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# Mathematics test

## Paper 2

### Calculator allowed

Please read this page, but do not open the booklet until your teacher tells you to start. Write your name and the name of your school in the spaces below. If you have been given a pupil number, write that also.

First name \_\_\_\_\_

Last name \_\_\_\_\_

School \_\_\_\_\_

Pupil number

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#### Remember

- The test is 1 hour long.
- You may use a calculator in this test.
- You will need: pen, pencil, rubber, ruler, an angle measurer or protractor and a 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.
- 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

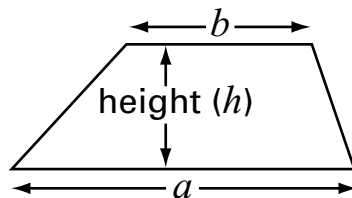


You may use a calculator to answer any question in this test.

## Formulae

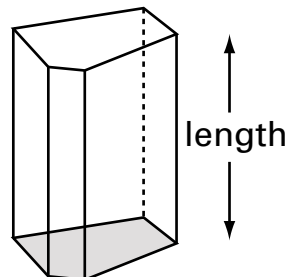
You might need to use these formulae.

### Trapezium



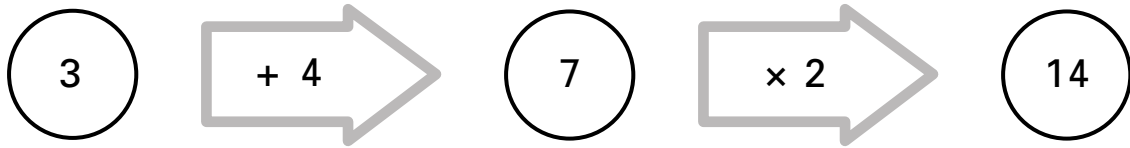
$$\text{Area} = \frac{(a + b)}{2} \times h$$

### Prism

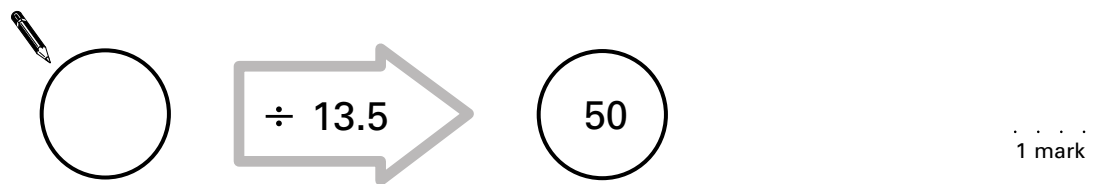
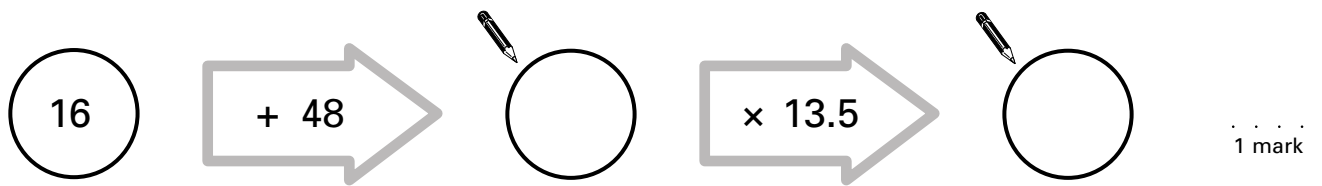


$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

1. Look at this number chain.



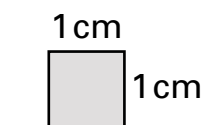
(a) Fill in the missing numbers in the circles below.



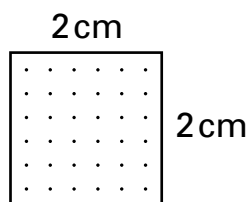
(b) Fill in the missing numbers in the arrows below.



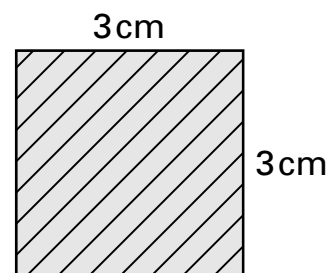
2. Aika has a box of square tiles.  
The tiles are three different sizes.



