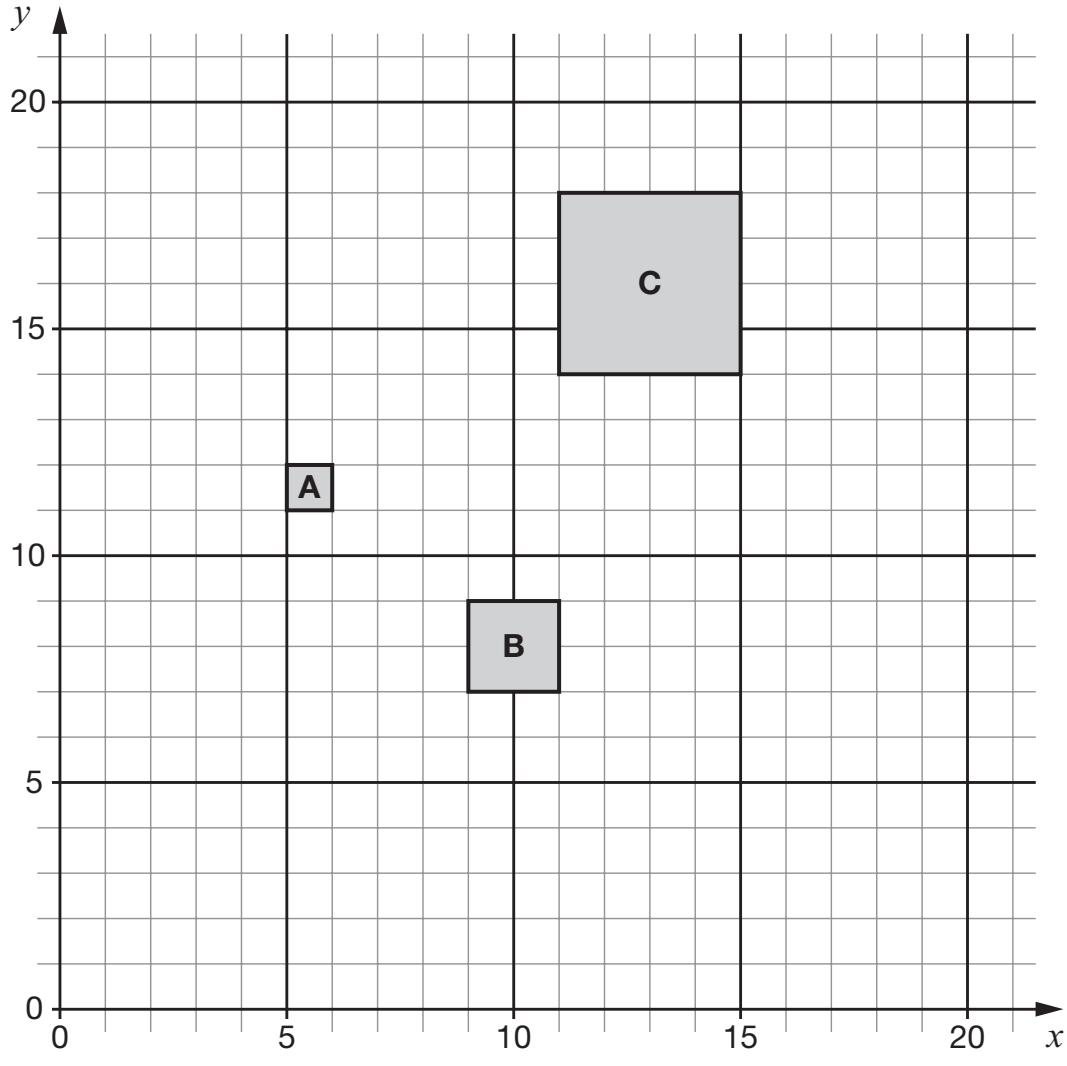
$6\,193 \div 18\,494.33 = 0.33$

…so about _____

_____

1 mark

21. The diagram shows three squares, A, B and C.



Complete the table.

Enlargement	Centre of enlargement	Scale factor of enlargement
A to B	(1, 15)	2
B to C	(_____, _____)	2
C to A	(_____, _____)	_____

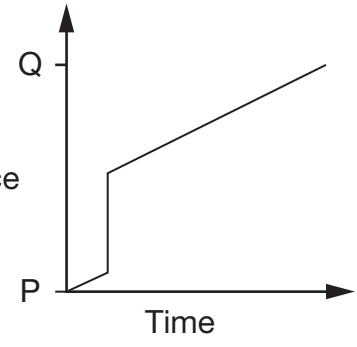
1 mark

1 mark

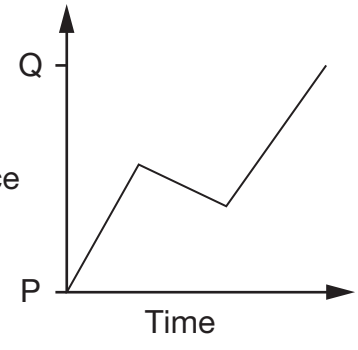
1 mark

22. Look at these graphs.

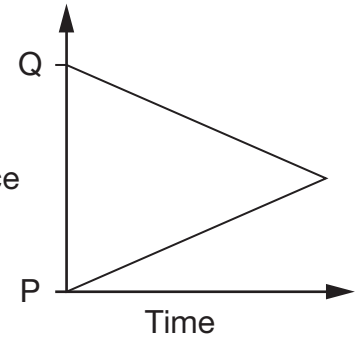
Graph A



Graph B



Graph C



Which **one** of these three graphs can represent a journey from P to Q?

