



Rewarding Learning

General Certificate of Secondary Education  
January 2020

Centre Number

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Candidate Number

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## Mathematics

Unit M2

(With calculator)

Foundation Tier



**MV18**

[GMC21]

MONDAY 13 JANUARY, 9.15am–11.00am

### Time

1 hour 45 minutes, plus your additional time allowance.

### Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write on blank pages.**

Complete in black ink only. Answer **all twenty-eight** questions.

All working should be clearly shown in the spaces provided.

Marks may be awarded for partially correct solutions.

You **may** use a calculator for this paper.

### Information for Candidates

Functional Mathematics is assessed in this unit.

The total mark for this paper is 100.

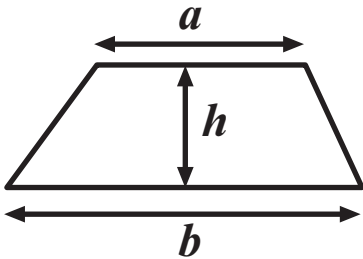
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

You should have a calculator, ruler, compasses and a protractor.

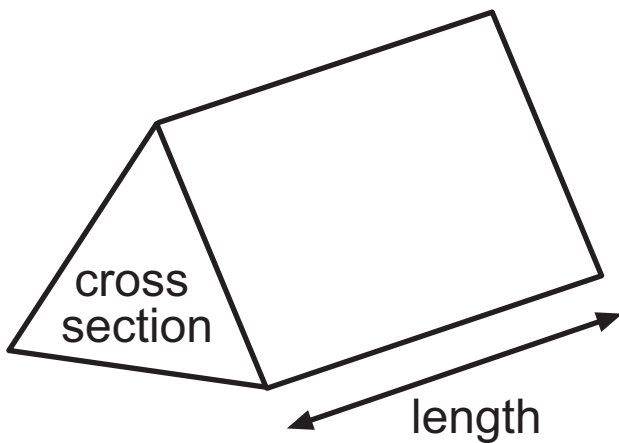
The Formula Sheet is on page 2.

# Formula Sheet

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



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



1 The table shows information about eight different cameras.

Name of camera	Price (£)	Weight (g)	Battery life (shots)	Resolution (megapixels)	Touchscreen
Tinon 10	479	460	260	24	Yes
Tinon 20	605	510	400	28	No
Fiji F1	345	390	366	12	No
Fiji F2	380	360	450	18	Yes
Nika N400	750	625	300	20	No
Nika N500	879	775	365	24	No
Olympia OL	399	375	240	16	Yes
Olympia OM	549	390	275	20	No

Stan wants to buy a camera with  
a resolution of at least 20 megapixels and  
a weight under 500 g.

Write down the names of the two cameras that he  
could buy. [1 mark]

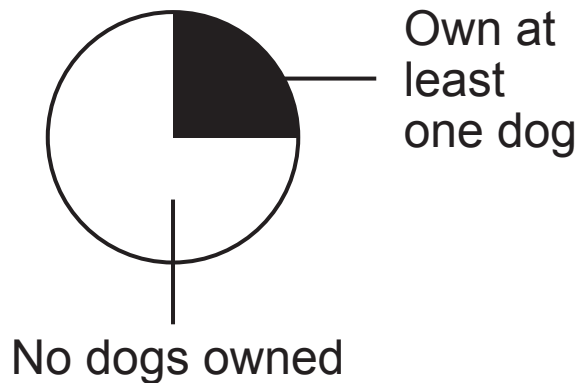
Answer \_\_\_\_\_ and \_\_\_\_\_

- 2 The pie charts show the proportion of households in the UK in 2017 that owned dogs.

The number of households in each country is also shown.

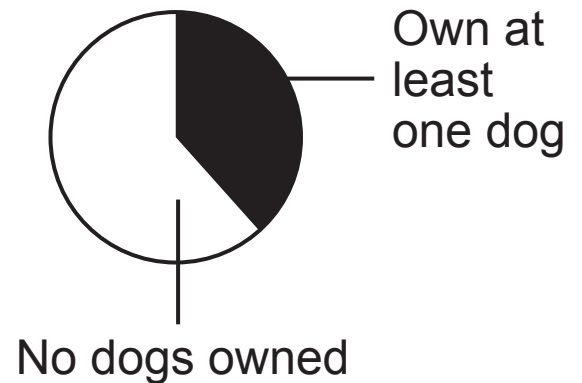
**England**

(22 million households)