1 by 1 tile



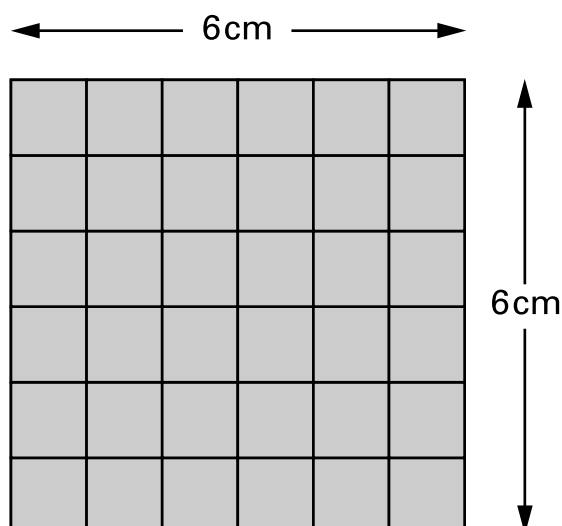
2 by 2 tile



3 by 3 tile

She also has a mat that is 6 cm by 6 cm.

**36** of the 1 by 1 tiles will cover the mat.



- (a) How many of the **2 by 2 tiles** will cover the mat?



.....

.....  
1 mark

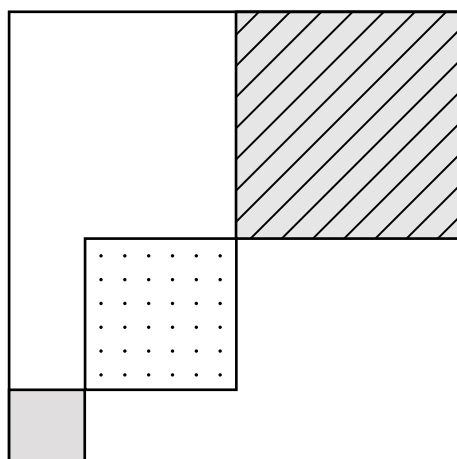
- (b) How many of the **3 by 3 tiles** will cover the mat?



.....

.....  
1 mark

(c) Alika glues three tiles on her mat like this:



Complete the gaps below.

She could cover the rest of the mat by using  
another **two** 3 by 3 tiles, and  
another . . . . . 1 by 1 tiles.

1 mark

She could cover the rest of the mat by using  
another **two** 2 by 2 tiles, and  
another . . . . . 1 by 1 tiles.

1 mark



3. Some pupils are planning a disco.  
They use the spreadsheet on the opposite page to work out their costs.

Use the spreadsheet to answer these questions.

(a) How much does each ticket cost?



£

.....  
1 mark

(b) Explain why column **C** always shows the same amount.



.....  
1 mark

(c) The pupils will lose money if they do not sell many tickets.  
The pupils want to make a **profit**.

What is the smallest number of tickets they need to sell?



.....

.....  
1 mark

(d) The pupils decide they want to make a profit of **at least £20**

Now what is the smallest number of tickets they need to sell?



.....

.....  
1 mark

(e) At the disco they sell **30** tickets.

Work out how much profit they make.




