Ma

KEY STAGE 3

TIER 5–7

Year 8 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 a pen, pencil, rubber, ruler, an angle measurer and a pair of compasses. You may find tracing paper useful.
- Some formulas you might need are on page 3.
- This test starts with easier questions.
- Try to answer all of the questions.
- Write all of 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	

1 This chart shows the opening hours of a theme park.

Opening hours

Key:

- 10am–5pm
- 10am–6pm
- 10am–7pm
- Closed

JUNE

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

JULY

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

AUGUST

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

SEPTEMBER

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

OCTOBER

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

NOVEMBER

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

How likely is it that the park is open on a day chosen at random in each month?

Put one tick (✓) for each month in the table.

The first is done for you.

	certain	likely	unlikely	impossible
June	✓			
July				
August				
September				
October				
November				

. . . .

. . . .

2 marks

2 Write a number in the box to make the equation correct.

$534 \times 7 = 534 \times 5 + 534 \times \square$

. . . .
1 mark

3 On Tuesday, Alex saw 30 people in the park.

> 17 of the 30 people were children.
> 11 of the 17 children were wearing hats.
> There were 5 adults not wearing hats.

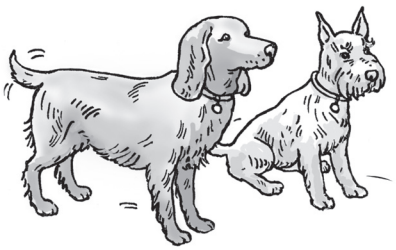
Fill in the table to show this information.

	Wearing hats	Not wearing hats
Adults		
Children		

. . . .
. . . .
2 marks

4 Sara has two dogs.

The dogs are called Rover and Patch.



Sara has a 5kg bag of food for the dogs.

The table shows the amount of food the dogs eat each day.

Name of dog	Morning	Evening
Rover	120g	210g
Patch	110g	160g

How many whole days will the 5kg bag of food last?

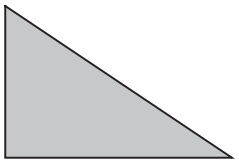
. . . . .

. . . . .

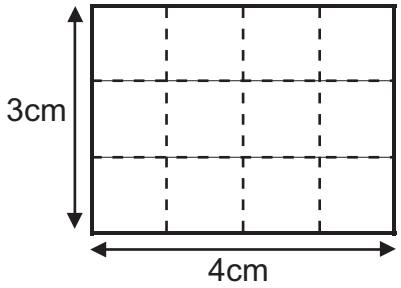
. . . . . days . . . .

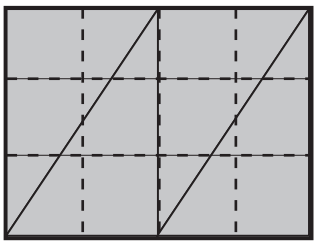
3 marks

5 Owen has a lot of right-angled triangle tiles like this.

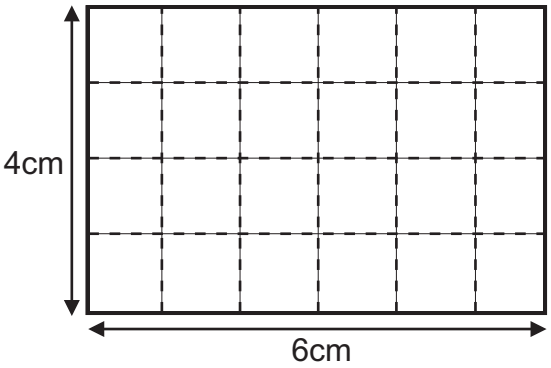


He can just cover this rectangle with 4 of the triangle tiles.





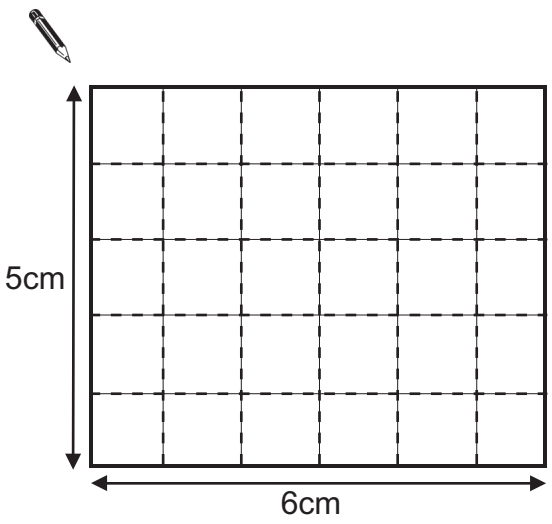
(a) How many triangle tiles does Owen need to just cover this rectangle?



Number of triangle tiles: . . . . . .

1 mark

(b) Show how Owen can just cover this rectangle with his triangle tiles.



1 mark

6 Five pupils picked blackberries.

The table shows the amount that each pupil picked.

Name	Anna	Ben	Colin	David	Ellie
Weight of blackberries	1 kg	1.2 kg	1.6 kg	800 g	1.4 kg

(a) How many kilograms of blackberries did the five pupils pick altogether?

..... kg

1 mark

(b) The five pupils share out the blackberries equally between themselves.

How many kilograms of blackberries does each pupil get?

