Write your name here

Surname	Other names

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

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics Last Few Questions

Compiled as Revision
Much of this is Cross-Over

Foundation Tier

Good Luck with your Exams

Paper Reference
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.

Turn over ▶

P48134A

6/6/6/6/6/7/7/4/

P 4 8 1 3 4 A 0 1 2 0

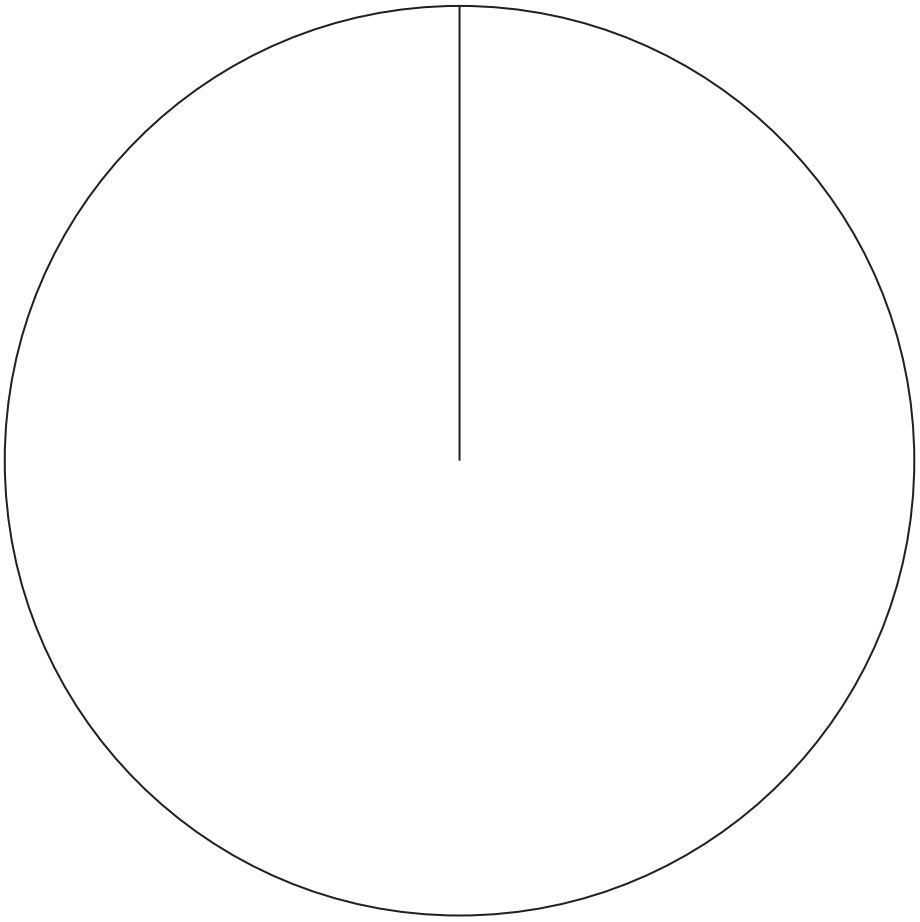
Pearson

14 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	

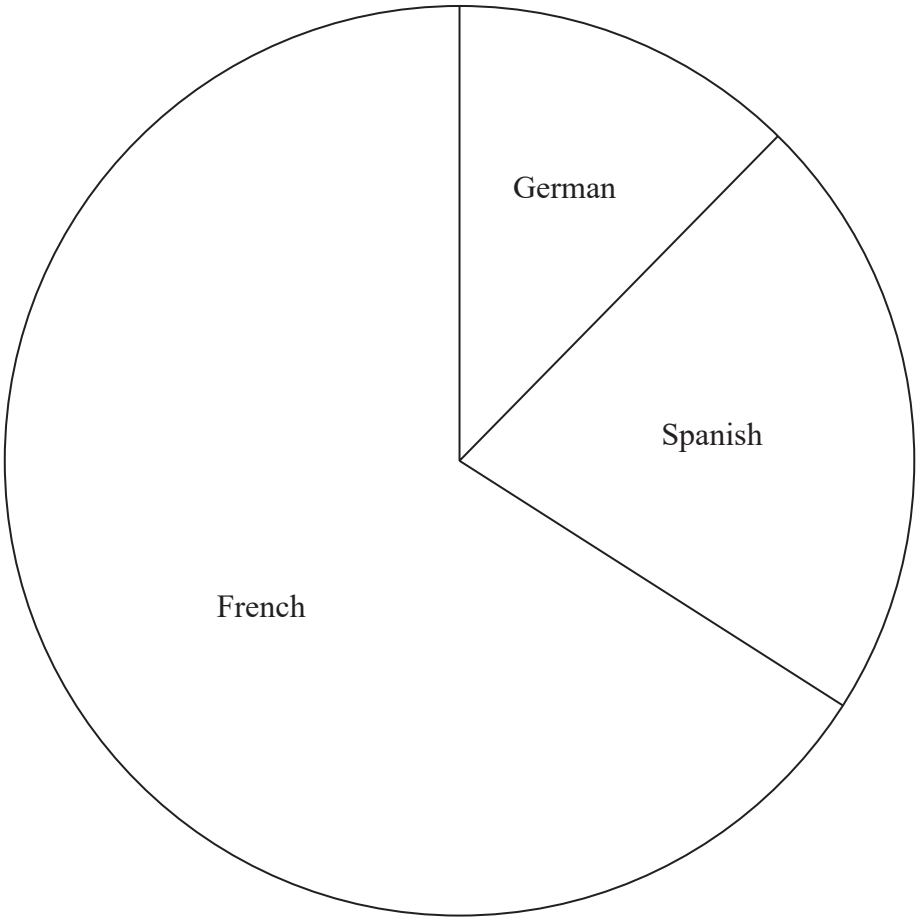
(a) Draw an accurate pie chart to show this information.



(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)

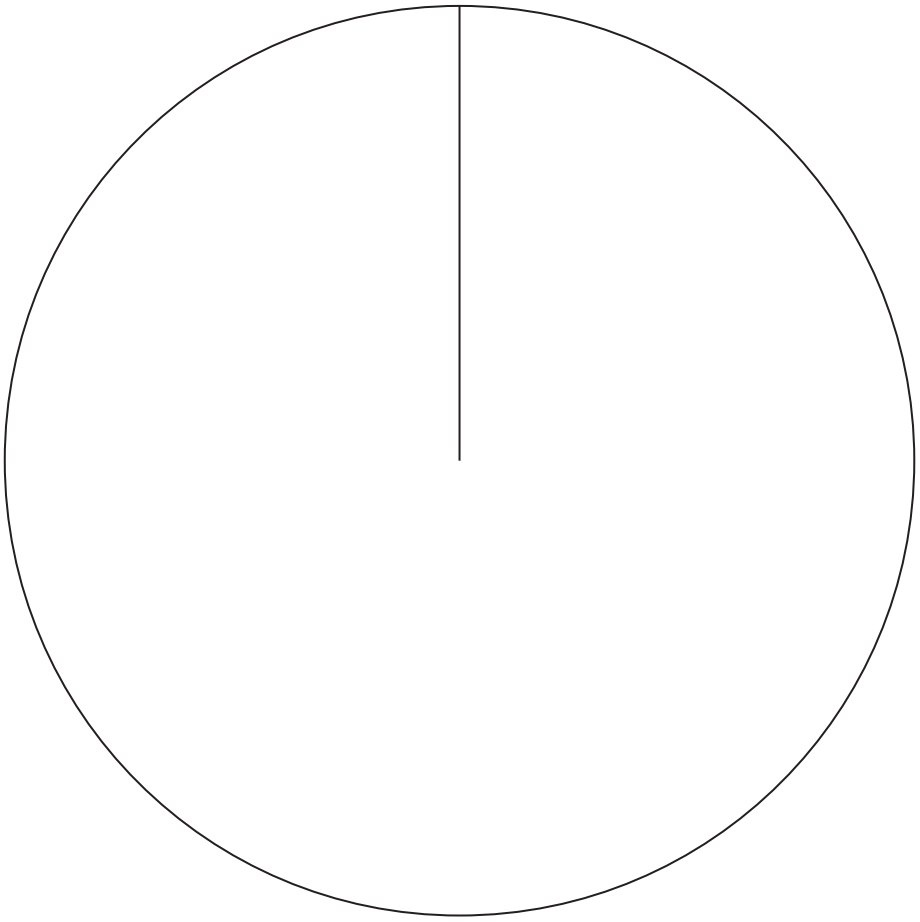
(Total for Question 14 is 4 marks)