£


.....  
1 mark

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
<b>Number of tickets we might sell</b>	<b>Income from selling tickets</b>	<b>Hire of hall</b>	<b>Cost of food</b>	<b>Total costs</b>	<b>Profit or loss</b>
10	£40.00	£46.50	£15.00	£61.50	-£21.50
11	£44.00	£46.50	£16.50	£63.00	-£19.00
12	£48.00	£46.50	£18.00	£64.50	-£16.50
13	£52.00	£46.50	£19.50	£66.00	-£14.00
14	£56.00	£46.50	£21.00	£67.50	-£11.50
15	£60.00	£46.50	£22.50	£69.00	-£9.00
16	£64.00	£46.50	£24.00	£70.50	-£6.50
17	£68.00	£46.50	£25.50	£72.00	-£4.00
18	£72.00	£46.50	£27.00	£73.50	-£1.50
19	£76.00	£46.50	£28.50	£75.00	£1.00
20	£80.00	£46.50	£30.00	£76.50	£3.50
21	£84.00	£46.50	£31.50	£78.00	£6.00
22	£88.00	£46.50	£33.00	£79.50	£8.50
23	£92.00	£46.50	£34.50	£81.00	£11.00
24	£96.00	£46.50	£36.00	£82.50	£13.50
25	£100.00	£46.50	£37.50	£84.00	£16.00
26	£104.00	£46.50	£39.00	£85.50	£18.50
27	£108.00	£46.50	£40.50	£87.00	£21.00
28	£112.00	£46.50	£42.00	£88.50	£23.50
29	£116.00	£46.50	£43.50	£90.00	£26.00



4. A cookery book shows how long, in minutes, it takes to cook a joint of meat.

 Microwave oven
Time = ( 12 × weight in pounds ) + 15

 Electric oven
Time = ( 30 × weight in pounds ) + 35

- (a) How long will it take to cook a **3 pound** joint of meat in a **microwave oven**?



..... minutes

.....  
1 mark

- (b) How long will it take to cook a **7 pound** joint of meat in an **electric oven**?



..... minutes

.....  
1 mark

- (c) How much quicker is it to cook a **2 pound** joint of meat in a microwave oven than in an electric oven?

Show your working.

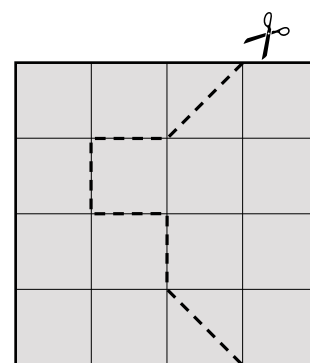


.....  
..... minutes

.....  
2 marks



5. (a) I have a square piece of card.  
I cut along the dashed line to make two pieces of card.



Do the two pieces of card have the **same area**? Tick (✓) Yes or No.



Yes  No

Explain your answer.

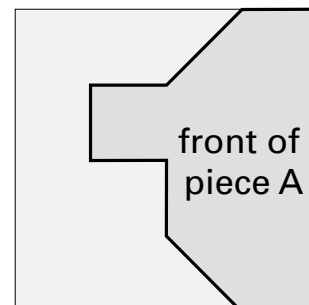


1 mark

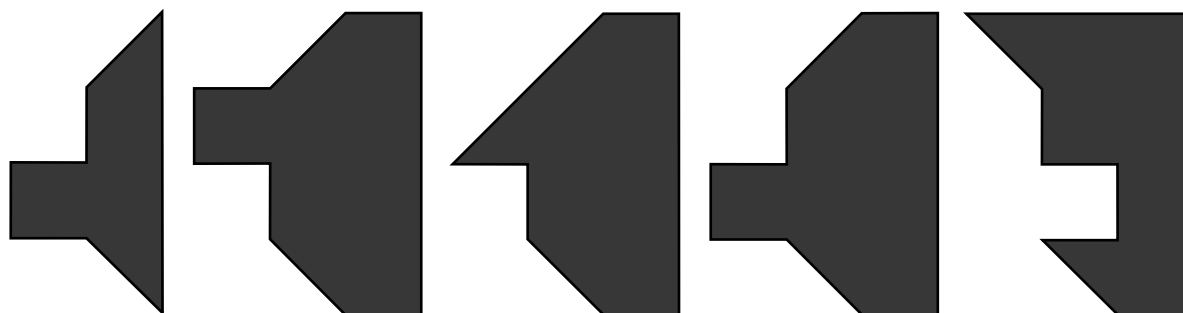
- (b) The card is shaded **grey** on the front, and **black** on the back.

I turn piece A over to see its black side.

Which of the shapes below shows the black side of piece A?