..... kg

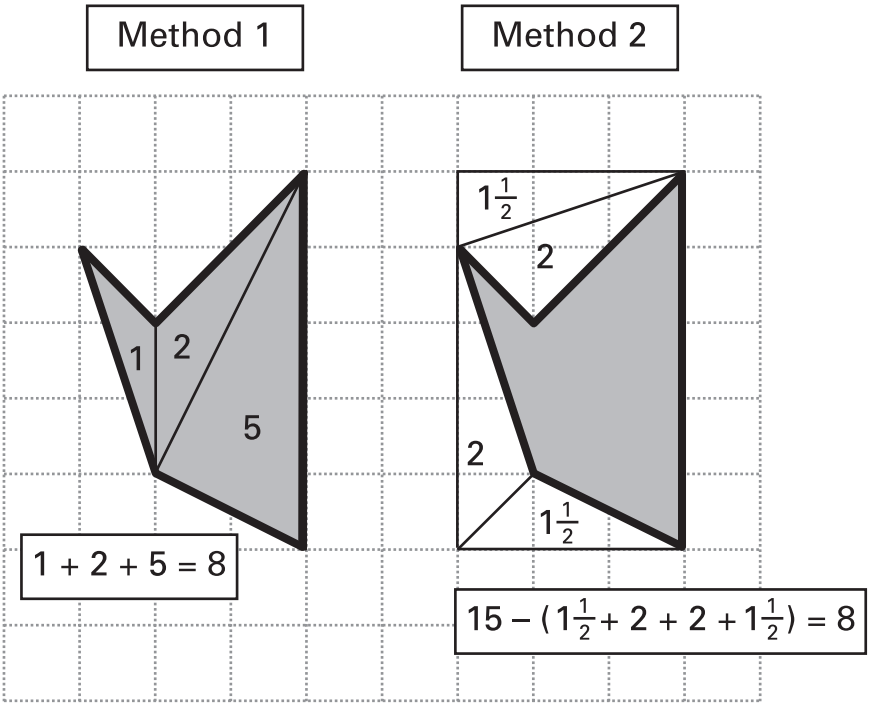
1 mark

(c) What is the mean weight of the blackberries that each pupil picked?

..... kg

1 mark

7 Amy uses two different methods to work out the area of this pentagon.



Explain what Amy has done each time.

(a) Method 1

. . . .
1 mark

(b) Method 2

. . . .
1 mark

8 A roll of steel wire weighs 0.6 tonnes.

A lorry can carry a maximum load of 13 tonnes.

How many rolls of the steel wire can the lorry carry?

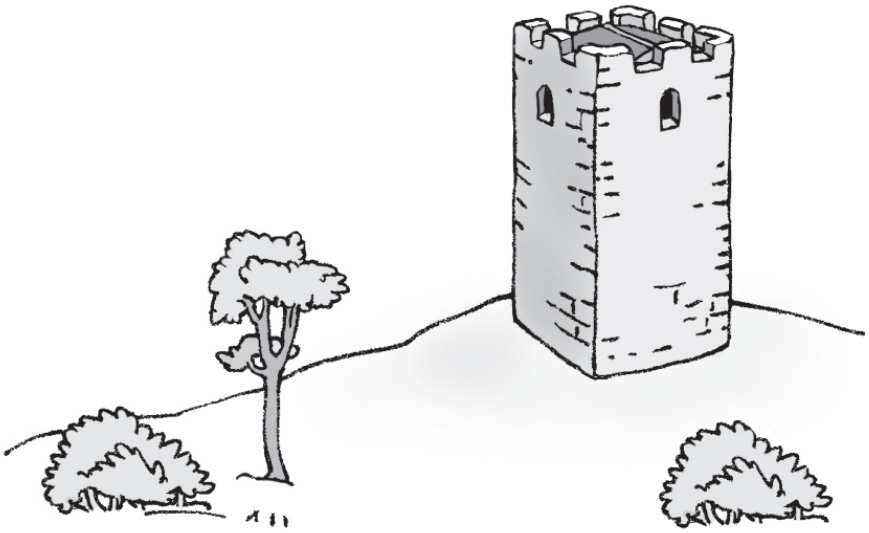
. . . . .

. . . .

2 marks

9 Ethan looks at some information about two towers.

Windy Hill Tower	**Castle Tower**
Number of steps 300 Height 60 metres	Number of steps 150



Ethan says:

Explain why Ethan could be wrong.

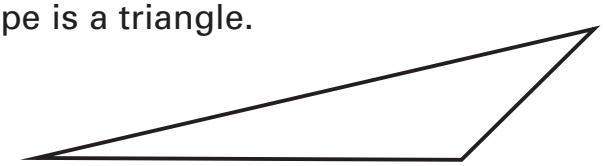
. . . .
1 mark

10 Mei has a piece of paper.

She cuts out a shape from her piece of paper.

She folds the shape in half once, and then she folds it in half again.

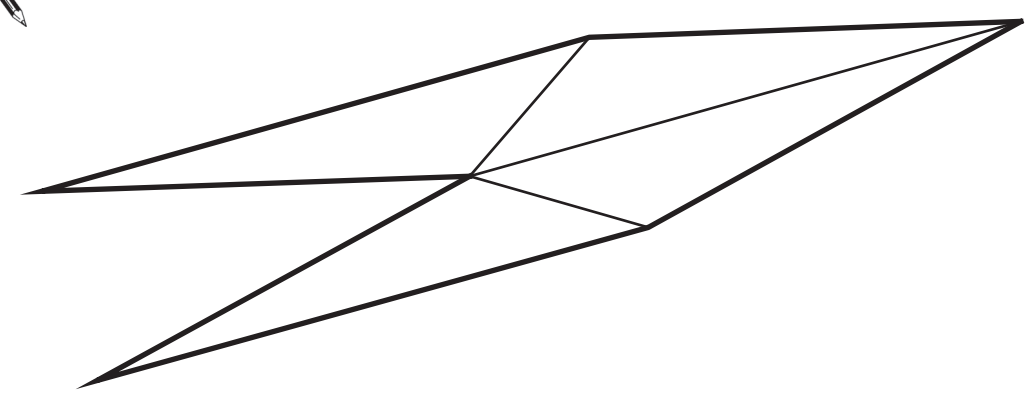
The folded shape is a triangle.