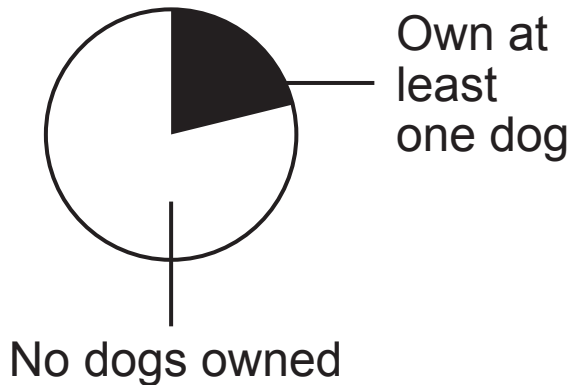
**Northern Ireland**

(800 000 households)



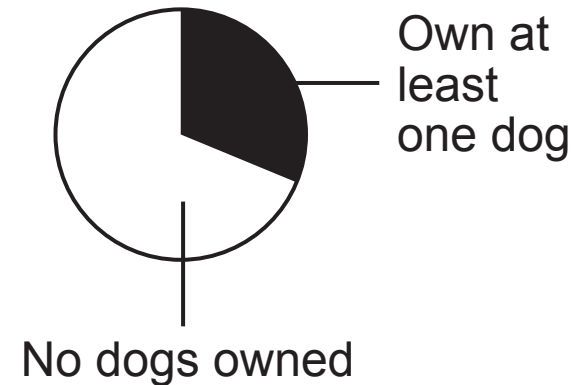
**Scotland**

(2.4 million households)



**Wales**

(1.3 million households)



- (a) What percentage of households in England own at least one dog? [1 mark]

Answer \_\_\_\_\_ %

- (b) About what fraction of households in Wales own at least one dog? [1 mark]

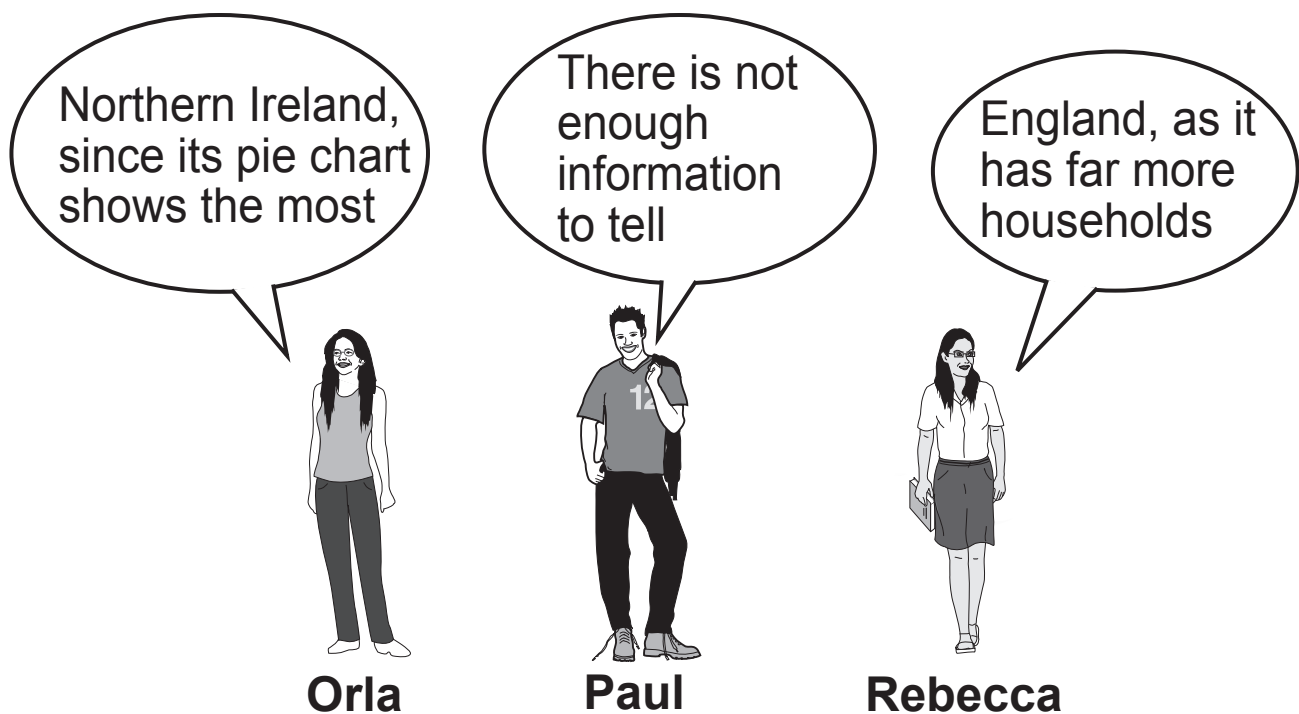
Answer \_\_\_\_\_

- (c)  $\frac{3}{8}$  of the households in Northern Ireland own at least one dog.

