**Pearson Edexcel
Level 1 / Level 2
GCSE (9–1)**

Centre Number	Candidate Number

Mathematics Middle Questions
Paper 1 (Non-Calculator)

Foundation Tier

Thursday 25 May 2017 – Morning	Paper Reference
Time: 1 hour 30 minutes	**1MA1/1F**

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
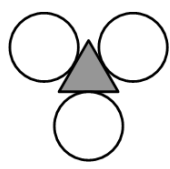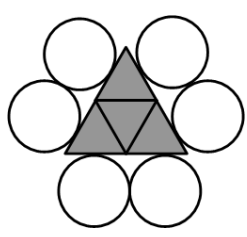- Check your answers if you have time at the end.

P48134A0120

1 A sequence of patterns is made from triangular tiles and circular tiles

Here are the first three patterns in the sequence.

pattern number 1   pattern number 2   pattern number 3

(a) How many triangular tiles are needed to make pattern number 8?

....

(2)

(b) How many circular tiles are needed to make pattern number 20?

....

(2)

Derek says,

"When the pattern number is odd, an odd number of circular tiles is needed to make the pattern."

(c) Is Derek right?
You must give reasons for your answer.

....

....

(2)

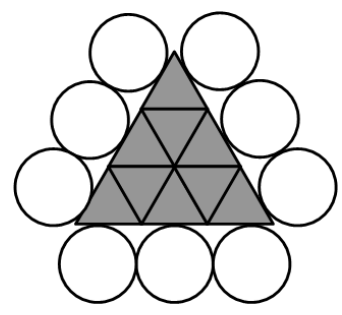**(Total for Question 1 is 6 marks)**

P48134A0620

2 A sequence of patterns is made from circular tiles ⬤ and square tiles ☐

Here are the first three patterns in the sequence.
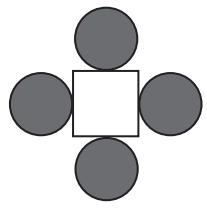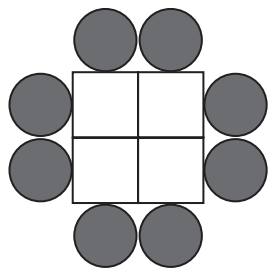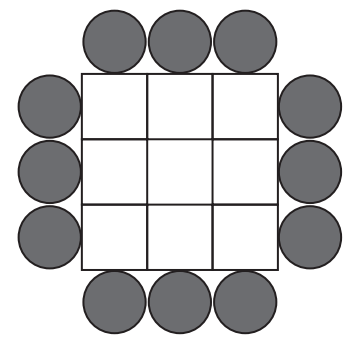
pattern number 1   pattern number 2   pattern number 3

(a) How many square tiles are needed to make pattern number 6?

....

(2)

(b) How many circular tiles are needed to make pattern number 20?

....

(2)

Derek says,

"When the pattern number is odd, an odd number of square tiles is needed to make the pattern."

(c) Is Derek right?
You must give reasons for your answer.

....

....

(2)

(Total for Question 2 is 6 marks)

3 There are only 7 blue pens, 4 green pens and 6 red pens in a box.

One pen is taken at random from the box.

Write down the probability that this pen is blue.

....

(Total for Question 3 is 2 marks)

4 The diagram shows a house and a man.
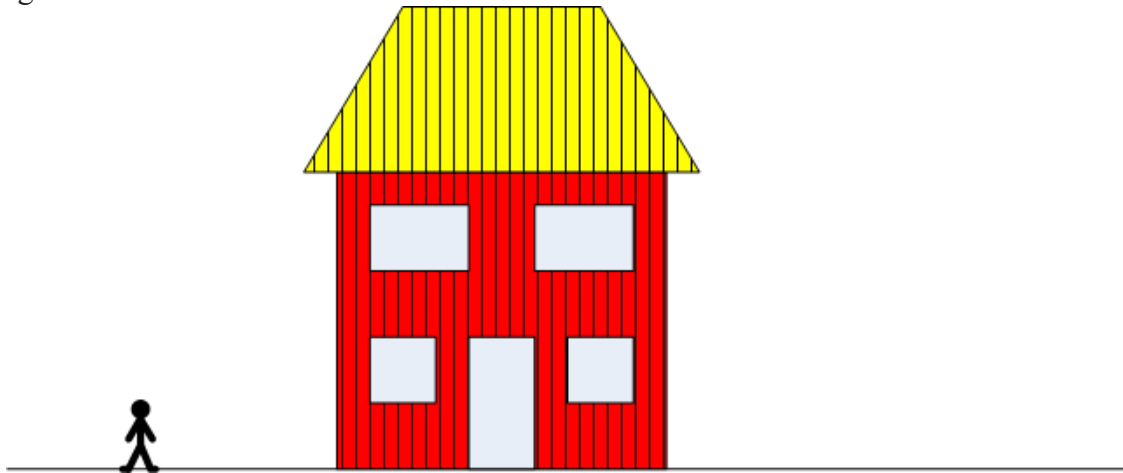
The man is of average height.
The tree and the man are drawn to the same scale.

(a) Write down an estimate for the real height, in metres, of the man.

.... metres

(1)

(b) Find an estimate for the real height, in metres, of the house.

.... metres

(2)

(Total for Question 4 is 3 marks)

5 There are only 7 blue pens, 4 green pens and 6 red pens in a box.

One pen is taken at random from the box.

Write down the probability that this pen is blue.

....

(Total for Question 5 is 2 marks)

6 The diagram shows a tree and a man.

The man is of average height.
The tree and the man are drawn to the same scale.

(a) Write down an estimate for the real height, in metres, of the man.

.... metres

(1)

(b) Find an estimate for the real height, in metres, of the tree.

.... metres

(2)

(Total for Question 6 is 3 marks)

7 Year 9 students from Halle School were asked to choose one language to study.

The table shows information about their choices.

Language	Number of students	
French	31	
Spanish	17	
German	12	

(a) Draw an accurate pie chart to show this information.

(3)

Year 9 students from Lowry School were also asked to choose one language to study.

This accurate pie chart shows information about their choices.

Shameena says,

"The pie chart shows that French was chosen by more Year 9 students at Lowry School than at Halle School."

(b) Is Shameena right?
You must explain your answer.

....

....

....