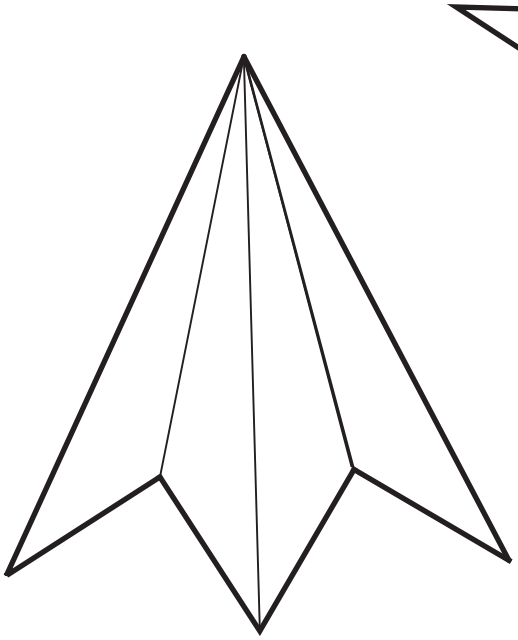


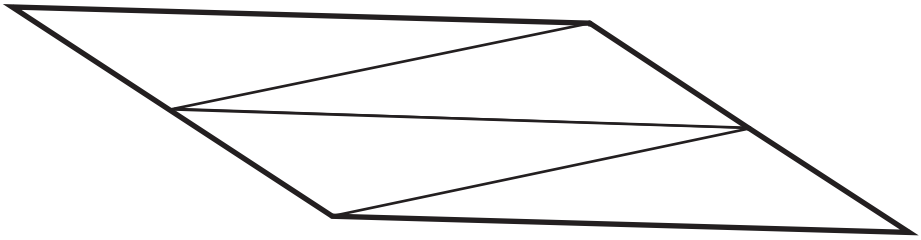
Then Mei unfolds her shape again.

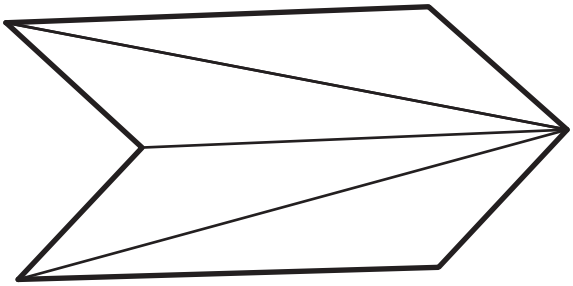
Look at these shapes.

Put a ring around Mei's unfolded shape.









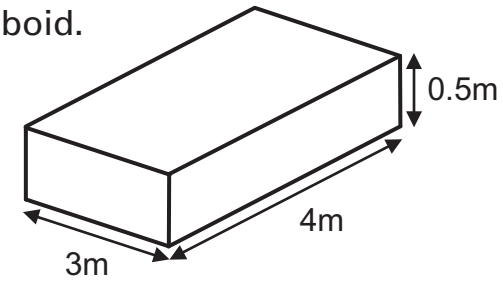
. . . . .
1 mark

11 (a) Jude has a fish pond in the shape of a cuboid.

It is 3m wide, and 4m long.

The water is 0.5m deep.

Calculate the volume of the water in m^3



not drawn to scale

..... m^3 . . . .
1 mark

(b) $1m^3 = 1000$ litres

How many litres of water are there in Jude's pond?

..... litres . . . .
1 mark

(c) The water in the pond has turned green.

Jude buys a bottle of Green Water Treatment.

Look at the instructions.

Green Water Treatment
Instructions
Use 10 millilitres of Green Water Treatment for every 300 litres of pond water.

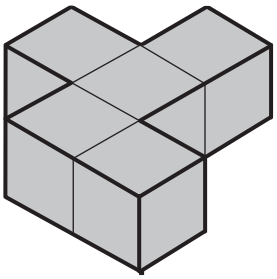
How much Green Water Treatment should Jude use for the pond?

Remember to write the units.

. . . .
1 mark

....
1 mark

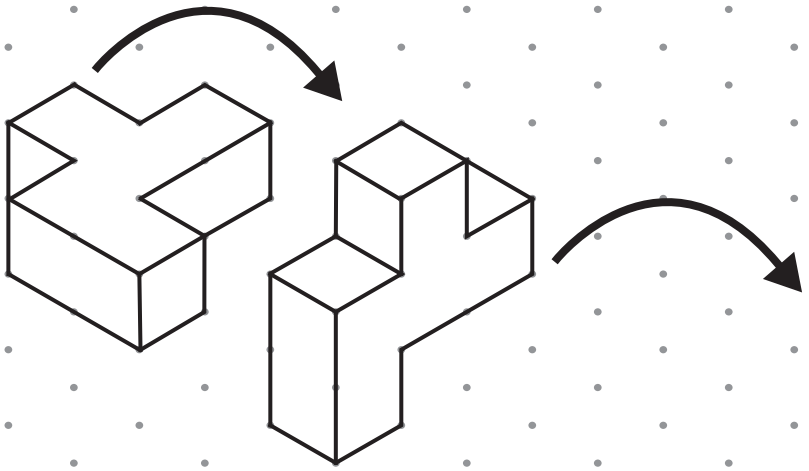
12 Eve makes a shape with five cubes.



She rotates her shape through a quarter-turn clockwise.

Then she rotates it again through another quarter-turn clockwise.

Draw Eve's shape after the second quarter-turn clockwise.