How many households is this? [1 mark]

Answer \_\_\_\_\_ households

- (d) Three friends were asked which country in the UK has the most households owning dogs.



Circle the person you agree with. [1 mark]

Orla

Paul

Rebecca

3 Below are some of Denzel's school exam results.

$$\text{English } \frac{13}{20}$$

$$\text{Maths } \frac{46}{50}$$

$$\text{Science } \frac{7}{10}$$

$$\text{LLW } \frac{21}{25}$$

(a) Write Denzel's English result as a percentage.  
[1 mark]

Answer \_\_\_\_\_ %

(b) Put his results in order, starting with his **highest** result.  
[3 marks]

You must show all your working.

Answer \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_  
                  ↑  
                  highest

- 4 (a) What is the value of the digit 4 in the number 3.04?  
[1 mark]

Circle the correct answer.

$$\frac{4}{10}$$

40

4

400

$$\frac{4}{100}$$

- (b) Put these decimals in order of size, starting with the **smallest**. [1 mark]

3.024

3.1

3.24

3.124

Answer \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_  
                  ↑  
                  smallest

5 Ciara bought four burgers.

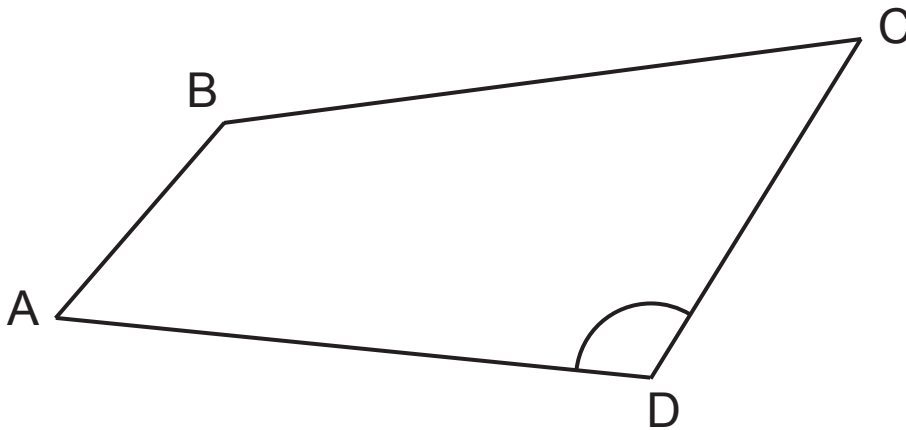
She paid with a £20 note and got £6 change.

How much did each burger cost? [2 marks]

Answer £ \_\_\_\_\_

---

6



(a) Measure the length of the line BC in mm. [2 marks]

Answer \_\_\_\_\_ mm

(b) Measure the size of angle CDA. [1 mark]