14 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	

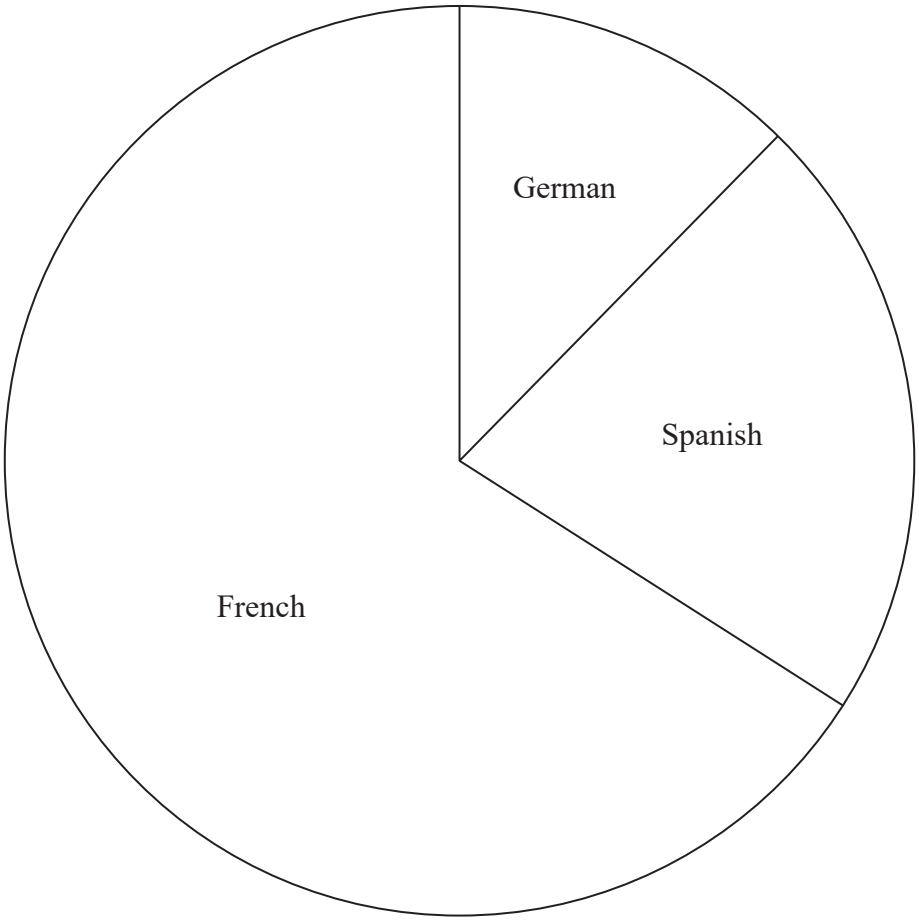
(a) Draw an accurate pie chart to show this information.



(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.

.....