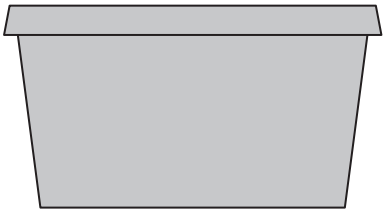


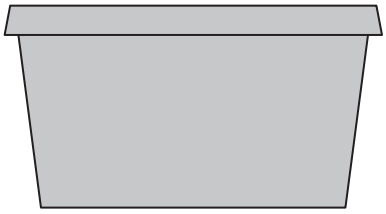
. . . . .

. . . . .

2 marks

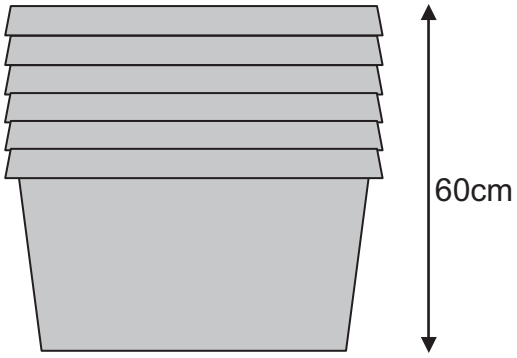
13 These crates can be stacked together.



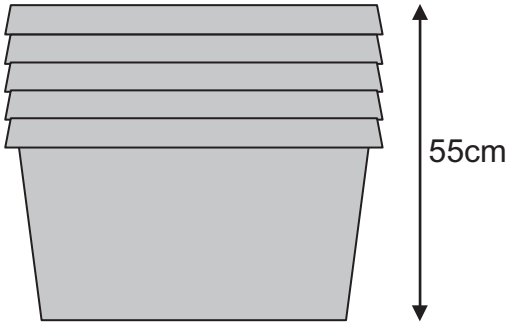


not drawn to scale

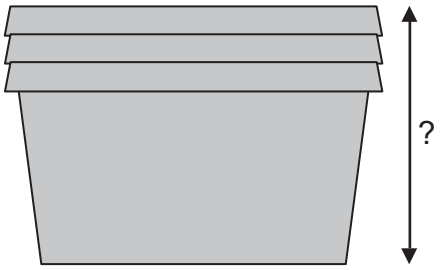
A stack of 6 crates has a height of 60cm.



A stack of 5 crates has a height of 55cm.



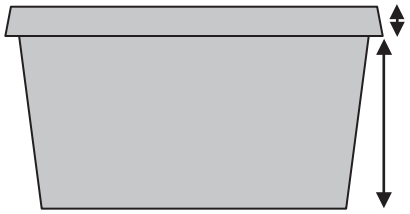
(a) What is the height of a stack of 3 crates?



..... cm

1 mark

(b) What are the measurements of one crate?



..... cm

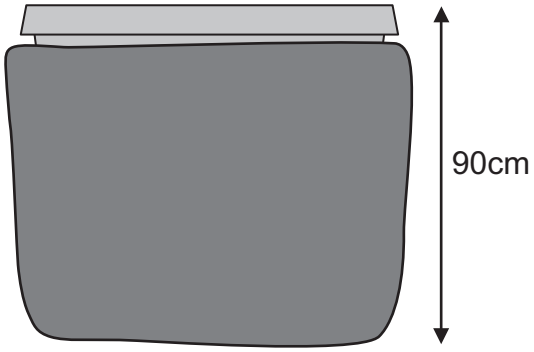
1 mark

..... cm

1 mark

(c) A stack of crates has a height of 90cm.

How many crates are there in the stack?



..... crates

1 mark

14 Each number in this sequence is **–2** multiplied by the number before.

Write the missing numbers.

1 mark

–1, 2, – 4, ..., ..., 32

1 mark

15 Daniel asked the pupils in his class:

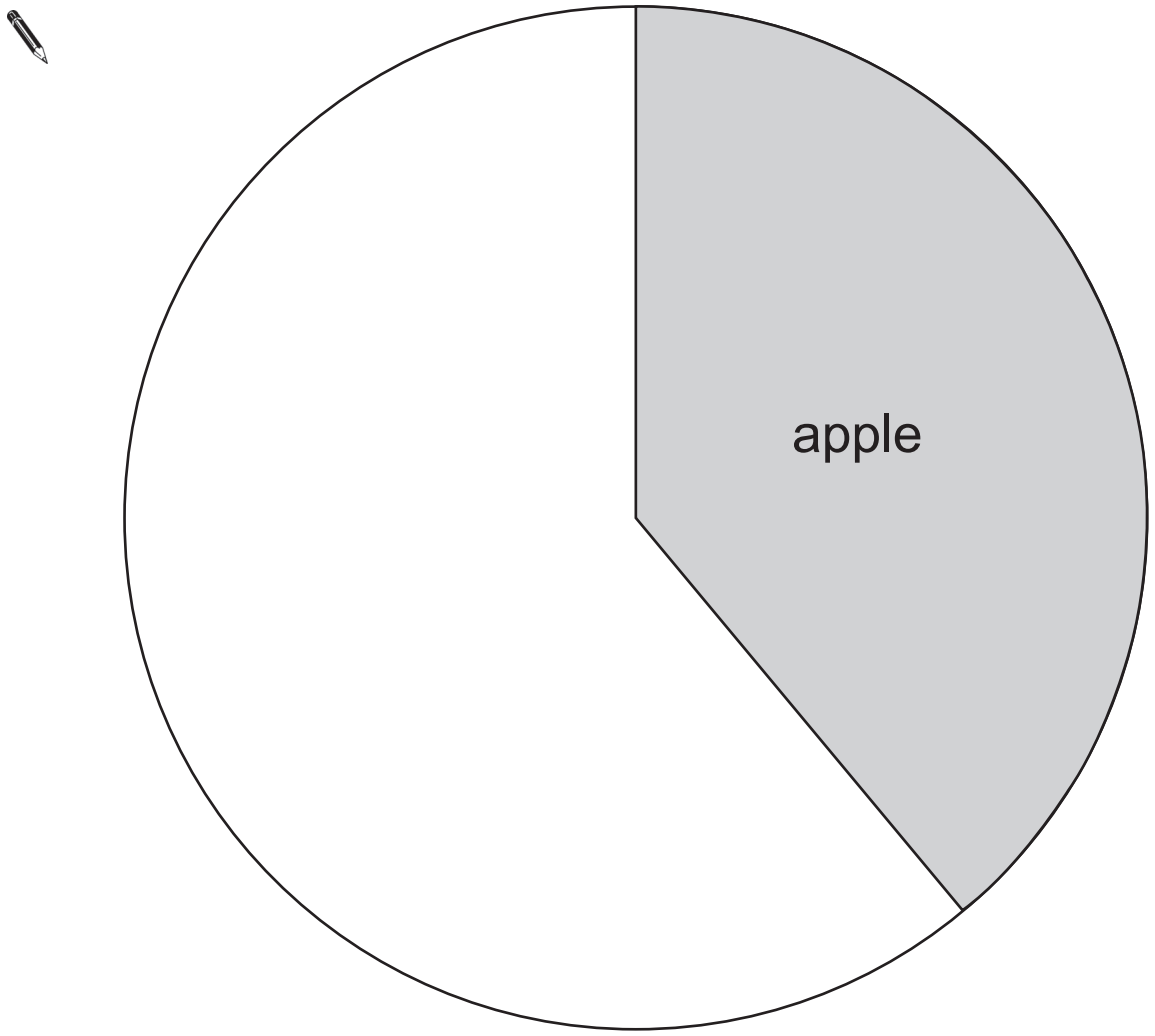
'Which fruit do you eat most often?'