(1)

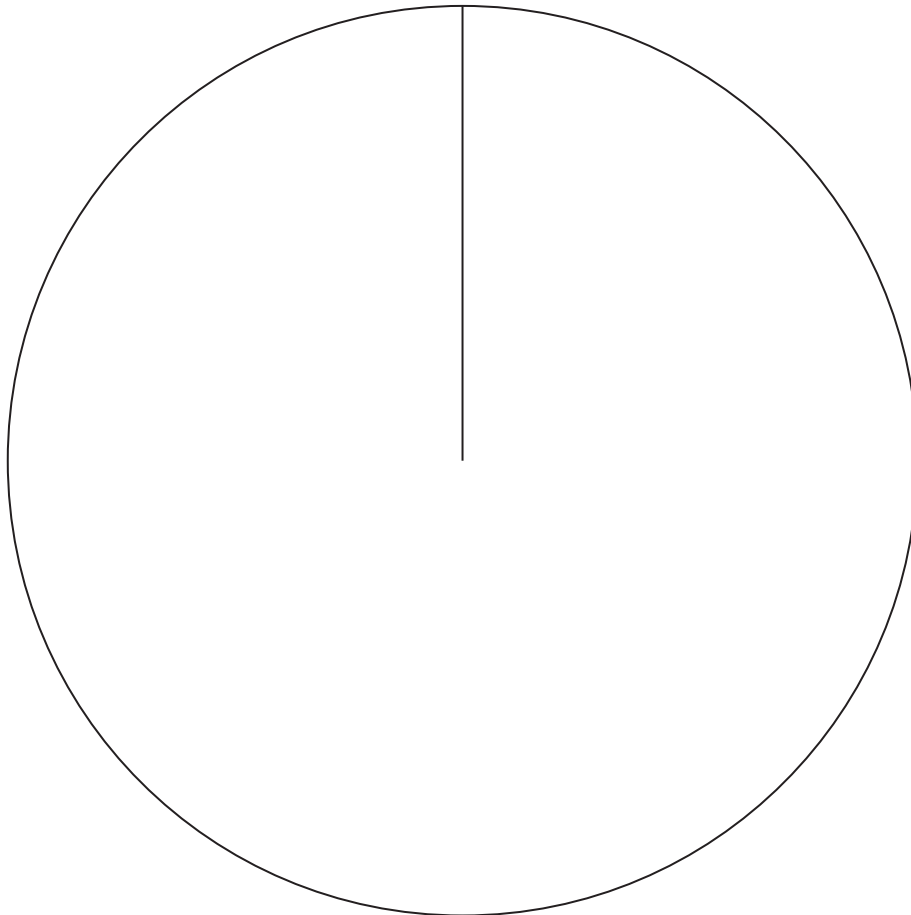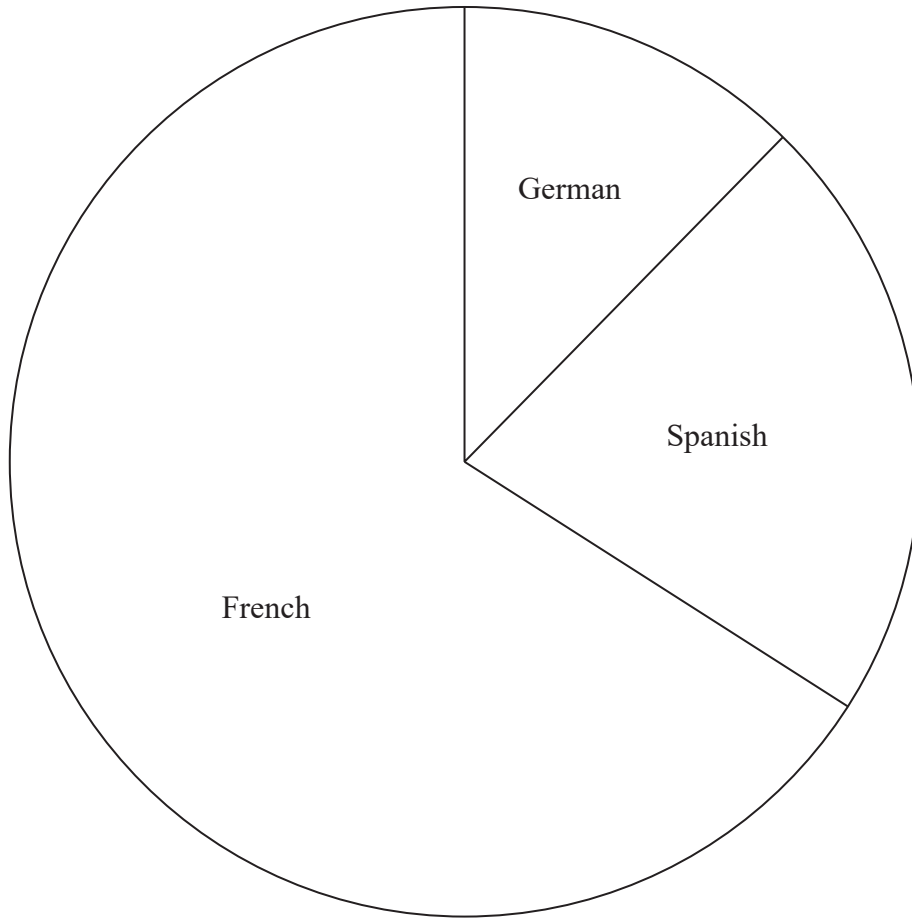**(Total for Question 7 is 4 marks)**

8 Year 9 students from Halle School were asked to choose one language to study.

The table shows information about their choices.

Language	Number of students	
French	56	
Spanish	40	
German	24	

(a) Draw an accurate pie chart to show this information.
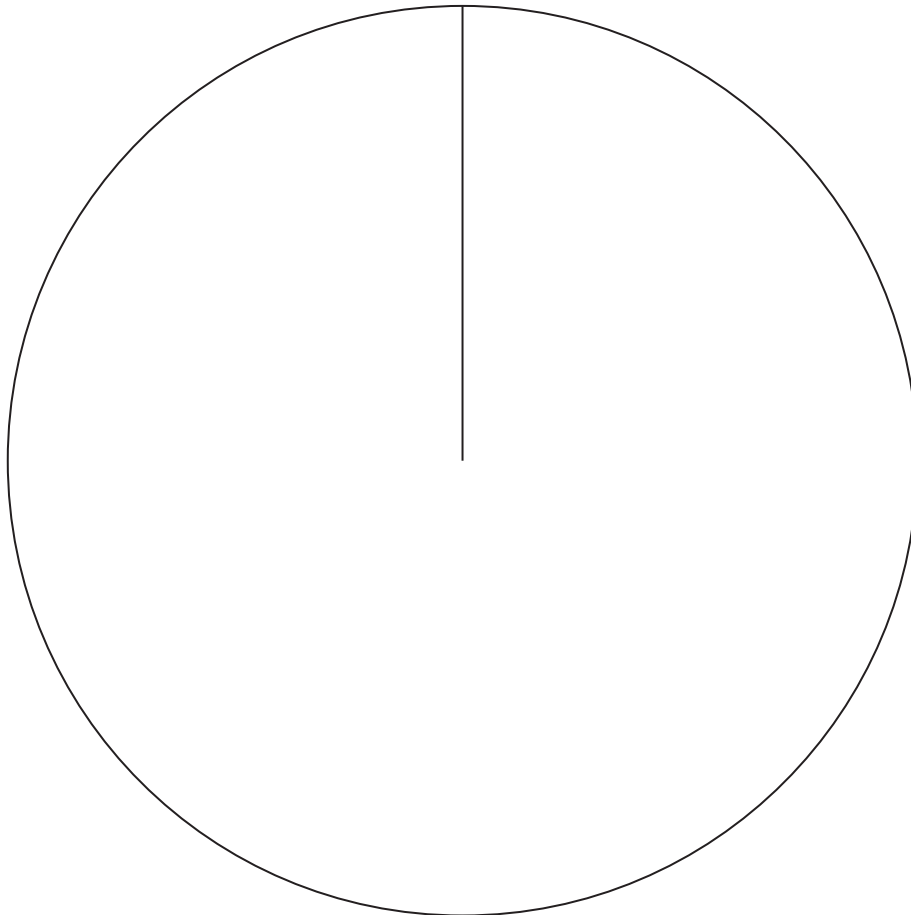
(3)

Year 9 students from Lowry School were also asked to choose one language to study.