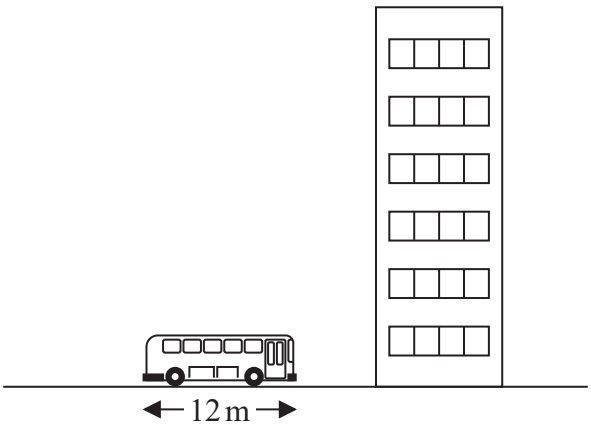
.....

.....

(1)

(Total for Question 14 is 4 marks)

8



The picture shows a bus next to a building.
The bus has a length of 12 m.

The bus and the building are drawn to the same scale.

Work out an estimate for the height, in metres, of the building.

..... m

(Total for Question 8 is 2 marks)

12 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 12 is 2 marks)

13 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)

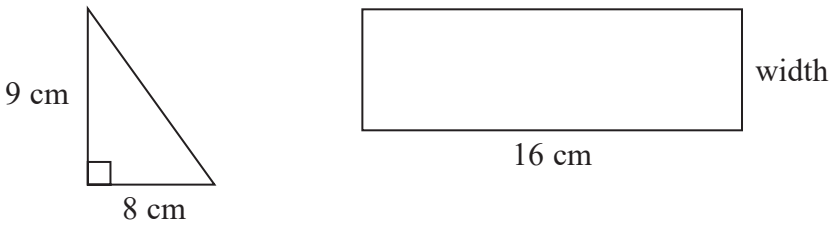
(b) Find an estimate for the real height, in metres, of the tree.

..... metres

(2)

(Total for Question 13 is 3 marks)

15 Here are a triangle and a rectangle.



The area of the rectangle is 6 times the area of the triangle.

Work out the width of the rectangle.

..... cm

(Total for Question 15 is 4 marks)

16 $v = u + at$

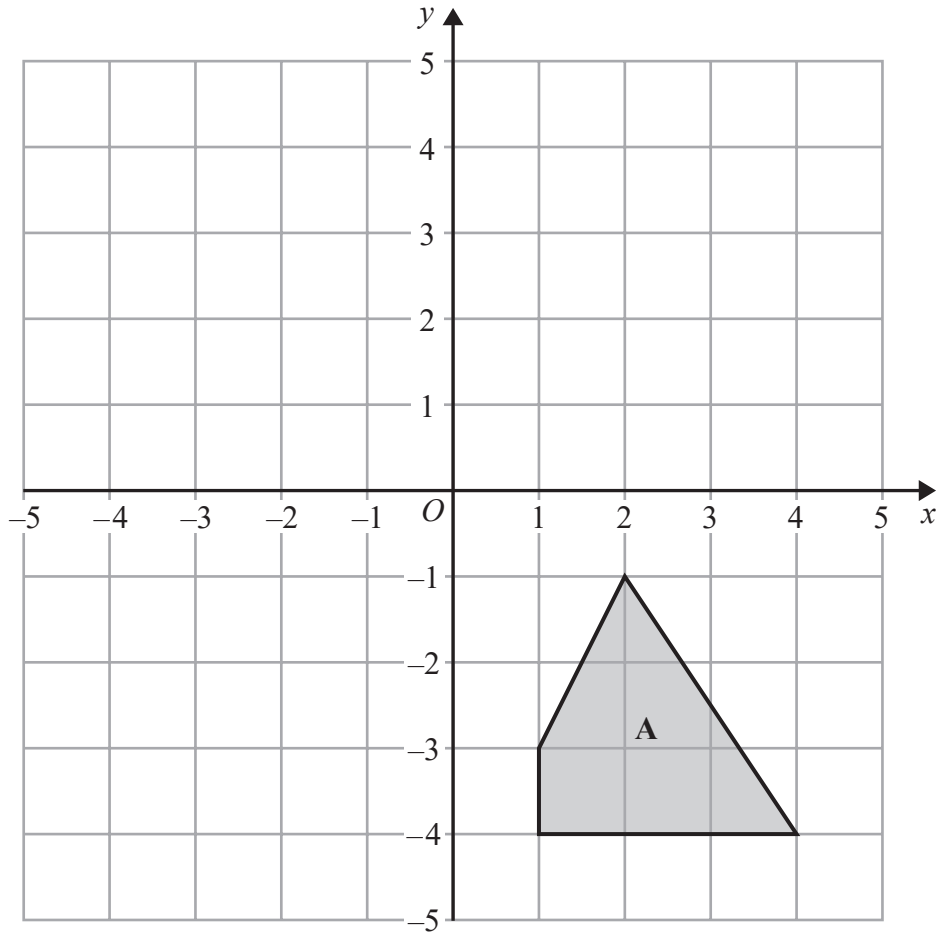
$u = 1 \quad a = -3 \quad t = \frac{1}{2}$