The table shows his results.

Fruit	Frequency
apple	14
banana	16
other	6

Complete the pie chart.

You will need a ruler and an angle measurer.



. . . .

. . . .

. . . .

3 marks

16 Draw lines to match the boxes that give the **same** answer.

The first one is done for you.

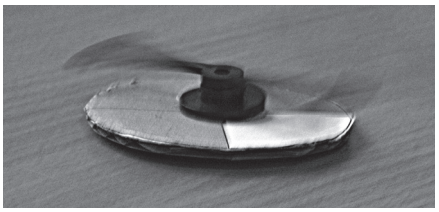
17×0.1	17×0.25
$17 \div 4$	$17 \div 10$
17×5	$17 \div 5$
$17 \div 0.01$	17×100
17×0.2	$17 \div 0.2$

. . . .

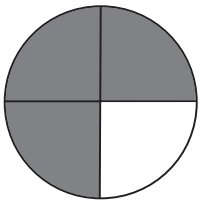
. . . .

2 marks

17 Ada makes a spinner.



The probability that it lands on grey is $\frac{3}{4}$



The probability that it lands on white is $\frac{1}{4}$

Ada spins the spinner 100 times.

How many times would you expect the pointer to land on grey?

. . . .

. . . .

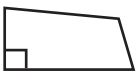
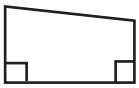
1 mark

18 Is it possible to draw these shapes?

Put a tick (✓) for each shape that is possible.

Put a cross (✗) for each shape that is not possible.

The first three are done for you.

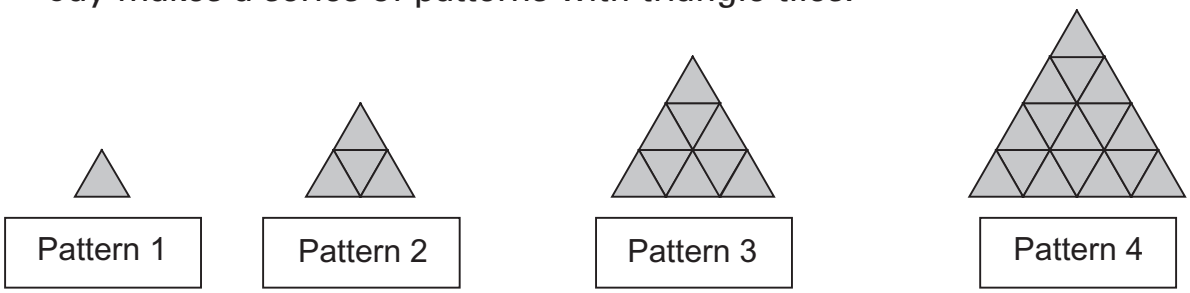
Number of sides	One right angle	Two right angles	Three right angles	Four right angles	Five right angles
4 sides	 ✓	 ✓	✗		
5 sides					

. . . .

. . . .

2 marks

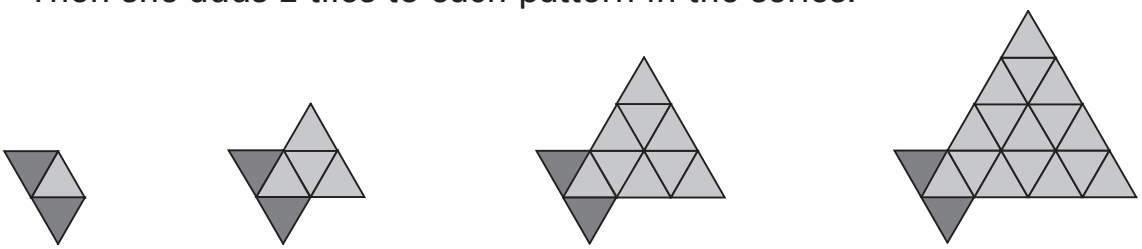
19 Jay makes a series of patterns with triangle tiles.



Pattern n in Jay's series has n^2 tiles.

(a) Jasmine copies Jay's series.

Then she adds 2 tiles to each pattern in the series.