This accurate pie chart shows information about their choices.

Shameena says,

"The pie chart shows that French was chosen by more Year 9 students at Lowry School than at Halle School."

(b) Is Shameena right?
You must explain your answer.

....

....

....

(1)
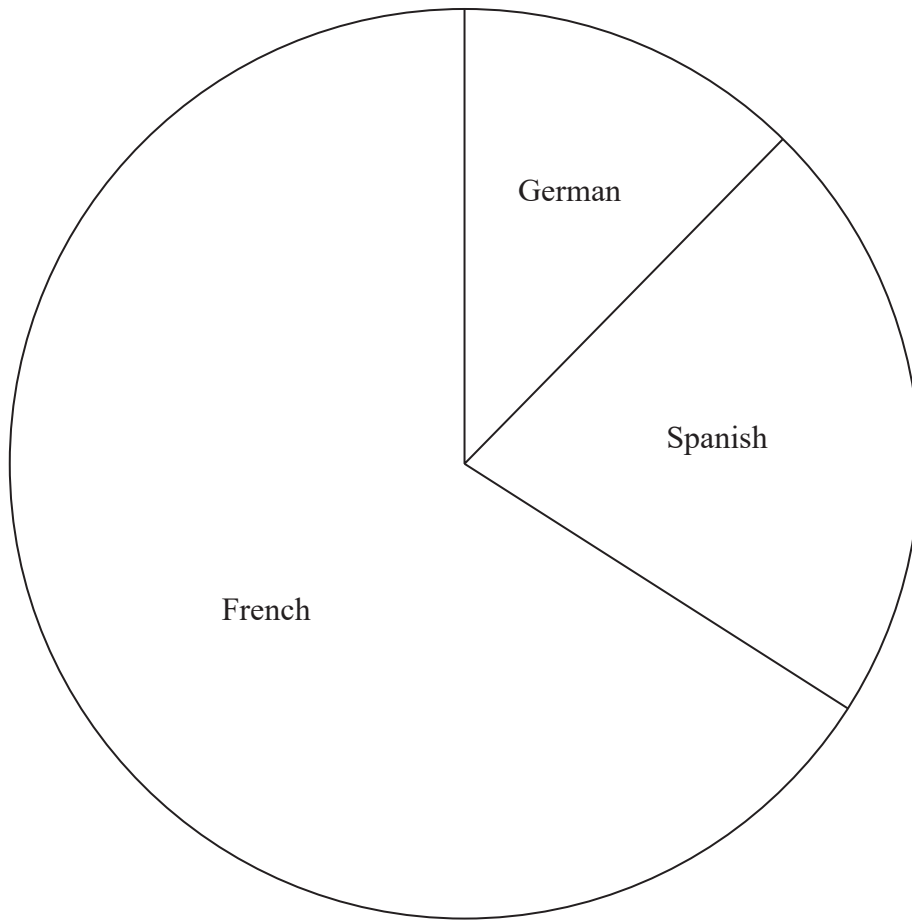
(Total for Question 8 is 4 marks)

9 Here are a triangle and a rectangle.

12 cm

9 cm

18 cm
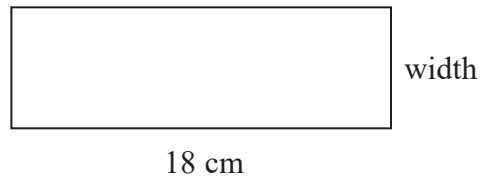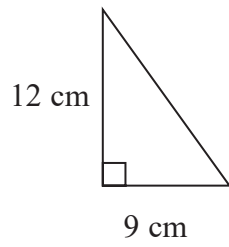
width

The area of the rectangle is 8 times the area of the triangle.

Work out the width of the rectangle.

.... cm

(Total for Question 9 is 4 marks)

10 $v = u + at$

$u = 4$ $a = 5$ $t = \dfrac{1}{2}$

Work out the value of v.

$v = $ ....

(Total for Question 10 is 2 marks)

11 Here is a probability scale.
It shows the probability of each of the events A, B, C and D.
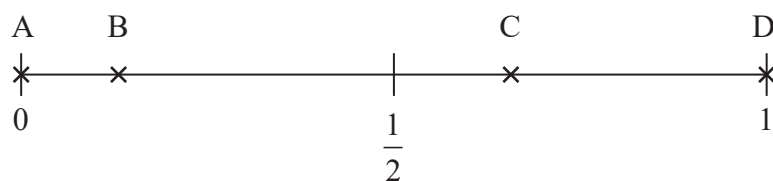
(a) Write down the letter of the event that is impossible.

....

(1)

(b) Write down the letter of the event that is likely.

....

(1)

There are 15 counters in a bag.

3 of the counters are red.
1 of the counters is blue.
2 of the counters are yellow.
The rest of the counters are green.

Caitlin takes at random a counter from the bag.

(c) Show that the probability that this counter is red or green is $\frac{4}{5}$

(3)

(Total for Question 11 is 5 marks)

12 Here is a probability scale.
It shows the probability of each of the events A, B, C and D.
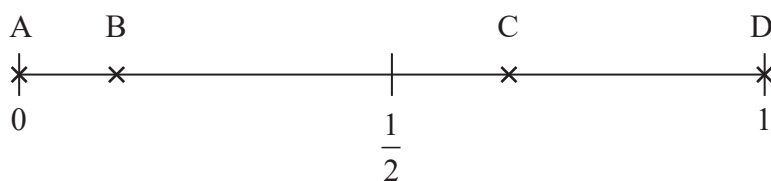
(a) Write down the letter of the event that is certain.

....

(1)

(b) Write down the letter of the event that is unlikely.

....

(1)

There are 12 counters in a bag.

3 of the counters are red.
1 of the counters is blue.
2 of the counters are yellow.
The rest of the counters are green.

Caitlin takes at random a counter from the bag.