Answer \_\_\_\_\_ °



**7** Insert the correct symbol in each box below. [4 marks]

<                      >                      =

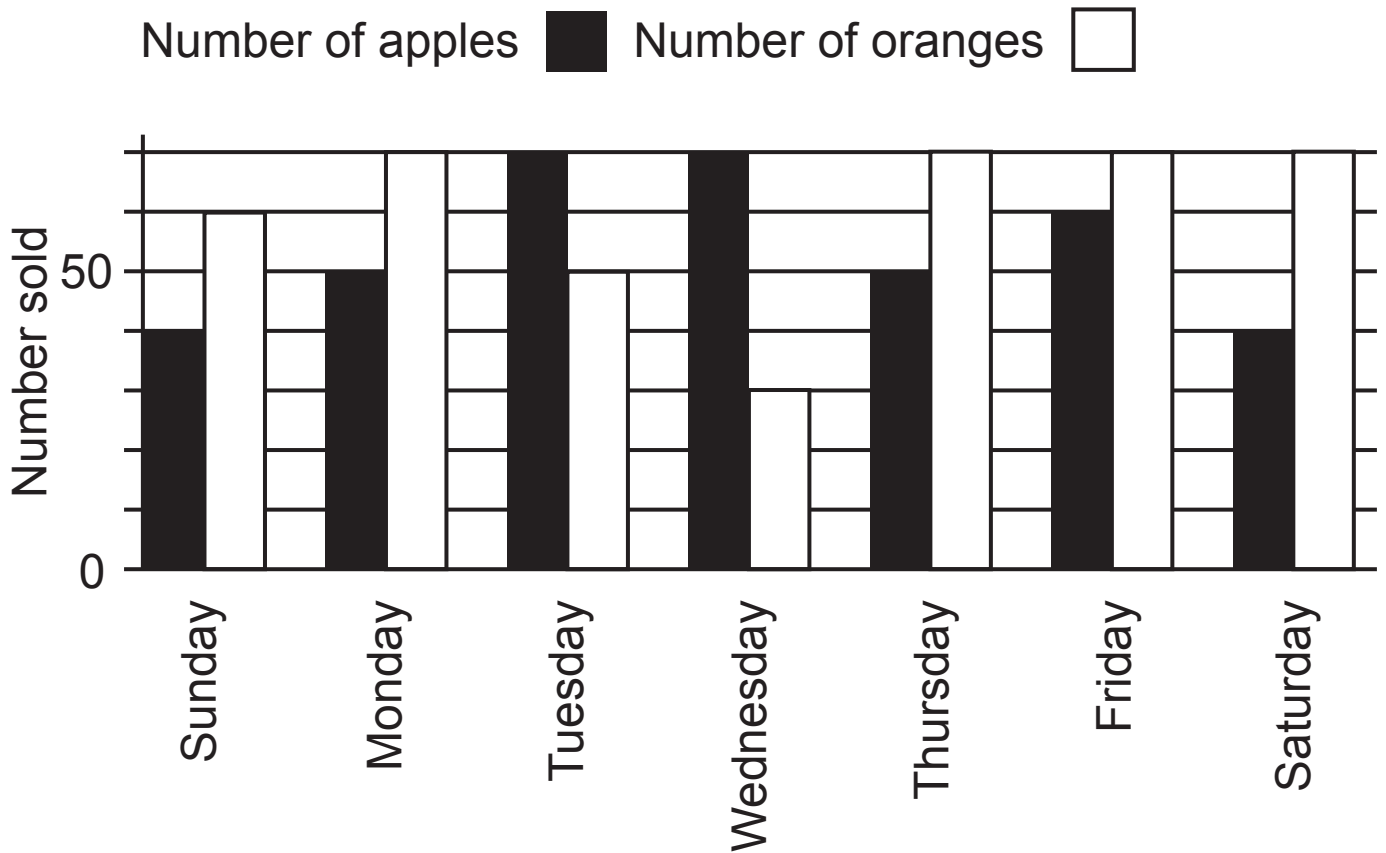
**(a)** 375 mm     37.5 cm

**(b)** 600 g     6 kg

**(c)** 27 litres     26 900 ml

**(d)** 310 mins     5 hours

- 8 The dual bar chart shows how many apples and oranges were sold in a fruit shop last week.



The owner says

“I sold 50 more oranges than apples last week.”

Is he correct? [3 marks]

You must explain your answer.

Answer \_\_\_\_\_ because \_\_\_\_\_

**9** 8500 tickets for a concert are sold.

The organisers think that 40% of the ticket holders will turn up more than an hour before the start.

How many ticket holders will this be? [2 marks]

Answer \_\_\_\_\_

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**10** Silverside costs £4.90 per kg

Topside costs £5.75 per kg

Fillet costs £13.00 per kg

Martin buys 4.5 kg of Fillet.

He also buys some Silverside.