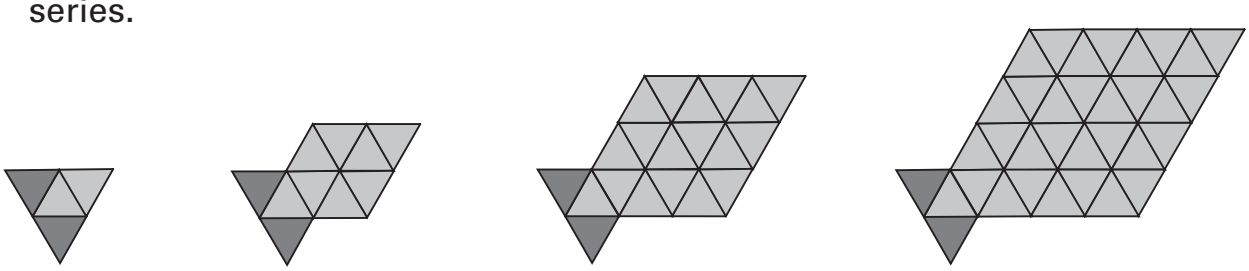


Write an expression for the number of tiles in Pattern n in Jasmine's series.

. . . . . .

1 mark

(b) Tom puts Jay's and Jasmine's patterns together to make a new series.



Write an expression for the number of tiles in Pattern n in Tom's series.

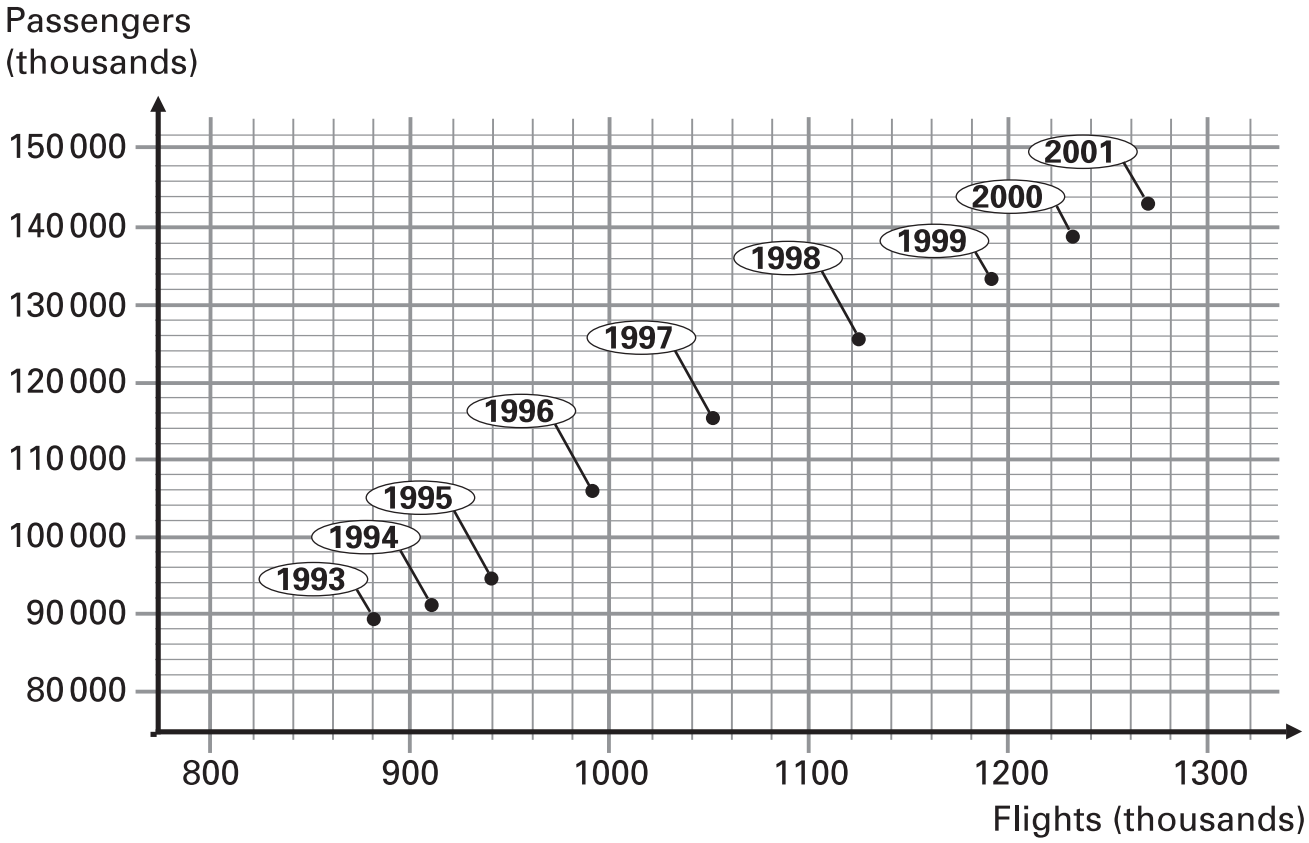
. . . . . .

1 mark

20 The scatter graph shows some information about flights to and from the UK each year from 1993 to 2001.

It shows

- The number of flights.
- The number of passengers who flew.



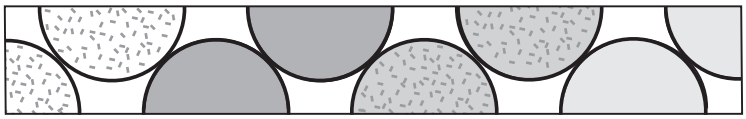
Describe the relationship between the number of flights and the number of passengers.

. . . .