Work out the value of v.

$v =$ .....

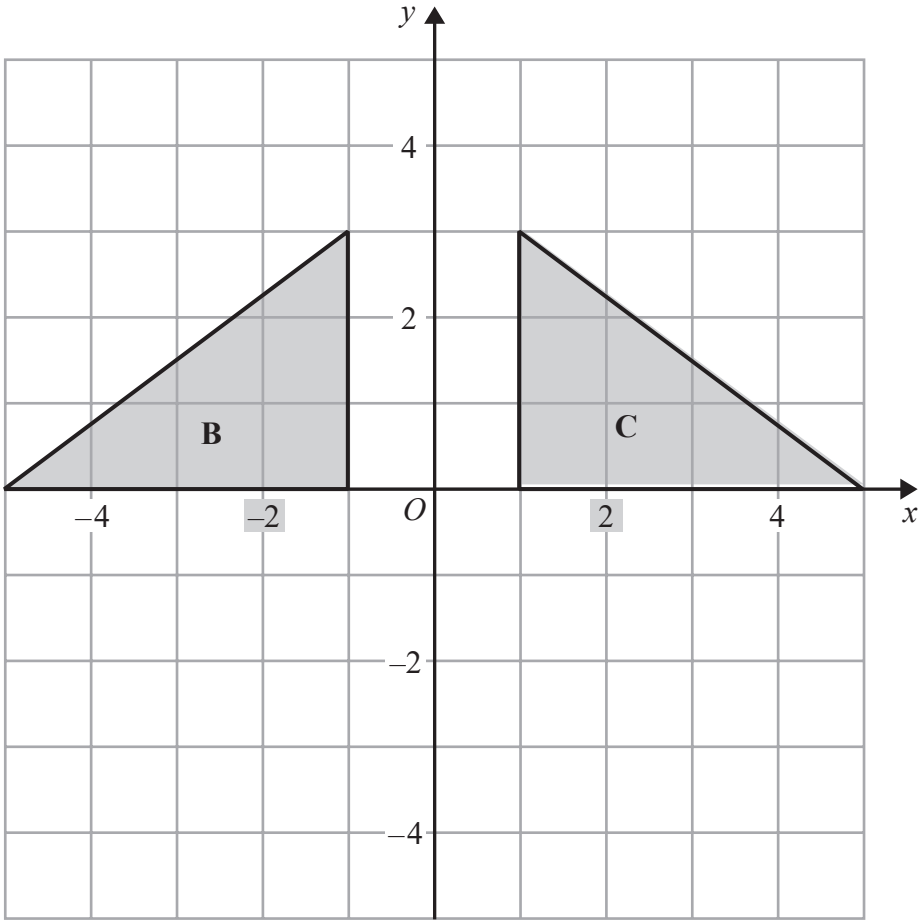
(Total for Question 16 is 2 marks)

13



(a) Rotate shape **A** 90° counter clockwise about centre *O*.