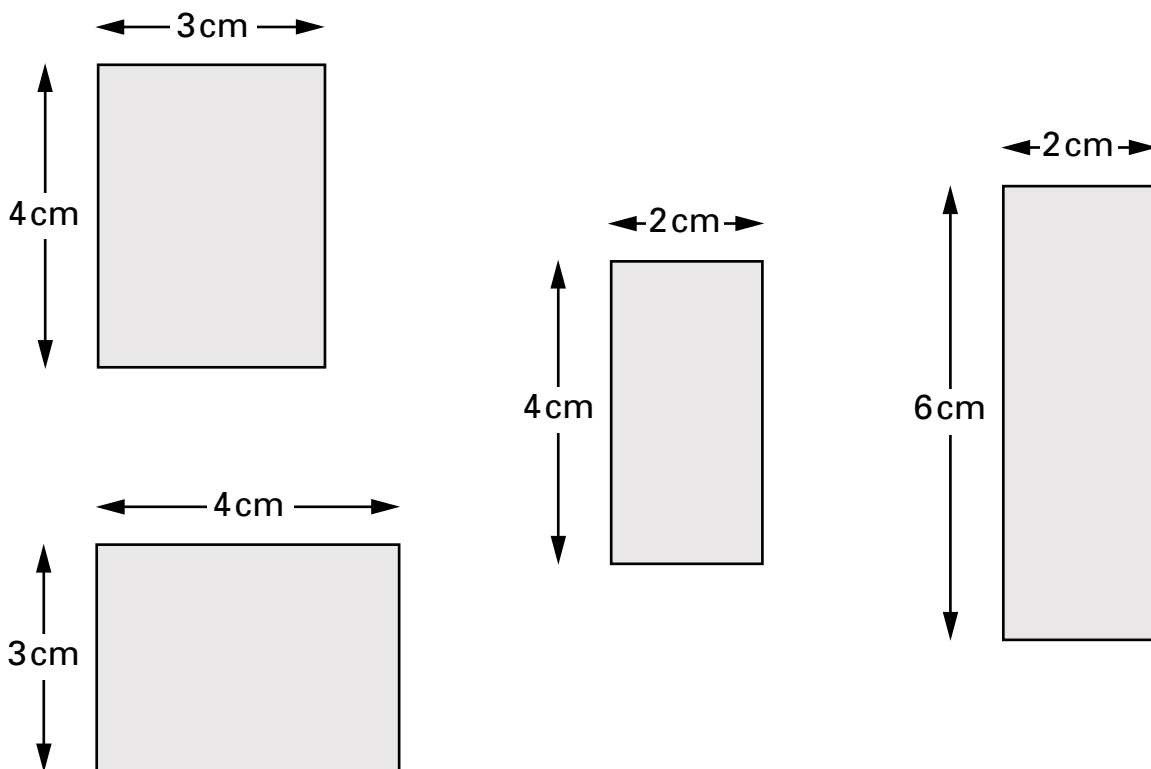
Put a tick (✓) under the correct answer.



1 mark



6. (a) Tick (✓) any rectangles below that have an **area** of  $12\text{cm}^2$



.....  
1 mark

(b) A **square** has an area of  $100\text{cm}^2$

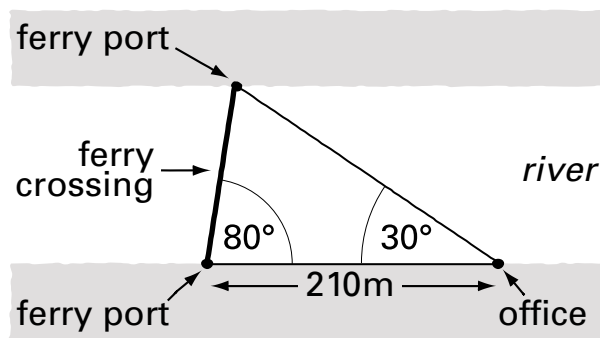
What is its **perimeter**?

Show your working.