(c) Show that the probability that this counter is yellow or green is $\frac{2}{3}$

(3)

(Total for Question 12 is 5 marks)

13 9 kg of meat costs £54
Nina buys 5 kg of the meat.

Work out how much Nina pays.

£ ....

(Total for Question 13 is 2 marks)

14 The centre of this circle is marked with a cross (×).
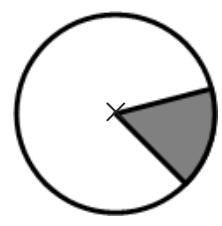
(a) Write down the mathematical name of the shaded part shown in the circle.

....

(1)

(b) Write down the mathematical name of the straight line that is touching the circle.

....

(1)
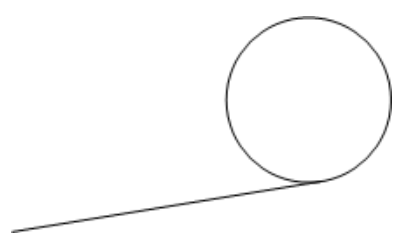
(Total for Question 14 is 2 marks)

15 3 kg of meat costs £54
Nina buys 2 kg of the meat.

Work out how much Nina pays.

£ ....

(Total for Question 15 is 2 marks)

16 The centre of this circle is marked with a cross (×).
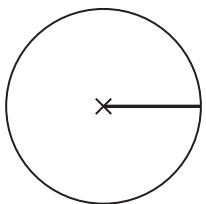
(a) Write down the mathematical name of the straight line shown in the circle.

....

(1)

(b) Write down the mathematical name of the straight line that is touching the circle.

....

(1)
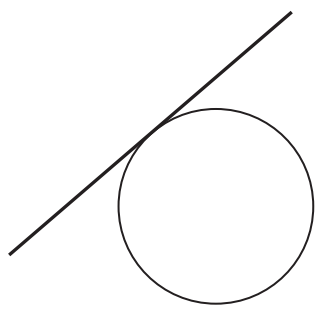
(Total for Question 16 is 2 marks)

17 Tim and three friends go on holiday together for a week.

The 4 friends will share the costs of the holiday equally.

Here are the costs of the holiday.

    £1780 for 4 return plane tickets
   £748 for the villa
    £268 for hire of a car for the week

Work out how much Tim has to pay for his share of the costs.

£ ....

(Total for Question 17 is 3 marks)

18 Tim and three friends go on holiday together for a week.

The 4 friends will share the costs of the holiday equally.

Here are the costs of the holiday.

> £1280 for 4 return plane tickets
> £640 for the villa
> £220 for hire of a car for the week

Work out how much Tim has to pay for his share of the costs.

£ ....

(Total for Question 18 is 3 marks)

19 Write down an example to show that each of the following two statements is **not** correct.

(a) The factors of an even number are always even.

....
(1)

(b) All the digits in an even number are even.

....
(1)

(Total for Question 19 is 2 marks)

20 Write down an example to show that each of the following two statements is **not** correct.

(a) The prime factors of an even number always include 5.

....

(1)

(b) All the digits in odd numbers are odd.

....

(1)

(Total for Question 20 is 2 marks)

21 A shop sells desktop computers, laptops and tablets.

The composite bar chart shows information about sales over the last three years.

Key:
◼ desktop computers
▨ laptops
▨ tablets
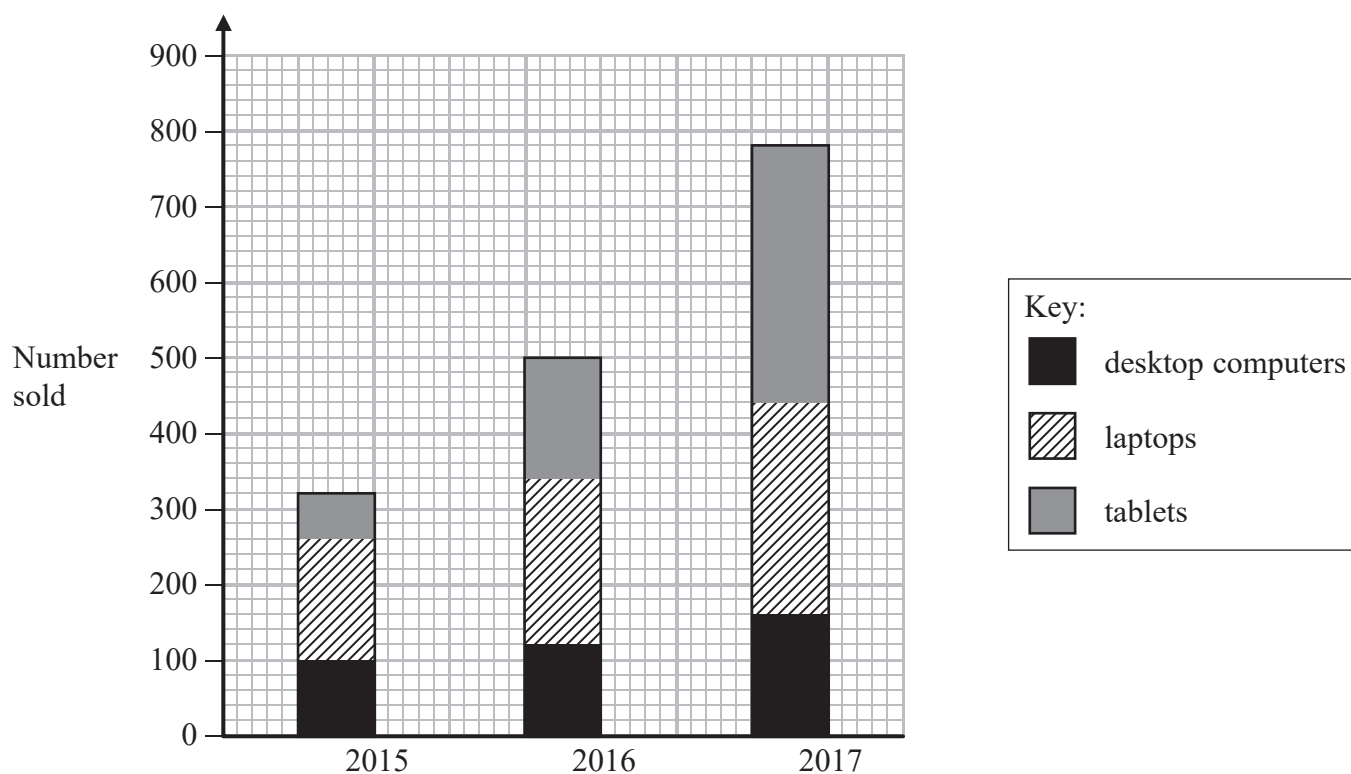
(a) Write down the number of desktop computers sold in 2017

....
(1)

(b) Work out the total number of tablets sold in the 3 years.

....
(3)

(c) State the item that had the greatest increase in sales over the 3 years.
Give a reason for your answer.