(2)



(b) Describe fully the single transformation that maps triangle **B** onto triangle **C**.

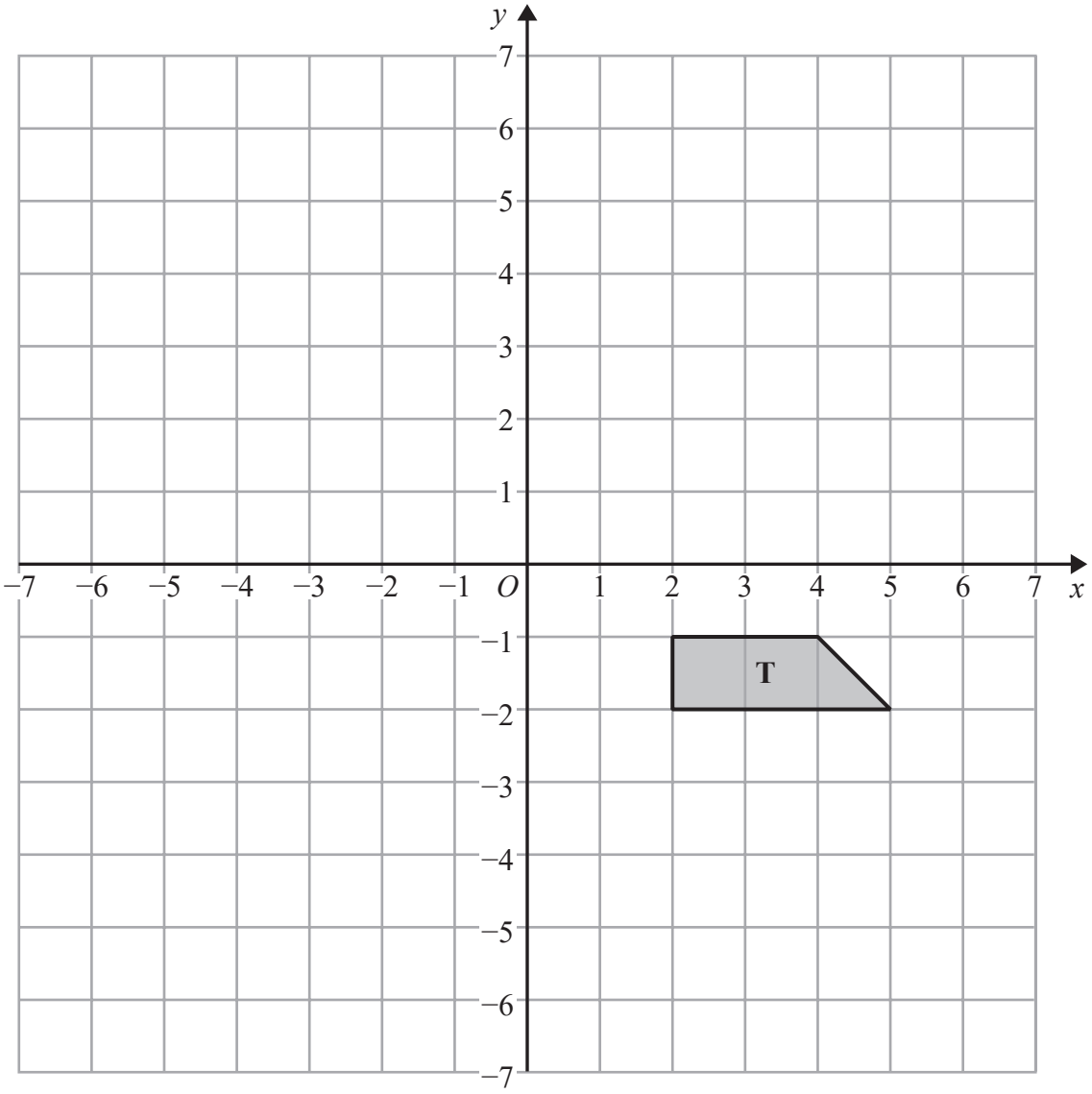
.....