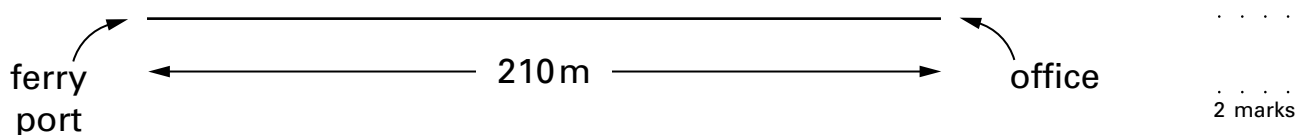
.....  
..... cm  
.....  
2 marks

7. Here is a plan of a ferry crossing.



Not drawn accurately

(a) Complete the accurate scale drawing of the ferry crossing below.



2 marks

(b) What is the length of the ferry crossing on **your** diagram?




1 mark

(c) The scale is **1 cm to 20 m**. Work out the length of the real ferry crossing. Show your working, and **write the units with your answer**.





2 marks



8. (a) You pay **£2.40** each time you go swimming.

Complete the table.



<b>Number of swims</b>	0	10	20	30
<b>Total cost (£)</b>	0	24		

.....  
1 mark


- (b) Now show this information on the graph on the page opposite.  
Join the points with a straight line.

.....

.....  
2 marks

- (c) A different way of paying is to pay a yearly fee of **£22**  
Then you pay **£1.40** each time you go swimming.

Complete the table.



<b>Number of swims</b>	0	10	20	30
<b>Total cost (£)</b>	22	36		

.....  
1 mark

- (d) Now show this information on the same graph.  
Join these points with a straight line.

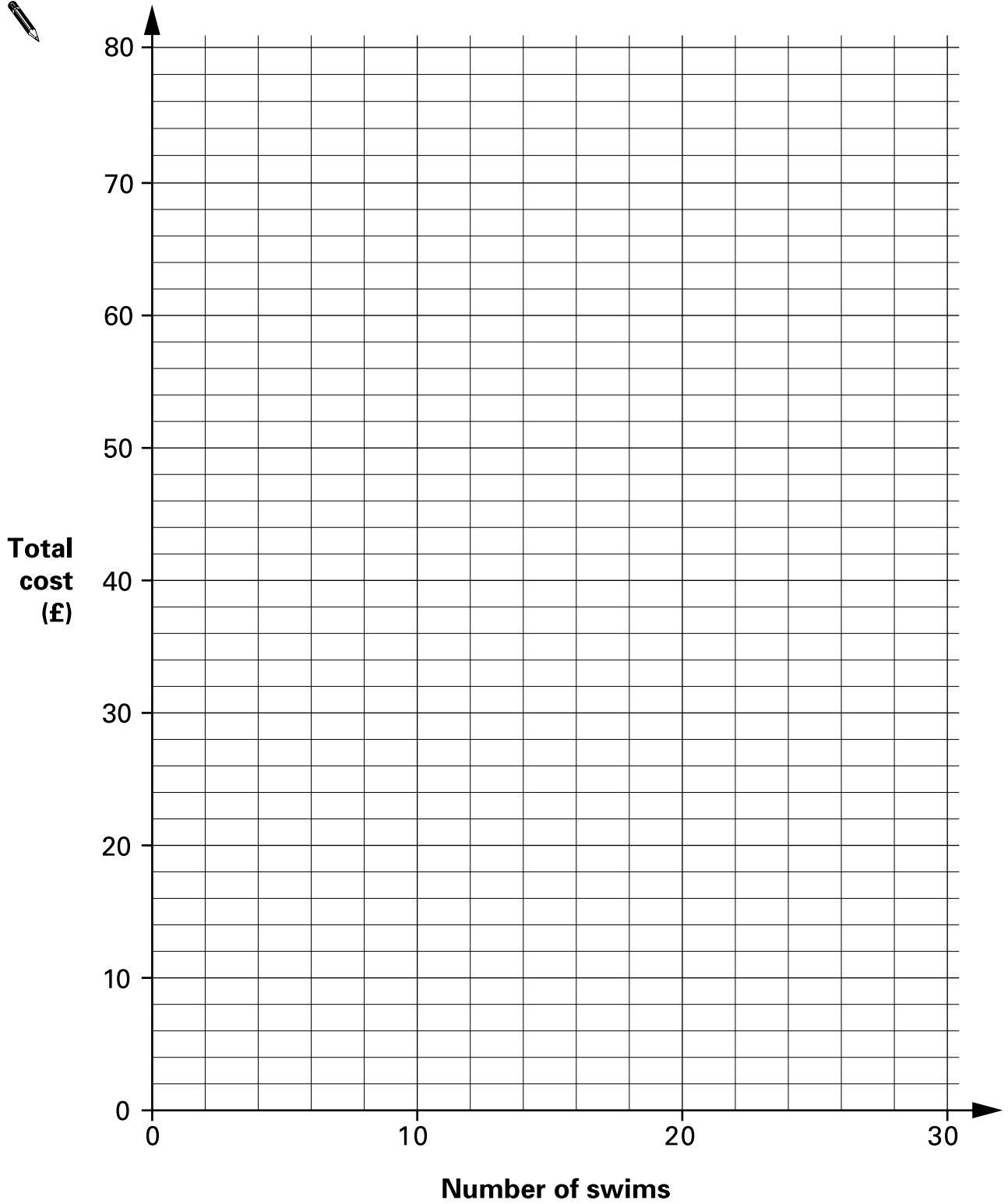
.....