....

....

....
(2)

P 4 8 5 2 7 A 0 8 2 4

Alex says,

> "In 2017, more tablets were sold than desktop computers. This means the shop makes more profit from the sale of tablets than from the sale of desktop computers."

(d) Is Alex correct?
You must justify your answer.

....

....

....

(1)

(Total for Question 21 is 7 marks)

22 A piece of wire is 303 cm long.

Peter cuts three 45 cm lengths off the wire.
He then cuts the rest of the wire into as many 24 cm lengths as possible.

Work out how many 24 cm lengths of wire Peter cuts.

....

(Total for Question 22 is 3 marks)

23 A shop sells desktop computers, laptops and tablets.

The composite bar chart shows information about sales over the last three years.

Key:

■ desktop computers

▨ laptops

▨ tablets
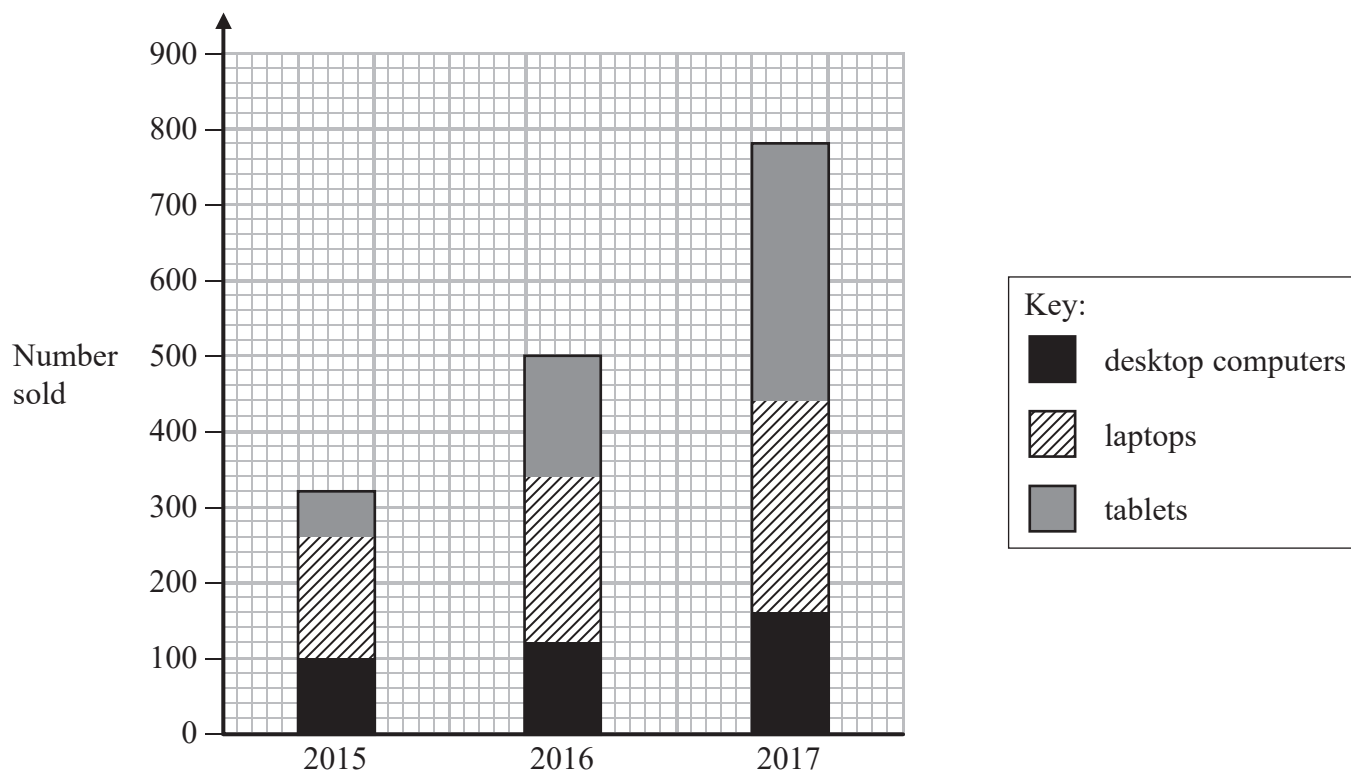
(a) Write down the number of desktop computers sold in 2015

....

(1)

(b) Work out the total number of laptops sold in the 3 years.

....

(3)

(c) State the item that had the greatest increase in sales over the 3 years.
Give a reason for your answer.

....

....

....

(2)

Alex says,

"In 2017, more tablets were sold than desktop computers. This means the shop makes more profit from the sale of tablets than from the sale of desktop computers."

(d) Is Alex correct?
You must justify your answer.

....

....

....

(1)

(Total for Question 23 is 7 marks)

24 A piece of wire is 240 cm long.

Peter cuts two 45 cm lengths off the wire.
He then cuts the rest of the wire into as many 40 cm lengths as possible.

Work out how many 40 cm lengths of wire Peter cuts.

....

(Total for Question 24 is 3 marks)

Turn over ▶

25 Write the following fractions in order of size.
Start with the smallest fraction.

$$\frac{1}{3} \qquad \frac{3}{4} \qquad \frac{1}{4} \qquad \frac{7}{12} \qquad \frac{1}{2}$$

....

(Total for Question 8 is 25 marks)

26 Ruth left her home at 9 am and walked to the library.
She got to the library at 10 30 am.
Ruth walked at a speed of 4 mph.

(a) Work out the distance Ruth walked.

.... miles

(2)

Ruth got to the library at 10 30 am.
She stayed at the library for 50 minutes.
Then she walked home.

Ruth took $1\frac{1}{4}$ hours to walk home.

(b) At what time did Ruth get home?

....

(2)

(Total for Question 26 is 4 marks)

27 Write the following fractions in order of size.
Start with the smallest fraction.

$$\frac{1}{5} \qquad \frac{3}{4} \qquad \frac{1}{4} \qquad \frac{7}{10} \qquad \frac{1}{3}$$

....

(Total for Question 27 is 2 marks)

28 Ruth left her home at 11 am and walked to the library.
She got to the library at 1:30 pm. Ruth
walked at a speed of 3 mph.

(a) Work out the distance Ruth walked.

.... miles

(2)

Ruth got to the library at 1 30 pm. She
stayed at the library for 35 minutes.
Then she walked home.

Ruth took $1\frac{1}{4}$ hours to walk home.

(b) At what time did Ruth get home?

....

(2)

(Total for Question 28 is 4 marks)

Turn over ▶

29 Write the following fractions in order of size.
Start with the smallest fraction.

$$\frac{3}{5} \qquad \frac{3}{4} \qquad \frac{1}{2} \qquad \frac{9}{10} \qquad \frac{1}{3} \qquad \frac{17}{20}$$

....