The total cost is £92.31

How much Silverside does he buy? [4 marks]

Answer \_\_\_\_\_ kg

**11 (a)** Calculate the value of  $\frac{2}{0.4^2}$  [2 marks]

Answer \_\_\_\_\_

**(b)** Calculate the cube of 6 [1 mark]

Answer \_\_\_\_\_

**(c)** 36

1

19

49

10

39

15

31

From the numbers in the list, write down all the

**(i)** prime numbers, [1 mark]

Answer \_\_\_\_\_

**(ii)** square numbers. [1 mark]

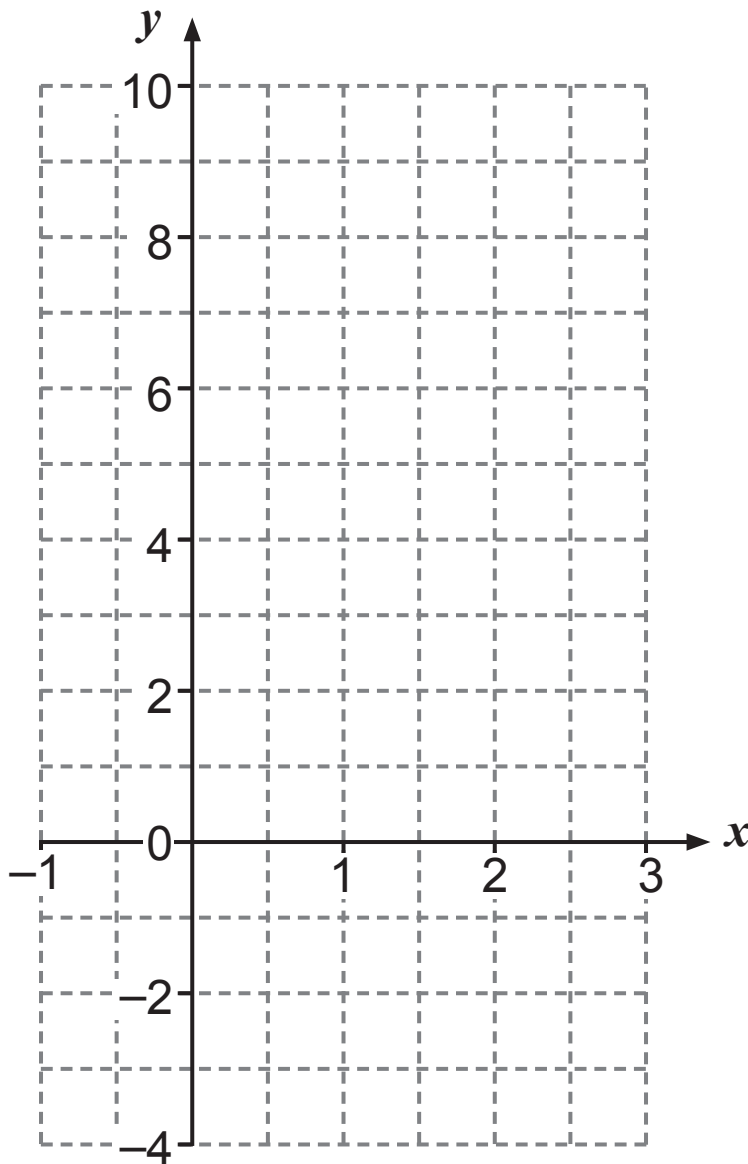
Answer \_\_\_\_\_

**12 (a)** Complete the table below for  
[1 mark]

$$y = 4x - 3$$

$x$	1	2	3
$y$			

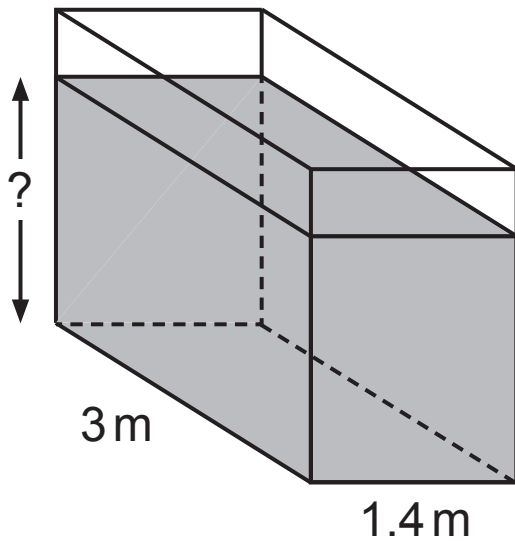
**(b)** Draw the line  $y = 4x - 3$  on the grid below  
[2 marks]



**13** A tank is in the shape of a cuboid, as shown below.

The tank is used to store  $11.13 \text{ m}^3$  of liquid.