.....  
2 marks

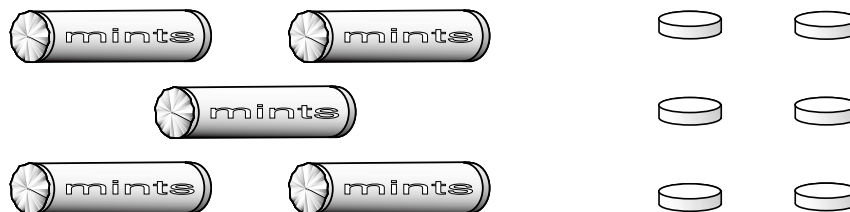
- (e) For **how many swims** does the graph show that  
the cost is the **same** for both ways of paying?



.....  
1 mark



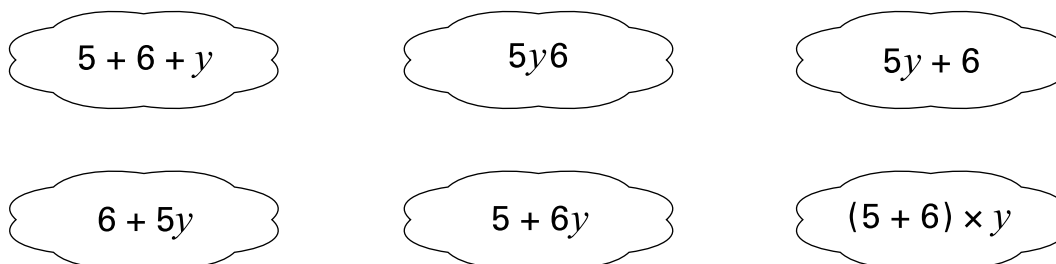
9. A teacher has **5 full packets** of mints and **6 single** mints.  
The number of mints inside each packet is the same.



The teacher tells the class:

**'Write an expression to show how many mints there are altogether.**  
Call the number of mints inside each packet  $y$ '

Here are some of the expressions that the pupils write:



- (a) Write down **two** expressions that are correct.



..... and .....

.....

2 marks

- (b) A pupil says: 'I think the teacher has a total of **56 mints**'.

Could the pupil be correct? Tick (✓) Yes or No.



Yes  No

Explain how you know.



.....  
1 mark

10. A drink from a machine costs **55p**



The table shows the coins that were put into the machine one day.

Coins	Number of coins
50p	31
20p	22
10p	41
5p	59

How many cans of drink were sold that day?

Show your working.



.....  
 .....  
 ..... cans  
 .....  
 3 marks



11. You can work out the cost of an advert in a newspaper by using this formula:

$C = 15n + 75$	<p><b>C</b> is the cost in pounds  <b>n</b> is the number of words in the advert</p>
----------------	--

- (a) An advert has **18 words**.

Work out the cost of the advert.

Show your working.