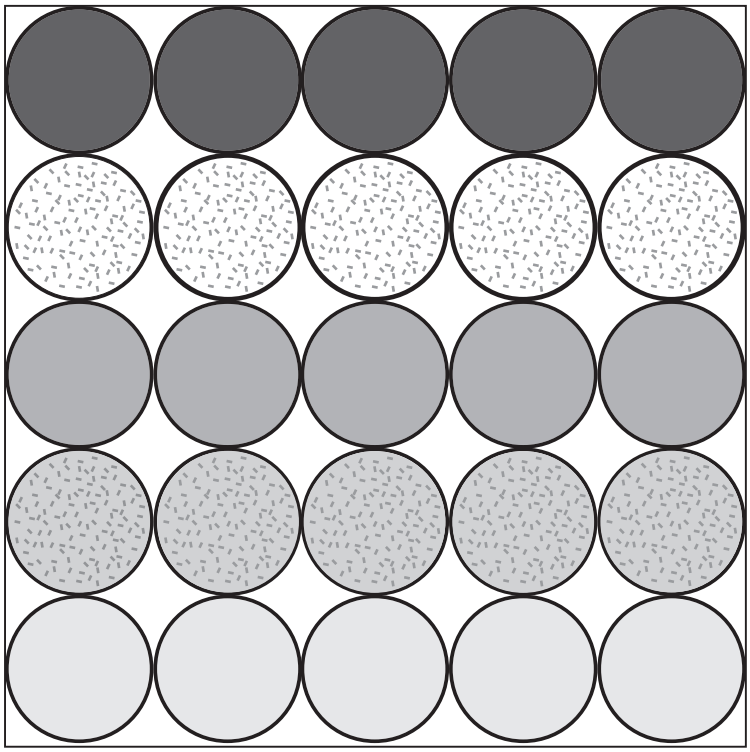
1 mark

21 Holly has a square of patterned paper.

She wants to cut out a rectangle that looks like this.



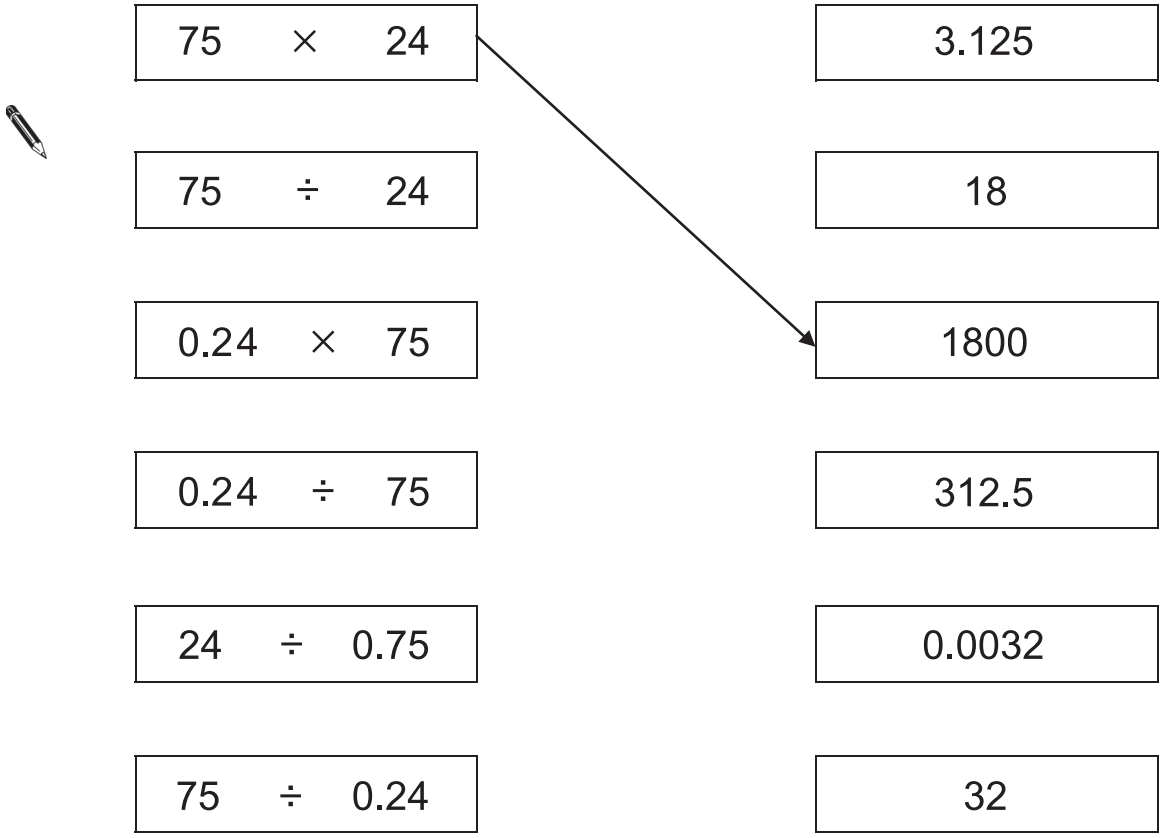
Draw the rectangle that Holly should cut out on this diagram.



. . . . .
1 mark

22 Draw arrows to match each calculation with its result.

The first is done for you.



. . . .

. . . .

. . . .

3 marks

23 The table shows some questions that need to be answered, and the data that is available to answer them.

For each question, state which is the most useful:

mean, mode, maximum, minimum, range

The first is done for you.

Question	Data	Most useful
A school cook wants to know: *What quantity of potatoes should be ordered each week for the school canteen next term?*	The quantity of potatoes used last term.	mean
A builder wants to know: *How high should the entrance to a new garage be?*	The heights of all the vehicles that will use the garage.	
A librarian wants to know: *What length of shelving is needed for three thousand new books?*	The widths of a random sample of the new books.	