How deep is the liquid in the tank? [3 marks]



Answer \_\_\_\_\_ m

14 Work out the size of the angle marked  $x$  in the diagram below. [3 marks]

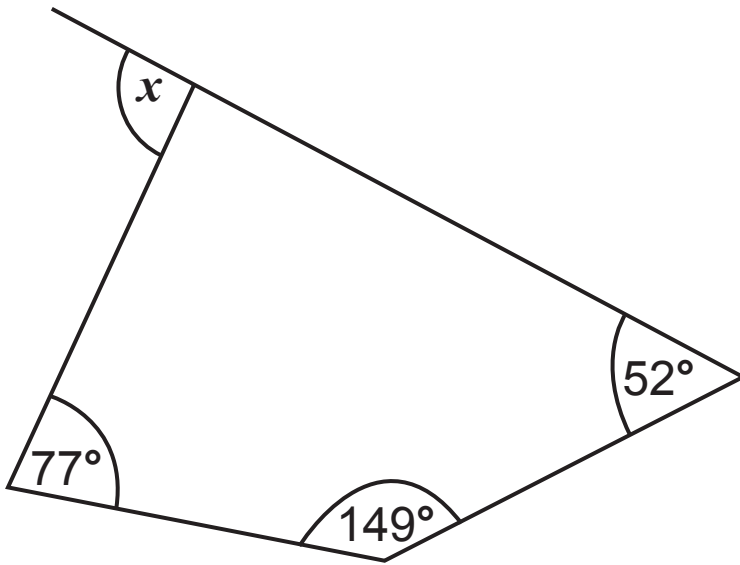


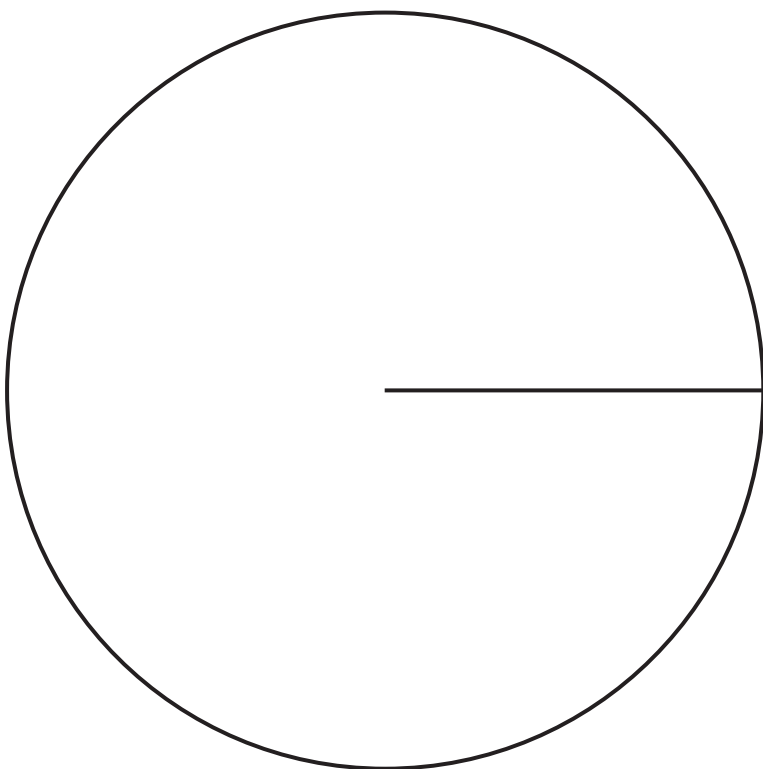
diagram not  
drawn accurately

Answer \_\_\_\_\_ $^\circ$

**15** The total sales figures for a supermarket one month are shown below.

<b>Department</b>	<b>Total Sales (£1000s)</b>	
Food	65	
Electrical	32	
Clothing	46	
Household	23	
Health & Beauty	14	

Draw a pie chart to show this information. [4 marks]





**16** A hotel has single, twin and family rooms.

It offers room only, bed and breakfast (B&B) or half board.

On Saturday night, all the rooms in the hotel were booked.

Some information is shown in this two-way table.