£
---

.....  
 .....  
 2 marks

- (b) The cost of an advert is **£615**

How many words are in the advert?

Show your working.



..... words

.....  
 .....  
 2 marks



12. (a) A coach travels **300 miles** at an average speed of **40 mph**.

For how many hours does the coach travel?



..... hours

.....  
1 mark

(b) An aeroplane flies **1860 miles** in **4 hours**.

What is its average speed?



..... mph

.....  
1 mark

(c) A bus travels for  **$2\frac{1}{2}$  hours** at an average speed of **24 mph**.

How far does the bus travel?



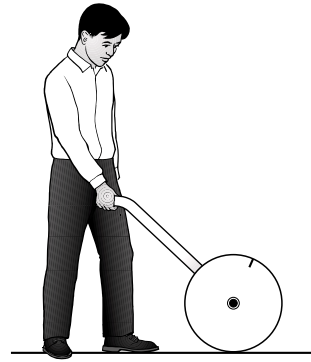
..... miles

.....  
1 mark



13. A trundle wheel is used to measure distances.

Imran makes a trundle wheel, of **diameter 50 cm**.



- (a) Calculate the **circumference** of Imran's trundle wheel.  
Show your working.



..... cm

.....  
.....  
2 marks

- (b) Imran uses his trundle wheel to measure the length of the school car park.  
His trundle wheel rotates **87 times**.

What is the **length** of the car park, to the **nearest metre**?

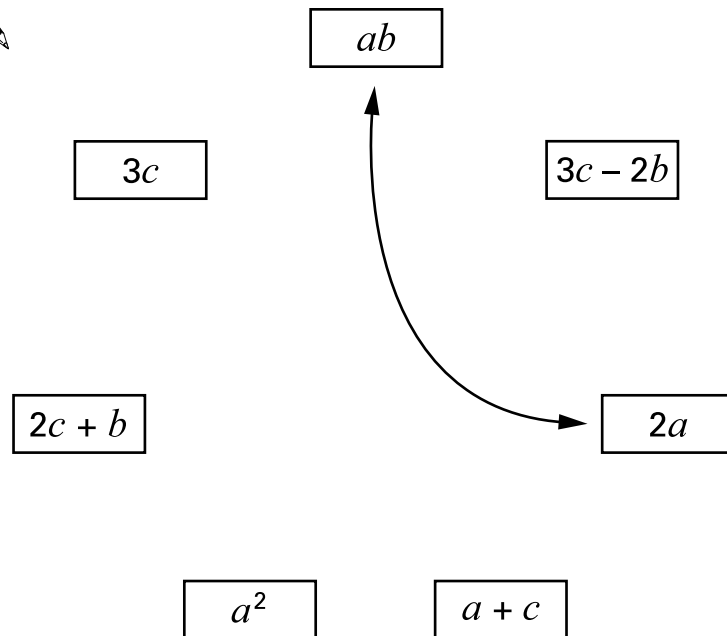


..... m

.....  
1 mark

14. Join pairs of algebraic expressions that have the **same value** when  $a = 3$ ,  $b = 2$  and  $c = 6$

One pair is joined for you.



.....  
.....  
2 marks



15. A teacher asked two different classes:

'What type of book is your favourite?'

(a) Results from **class A** (total 20 pupils):

Type of book	Frequency
Crime	3
Non-fiction	13
Fantasy	4

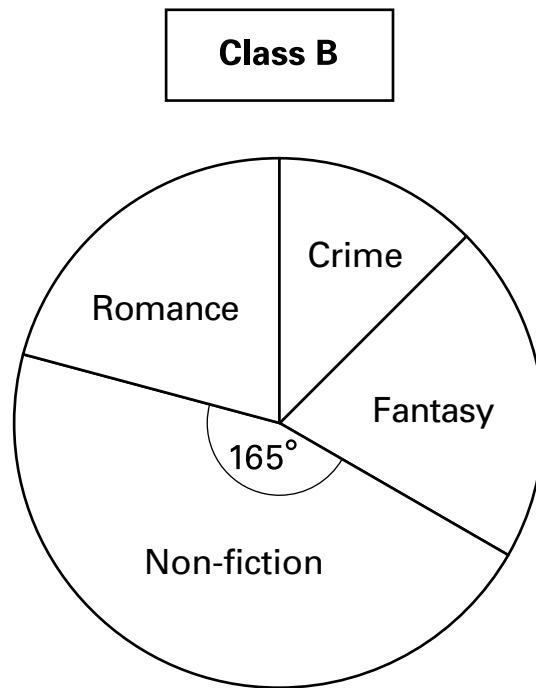
Complete the pie chart to show this information.  
Show your working and draw your angles accurately.