☐ A ☐ B ☐ C

Now complete these sentences.

Graph _____ cannot represent a journey from P to Q because _____

_____

_____

1 mark

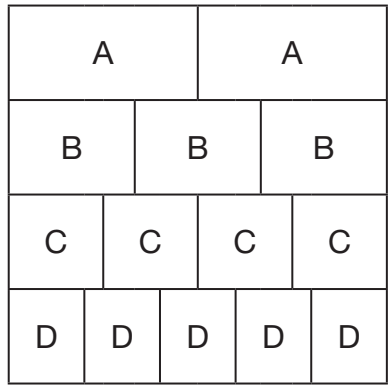
Graph _____ cannot represent a journey from P to Q because _____

_____

_____

1 mark

23. The diagram shows a square, divided into strips of equal width.



Use the diagram to work out the missing numbers.

The first one is done for you.

If A = 100%, C = *50* %

If D = 100%, A = _____ %

1 mark

If B = 100%, D = _____ %

1 mark

24. A class of pupils grew some sunflowers.

The stem-and-leaf diagram shows the heights of 25 sunflower plants.

15	4	8					
16	3	4	5	5			
17	2	2	3	6	6		
18	0	1	2	3	7	8	9
19	0	6	6				
20	3	4	4	9			

Key:

15 | 4 represents 154cm

(a) What is the median height of the plants?

_____ cm

1 mark

(b) On the packet of seeds it states that the average height of the plant is 1.9 metres.

What percentage of the plants grew taller than the average height?

_____ %

1 mark

25. (a) Which is greater?

$\frac{2}{3}$ of $\frac{3}{4}$ ☐ $\frac{3}{4}$ of $\frac{2}{3}$ ☐ Both the same ☐

Explain how you know.

1 mark

(b) Which is greater?

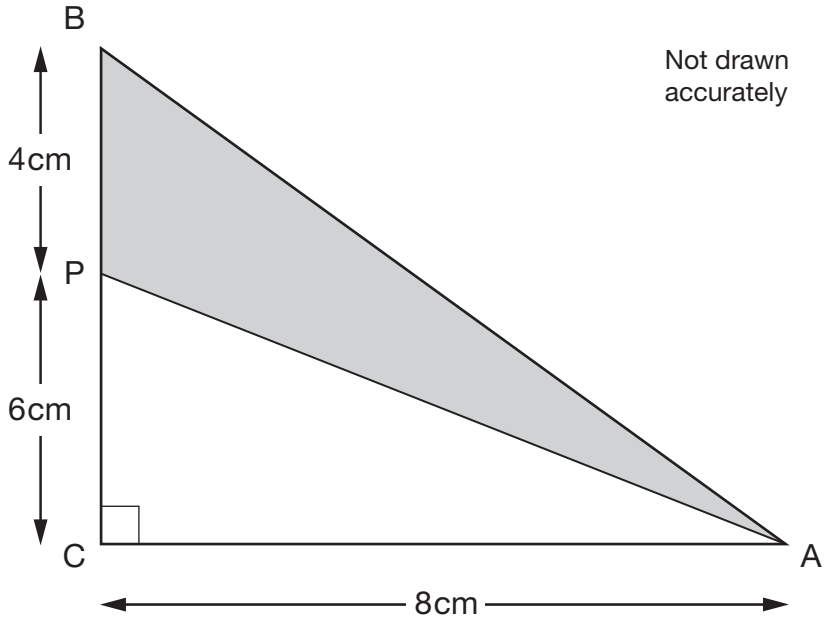
$\frac{2}{3} \div \frac{3}{4}$ ☐ $\frac{3}{4} \div \frac{2}{3}$ ☐ Both the same ☐

Explain how you know.

2 marks

26. Triangle ABC is right-angled.

BP is 4cm, PC is 6cm and CA is 8cm.



What is the area of the shaded triangle ABP?

_____ cm^2

2 marks

27. k is an **even** number.

Are the expressions below odd or even?

Tick (✓) the correct box for each one.

	Odd	Even
$k + 1$	☐	☐
k^2	☐	☐
$3k$	☐	☐
$(k - 1)(k + 1)$	☐	☐

2 marks

END OF TEST

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