(Total for Question 29 is 2 marks)

30 Ruth left her home at 10 am and walked to the library.
She got to the library at 1:30 pm. Ruth walked at a speed of 2 mph.

(a) Work out the distance Ruth walked.

.... miles

(2)

Ruth got to the library at 4:30 pm.
She stayed at the library for 45 minutes. Then she walked home.
Ruth took $1\frac{1}{4}$ hours to walk home.

(b) At what time did Ruth get home?

....

(2)

(Total for Question 30 is 4 marks)

31 (a) Solve $t + t + t = 12$

$t =$ ....

(b) Solve $x - 2 = 6$

$x =$ ....

(c) Solve $6w + 2 = 20$

$w =$ ....

(Total for Question 31 is 4 marks)

32 (a) Solve $t + t + t = 18$

$t = $ ....

(1)

(b) Solve $x - 3 = 9$

$x = $ ....

(1)

(c) Solve $7w + 2 = 23$

$w = $ ....

(2)

(Total for Question 32 is 4 marks)

33 (a) Solve $t + t + t + t = 28$

$t = $ ....
(1)

(b) Solve $x - 11 = 9$

$x = $ ....
(1)

(c) Solve $5w + 7 = 52$

$w = $ ....
(2)

(Total for Question 33 is 4 marks)

34 Work out 74×58

....

(Total for Question 34 is 2 marks)

35 Work out 27×38

....

(Total for Question 35 is 2 marks)

36 Work out 79×38

....

(Total for Question 36 is 2 marks)

37 *AB* and *BC* are perpendicular lines.

(a) Find the value of *x*.

x = ...

(2)
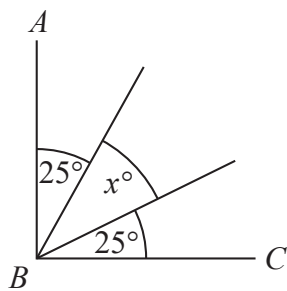
RS and *TU* are parallel lines.
PQ is a straight line.
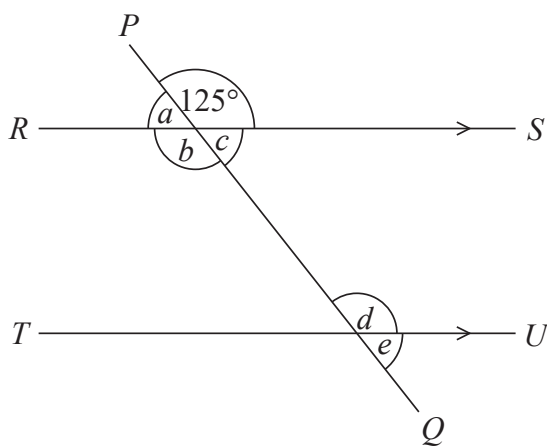
An angle of size 125° is shown on the diagram.

(b) (i) Write down the letter of one other angle of size 125°
Give a reason for your answer.

....

....

(2)

(ii) Explain why *a* + *b* + *c* = 235°

....

....

....

(1)

(Total for Question 37 is 5 marks)

38 *AB* and *BC* are perpendicular lines.

(a) Find the value of *x*.

x = ...

(2)

RS and *TU* are parallel lines.
PQ is a straight line.
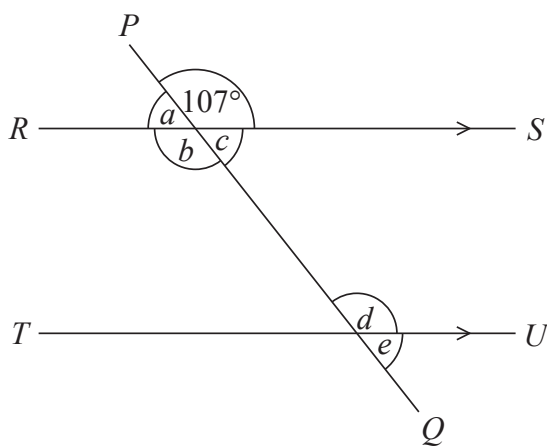
An angle of size 107° is shown on the diagram.

(b) (i) Write down the letter of one other angle of size 107°
Give a reason for your answer.

....

....

(2)

(ii) Explain why *a* + *b* + *c* = 253°

....

....

....

(1)

(Total for Question 38 is 5 marks)

39 *AB* and *BC* are perpendicular lines.

(a) Find the value of *x*.

$x =$ ....

(2)

RS and *TU* are parallel lines.
PQ is a straight line.
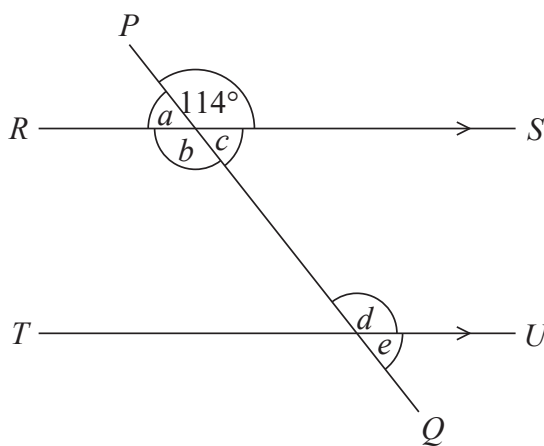
An angle of size 114° is shown on the diagram.

(b) (i) Write down the letter of one other angle of size 114°
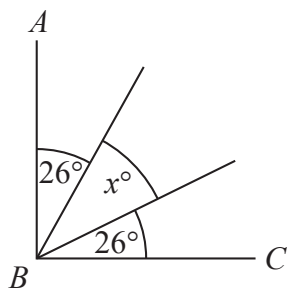Give a reason for your answer.

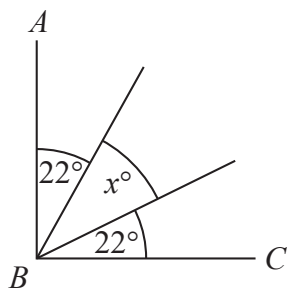...

....

(2)

(ii) Explain why $a + b + c = 246°$

....

....

....

(1)

(Total for Question 39 is 5 marks)

40 The length of a line is x centimetres.

Write down an expression, in terms of x, for the length of the line in millimetres.

....

(Total for Question 40 is 1 mark)

41 (a) Work out $\frac{1}{5}$ of 70

....

(1)

Fiona has to work out the exact value of $48 \div \frac{1}{2}$

She writes

$$48 \div \frac{1}{2} = 24$$

Fiona's reason is,

"There are 2 halves in 1, so there will be 24 halves in 48"

(b) Explain what is wrong with Fiona's reason.

....

....

....

(1)

(Total for Question 41 is 2 marks)

42 The length of a line is *x* centimetres.

Write down an expression, in terms of *x*, for the length of the line in millimetres.

....

(Total for Question 42 is 1 mark)

43 (a) Work out $\frac{1}{5}$ of 90

....