.....  
.....  
2 marks

(b) The pie chart below shows the results from all of **class B**.

Each pupil had only one vote.



The sector for **Non-fiction** represents **11 pupils**.

How many pupils are in class B?

Show your working.



..... pupils

.....  
2 marks



16. The label on a pot of yoghurt shows this information.

How many grams of **protein** does **100 g** of yoghurt provide?

Show your working.



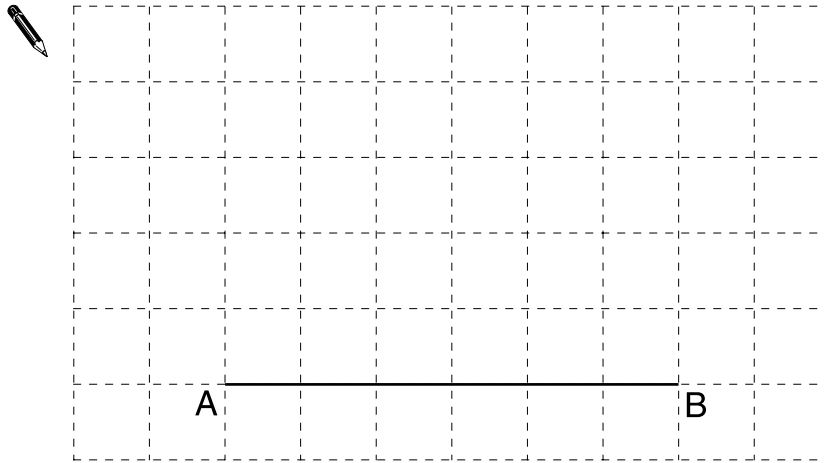
Yoghurt 125 g	
Each 125 g provides	
Energy	430 kJ
Protein	4.5 g
Carbohydrate	11.1 g
Fat	4.5 g

..... g

.....

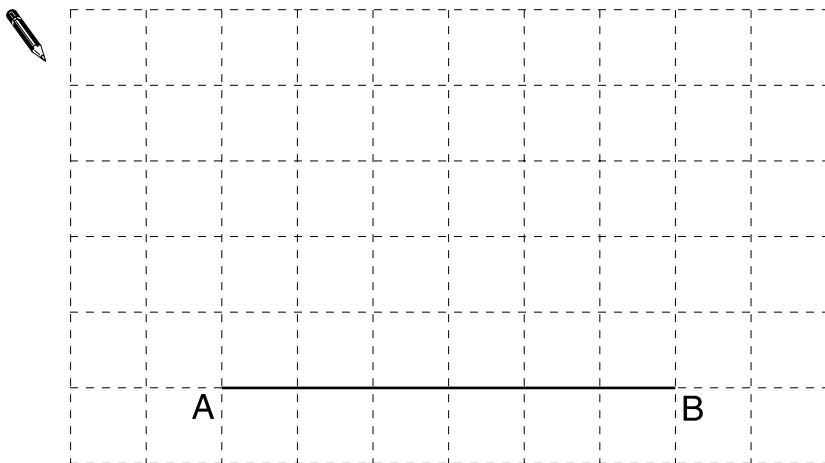
.....  
2 marks

17. (a) On the  $\text{cm}^2$  grid below, draw a **right-angled triangle** with an area of  $12 \text{ cm}^2$   
Use line AB as one side of the triangle.



1 mark

- (b) Now draw an **isosceles triangle** with an area of  $12 \text{ cm}^2$   
Use line AB as one side of the triangle.



1 mark