. . . . .
1 mark

. . . . .
1 mark

24 Lina wants to solve this pair of simultaneous equations.

$4t - r = 13$ and $2t + r = 2$

This is her working. Part of the working is covered.

$4t - r = 13$ and $2t + r = 2$

$6t = 15$

$t = 2\frac{1}{2}$

Which of these is most likely to be the covered part of Lina's working?

Put a ring around your answer.

$(4t - r) = 13$ $-\ (2t + r) = 2$	$(4t - r) = 13$ $+\ (2t + r) = 2$	$(2t + r) = 13$ $-\ (4t - r) = 2$

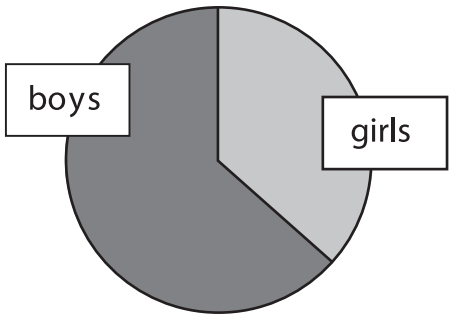
$2\ (2t + r) = 2 \times 2$	$2\ (4t - r) = 2 \times 13$

1 mark

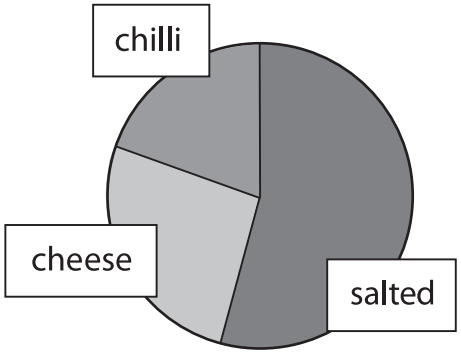
25 A shop sells three flavours of crisps: cheese, salted and chilli.

Some pupils bought a packet of crisps each.

This pie chart shows the proportion of crisps bought by boys and by girls.



This pie chart shows the proportion of each flavour that the pupils bought.



(a) Tick (✓) each sentence to show whether the statement must be true, could be either true or false, or must be false.

	True	Either	False
All of the girls had salted crisps.			
All of the boys had chilli crisps.			
Some of the girls had chilli crisps.			
Some of the boys had salted crisps.			

. . . .

. . . .

2 marks

(b) Complete this sentence to make a different statement that could be either true or false.

	True	Either	False
..... of the ..... had salted crisps.		✓	

. . . .

1 mark

26 Fill the gaps.

The first is done for you.

20 is 50 % of 40

40 is 200 % of 20

(a) 3 is ..... % of 12

12 is ..... % of 3

1 mark

(b) a is 20% of b

b is ..... % of a

1 mark

27 Which one of these is equal to π?

Put a tick (✓) in the box by your answer.

☐ The circumference of a circle divided by its diameter.

☐ The diameter of a circle divided by its circumference.

☐ The circumference of a circle divided by its radius.

☐ The radius of a circle divided by its circumference.

1 mark

28 Mike said,

My game cost 50% more this year than last year.
Next year it will cost 50% less than this year.
So, next year it will be the same price as last year.

Is Mike correct?

Tick (✓) Yes or No.

☐ Yes ☐ No

Explain your answer.

1 mark

Instructions

Answers

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

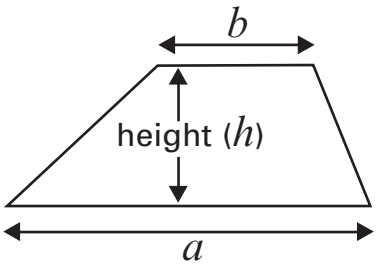
Calculators

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

Formulas

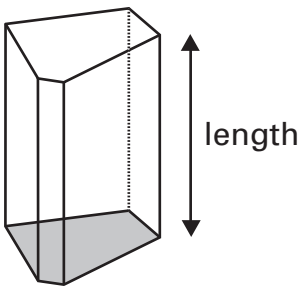
You might need to use these formulas.

Trapezium



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

Prism



Volume = area of cross-section × length

29 Put a ring around the inequality that could express each of these situations.

The first is done for you.

There are 20 people in the club. There are never enough biscuits for everyone to have one each.

$x \leq 20$ $\quad$ (circled) $x < 20$ $\quad$ $20 < x$ $\quad$ $20 \leq x$

x = Number of biscuits.

(a) There are over a hundred people coming to the concert. How many chairs will we need?

$x \geq 100$ $\quad$ $x > 100$ $\quad$ $100 > x$ $\quad$ $100 \geq x$

x = Number of chairs.

. . . .
1 mark

(b) Max walks more quickly than Toby. It takes Toby only 10 minutes to walk to the library from school.

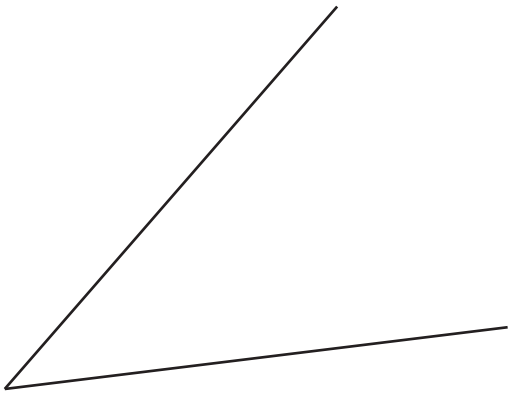
$x \leq 10$ $\quad$ $x < 10$ $\quad$ $10 < x$ $\quad$ $10 \leq x$

x = Number of minutes it takes Max to walk to the library from school.

. . . .
1 mark

30 Use a straight edge and a pair of compasses to complete this rhombus so that it has four sides of equal length.

You must leave in your construction lines.



. . . .

. . . .

2 marks

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