(1)

Fiona had to work out $64 \div \frac{1}{2}$

$64 \div \frac{1}{2} = 32$

Fiona's reason is,

"There are 2 halves in 1, so there will be 24 halves in 48"

(b) Explain what is wrong with Fiona's reason.

....

....

....

(1)

(Total for Question 43 is 2 marks)

44 The length of a line is $3x$ centimetres.

Write down an expression, in terms of x, for the length of the line in millimetres.

....

(Total for Question 44 is 1 mark)

45 (a) Work out $\frac{1}{5}$ of 160

....

(1)

Fiona had to work out $86 \div \frac{3}{4} =$

$$86 \div \frac{3}{4} = 63\frac{1}{2}$$

Fiona's reason is that 86 divided by 4 is 21.5 and then

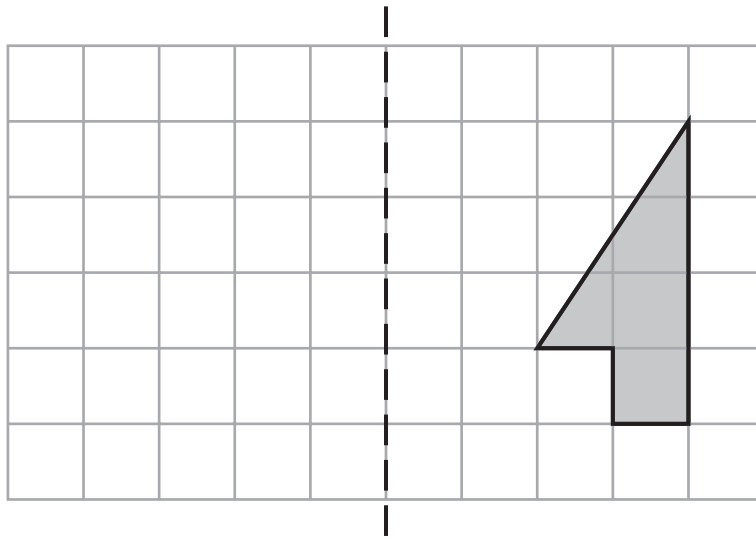multiply it by 3 gives you 63.5. Is Fiona correct?

....

....

....

(1)

(Total for Question 45 is 2 marks)

Turn over ▶

46

Reflect the shaded shape in the mirror line.

(Total for Question 46 is 2 marks)

47 The diagram shows a number machine.

input $\longrightarrow$ $\boxed{\times 2}$ $\longrightarrow$ $\boxed{-3}$ $\longrightarrow$ output

(a) Find the output when the input is 7

....
(1)

(b) Find the input when the output is 41

....
(2)

(Total for Question 47 is 3 marks)

Turn over ▶

48 Ishmael asked 30 students at college to tell him the sport they each like the best from cricket or tennis or swimming.

11 of the 20 female students said swimming.
2 of the male students said tennis.
5 students said cricket.

The number of male students who said cricket was the same as the number of male students who said swimming.

Complete the two-way table.

	Cricket	**Tennis**	**Swimming**	**Total**
Male students				
Female students				20
Total				30

(Total for Question 48 is 3 marks)

49 Jamil makes a drink by mixing
1 part of orange squash with 9 parts of water.

He uses 750 millilitres of orange squash.

Jamil is going to put the drink he has mixed into 1 litre bottles.

Work out the greatest number of 1 litre bottles that Jamil can completely fill.

....

(Total for Question 49 is 3 marks)

Turn over ▶

50 The table gives information about the number of points scored by each of 16 students in a game.

Number of points	Frequency
0	1
1	3
2	5
3	4
4	3

Tina worked out the median of the number of points scored to be 5

(a) Explain why it is **not** possible for the median to be 5

....

....

....

(1)

Tina also worked out the total number of points scored by the 16 students in the game. Here is her working.

$$(0 \times 1) + (1 \times 3) + (2 \times 5) + (3 \times 4) + (4 \times 3) = 1 + 3 + 10 + 12 + 12 = 38$$

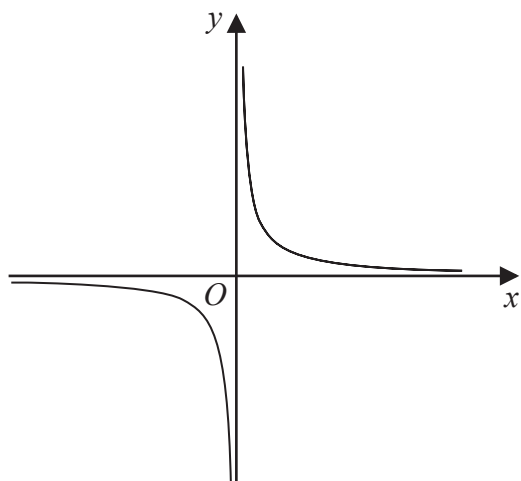Tina made a mistake in her working to find the total number of points scored.

(b) Describe the mistake that Tina made.

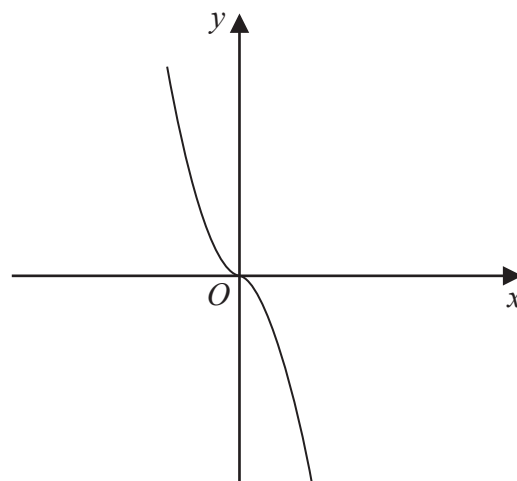...

....

....

(1)

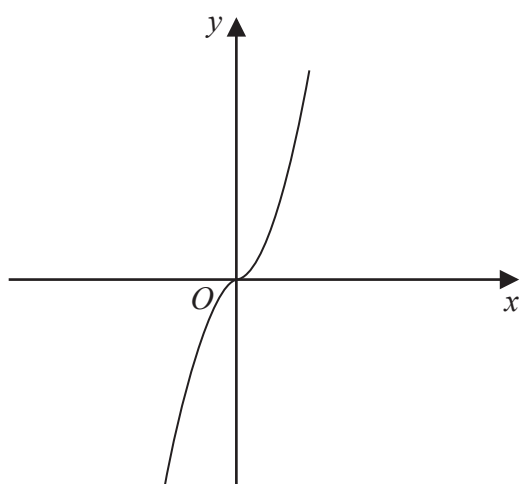**(Total for Question 50 is 2 marks)**

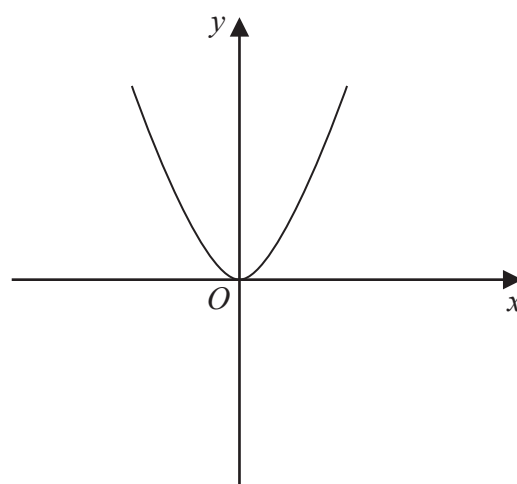**51** The diagram shows four graphs.