	<b>Room only</b>	<b>B&amp;B</b>	<b>Half board</b>	
<b>Single</b>	2	1		4
<b>Twin</b>		4	3	
<b>Family</b>	1		6	10
	7			

How many rooms are in the hotel? [3 marks]

Answer \_\_\_\_\_

**17** Streetwise Youth Club has 86 members.

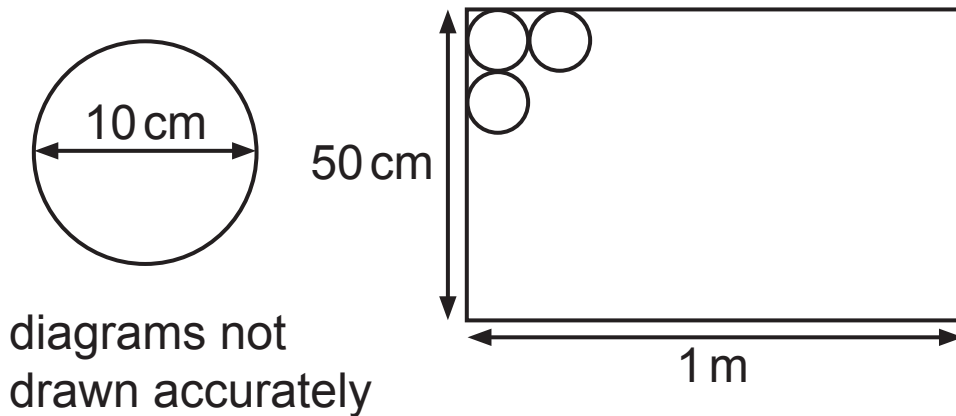
59 of the members attended last week.

What percentage attended last week? [3 marks]

Give your answer to 1 decimal place.

Answer \_\_\_\_\_ %

**18** Circles with diameter 10 cm are cut from a sheet of plastic as shown below.



**(a)** Calculate the area of each circle. [2 marks]

Answer \_\_\_\_\_  $\text{cm}^2$

**(b)** How many circles can be cut from the sheet of plastic? [2 marks]

Answer \_\_\_\_\_

**(c)** What is the area of the plastic left over after the maximum number of circles have been cut out? [3 marks]

Answer \_\_\_\_\_  $\text{cm}^2$

**19** Julie works on a market stall.

One Saturday she has 42 boxes of candles to sell.

Each box cost her £2.40

There are 18 candles in each box.

During the day she sells 34 boxes at £3.60 each.

In the last hour she starts to sell the remaining candles individually at 35p each.

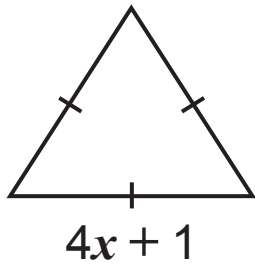
At the end of the day she has only 12 candles left.

Calculate the profit she made that day. [6 marks]

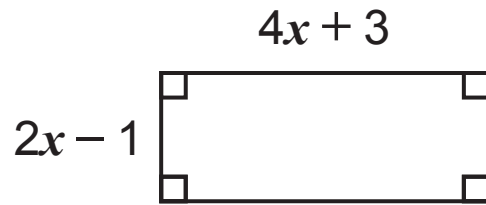
Answer £ \_\_\_\_\_

**20** Which of these shapes has the greatest perimeter?  
[4 marks]

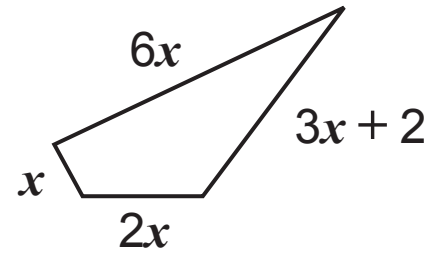
**Show all your working.**



Shape A



Shape B



Shape C

Answer Shape \_\_\_\_\_

**21** A shop sells 80 gift vouchers valued at £5, £10, £20, £50 or £100

The table shows the number of each sold one weekend.

<b>Price of gift voucher</b>	<b>Number of vouchers sold</b>	
£5	34	
£10	26	
£20	9	
£50	7	
£100	4	

The shopkeeper states “on average people spend at least £15 on a gift voucher”.

By finding all three averages (mode, median, mean), which average makes her statement correct? [5 marks]

Answer \_\_\_\_\_ because \_\_\_\_\_

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**22** BMI (Body Mass Index) is calculated using the formula

$$\text{BMI} = \frac{w}{h^2}$$

where  $w$  = weight in kilograms and  $h$  = height in metres.

Mark has a BMI of 22

His height is 1.83 m.