Graph **A**

Graph **B**

Graph **C**

Graph **D**

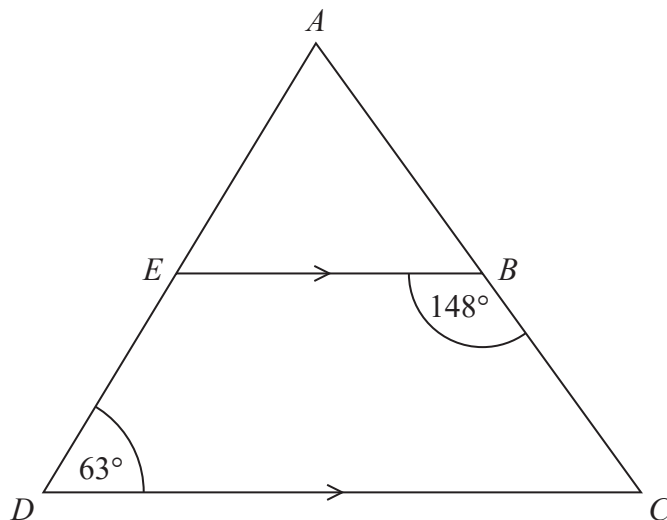Each of the equations in the table is the equation of one of the graphs.

Complete the table.

Equation	Letter of graph
$y = -x^3$	
$y = x^3$	
$y = x^2$	
$y = \dfrac{1}{x}$	

(Total for Question 51 is 2 marks)

52 *ADC* is a triangle.

AED and *ABC* are straight lines.
EB is parallel to *DC*.

Angle *EBC* = 148°
Angle *ADC* = 63°

Work out the size of angle *EAB*.
You must give a reason for each stage of your working.

(Total for Question 52 is 5 marks)

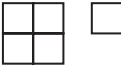P 6 2 2 7 4 R A 0 1 6 2 0

53 The pictogram shows information about the number of video games sold in a shop on Monday, on Tuesday and on Wednesday.

Monday	⊞ ⊞
Tuesday	⊞ ⊞ ⊟
Wednesday	⊞ ☐
Thursday	
Friday	

Key:

⊞ represents 8 video games

(a) How many video games were sold on Monday?

....

(1)

More video games were sold on Tuesday than on Wednesday.

(b) How many more?

....

(2)

On Thursday and Friday, a total of 32 video games were sold in the shop.

$\frac{1}{4}$ of these 32 video games were sold in the shop on Thursday.

(c) Complete the pictogram for Thursday and Friday.

(3)

(Total for Question 53 is 6 marks)

54 There are two drama groups in a school.

In one group there are 36 boys and 48 girls.

In the other group, $\dfrac{3}{7}$ of the students are boys and the rest of the students are girls.

Ann says,

   "The ratio of the number of boys to the number of girls is the same for both groups."

Is Ann correct?
You must show how you get your answer.

(Total for Question 54 is 3 marks)

55 (a) Expand $2(a + d)$

....
(1)

(b) Factorise $6y^2 - 5y$

....
(1)

(c) Solve $4x - 7 = 37$

$x =$ ....
(2)

(Total for Question 55 is 4 marks)

56 *ABCD* is a kite.
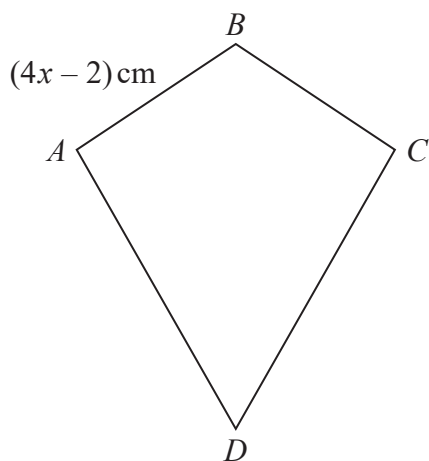
$AB = (4x - 2)\,\text{cm}$

Jasper says that x could be 0.5

(a) Explain why Jasper cannot be correct.

....

....

....

(1)

$AD = 3AB$
The kite has a perimeter of 64 cm.

(b) Find the value of *x*.

$x = $...

(3)

(Total for Question 56 is 4 marks)

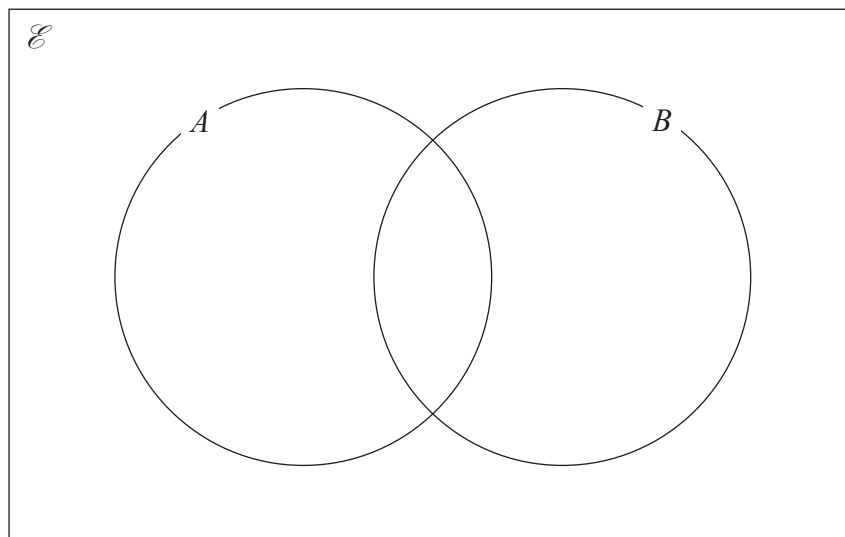**57** $\mathscr{E}$ = {even numbers less than 19}
  A = {6, 12, 18}
  B = {2, 6, 14, 18}

Complete the Venn diagram for this information.

(Total for Question 57 is 3 marks)

58 Work out $4 - \dfrac{1}{2}\dfrac{2}{5}\quad\dfrac{2}{3}$

Give your answer as a mixed number.

....

(Total for Question 58 is 3 marks)