Calculate his weight. [2 marks]

Answer \_\_\_\_\_ kg

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**23** Solve  $5(3x - 2) = 7x + 4$  [3 marks]

Answer  $x =$  \_\_\_\_\_

**24 (a)** Find the highest common factor (HCF) of 24 and 40  
[2 marks]

Answer \_\_\_\_\_

**(b)** Write down two numbers, greater than 1, which have a lowest common multiple (LCM) of 48 [2 marks]

Answer \_\_\_\_\_ , \_\_\_\_\_

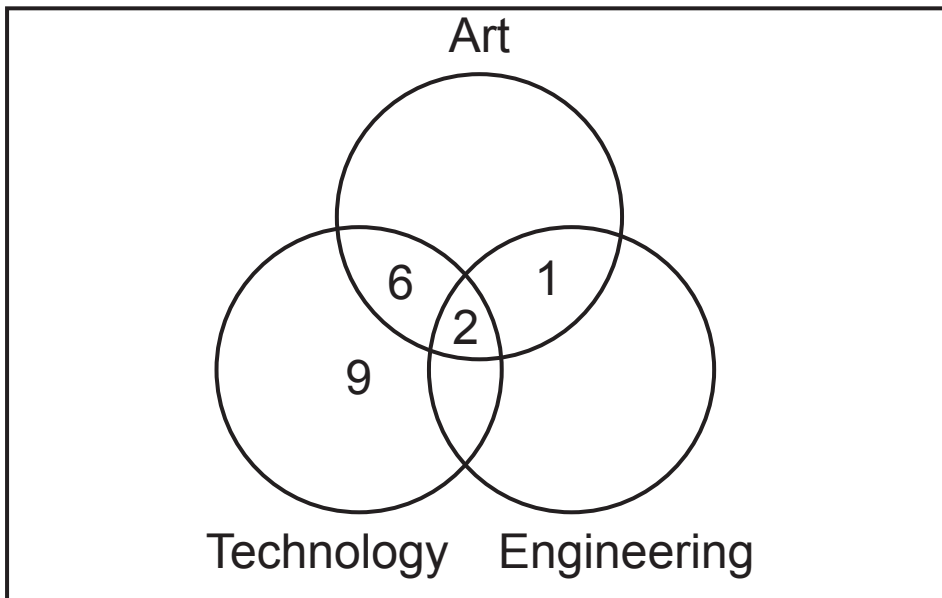


**25** There are 35 students in a Form Class.

Some students study Art, some study Technology, some study Engineering and some study a combination of these subjects.

Some study none of these subjects.

The Venn diagram shows some information about the number of students studying the subjects.



5 students study Technology and Engineering.

14 students study Art.

8 students study Engineering.

**(a)** Use this information to complete the Venn diagram.  
[4 marks]

**(b)** Use the Venn diagram to calculate what percentage of Technology students also study Art but not Engineering.  
[2 marks]

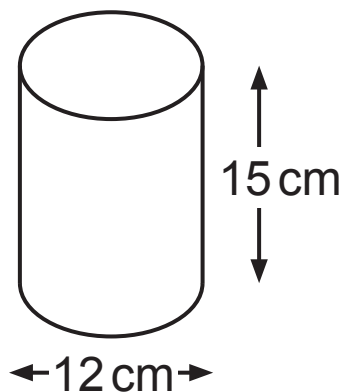
Answer \_\_\_\_\_ %

- 26** Work out the midpoint of the line PQ joining P(4, -6) and Q(8, 2). [2 marks]

Answer ( \_\_\_\_\_ , \_\_\_\_\_ )

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- 27** Calculate the volume of a cylinder with diameter 12 cm and height 15 cm. [2 marks]



Answer \_\_\_\_\_ cm<sup>3</sup>

- 28** A badge is made from a triangle and three-quarters of a circle as shown.

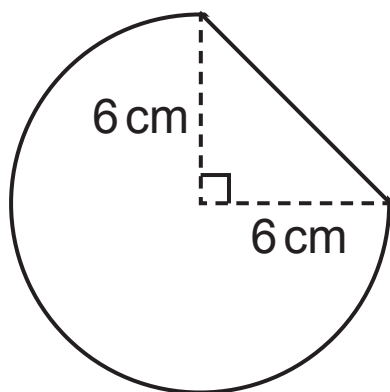


diagram not  
drawn accurately

Work out the perimeter of the badge. [6 marks]

Answer \_\_\_\_\_ cm

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**This is the end of the question paper**

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For Examiner's use only	
Question Number	Marks
1	
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<b>Total Marks</b>	
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Examiner Number

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