.....

(2)

(Total for Question 13 is 4 marks)

20



(a) Rotate trapezium **T** 180° about the origin.
Label the new trapezium **A**.

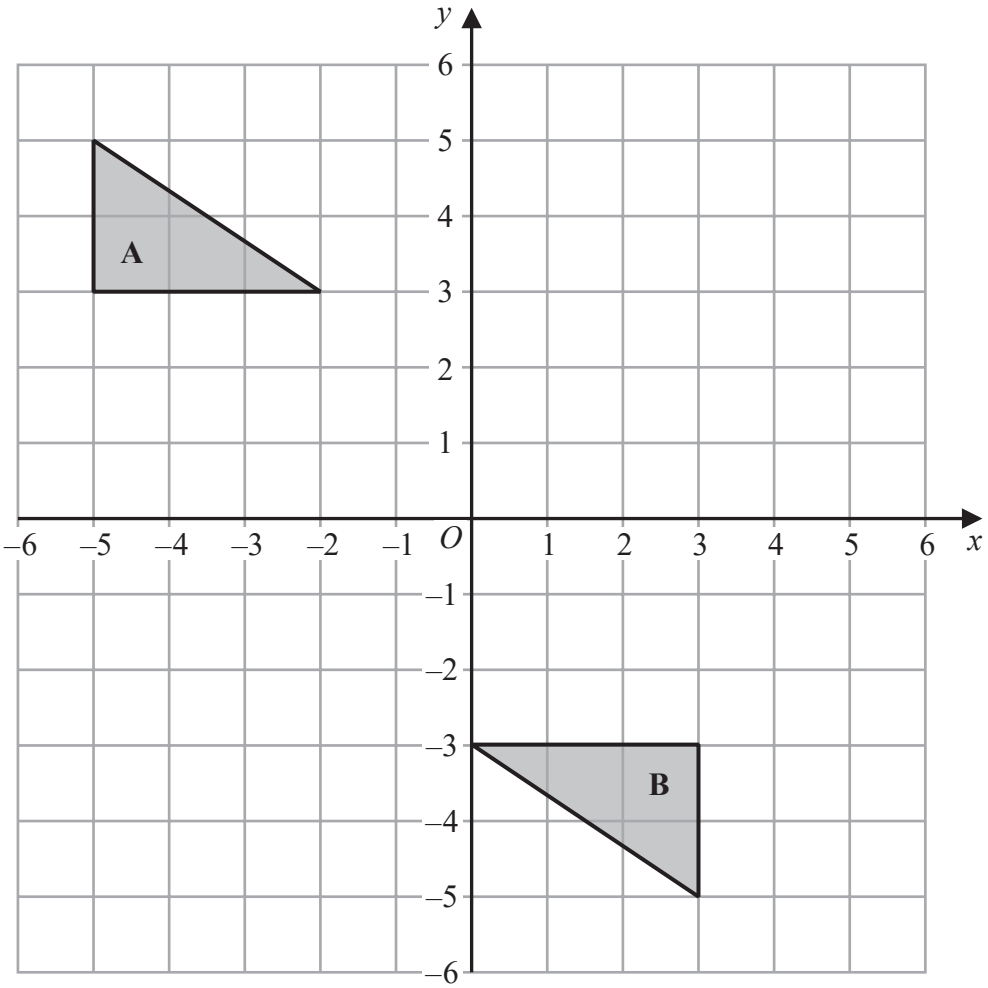
(1)

(b) Translate trapezium **T** by the vector $\begin{pmatrix} -1 \\ -3 \end{pmatrix}$
Label the new trapezium **B**.

(1)

(Total for Question 20 is 2 marks)

18



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

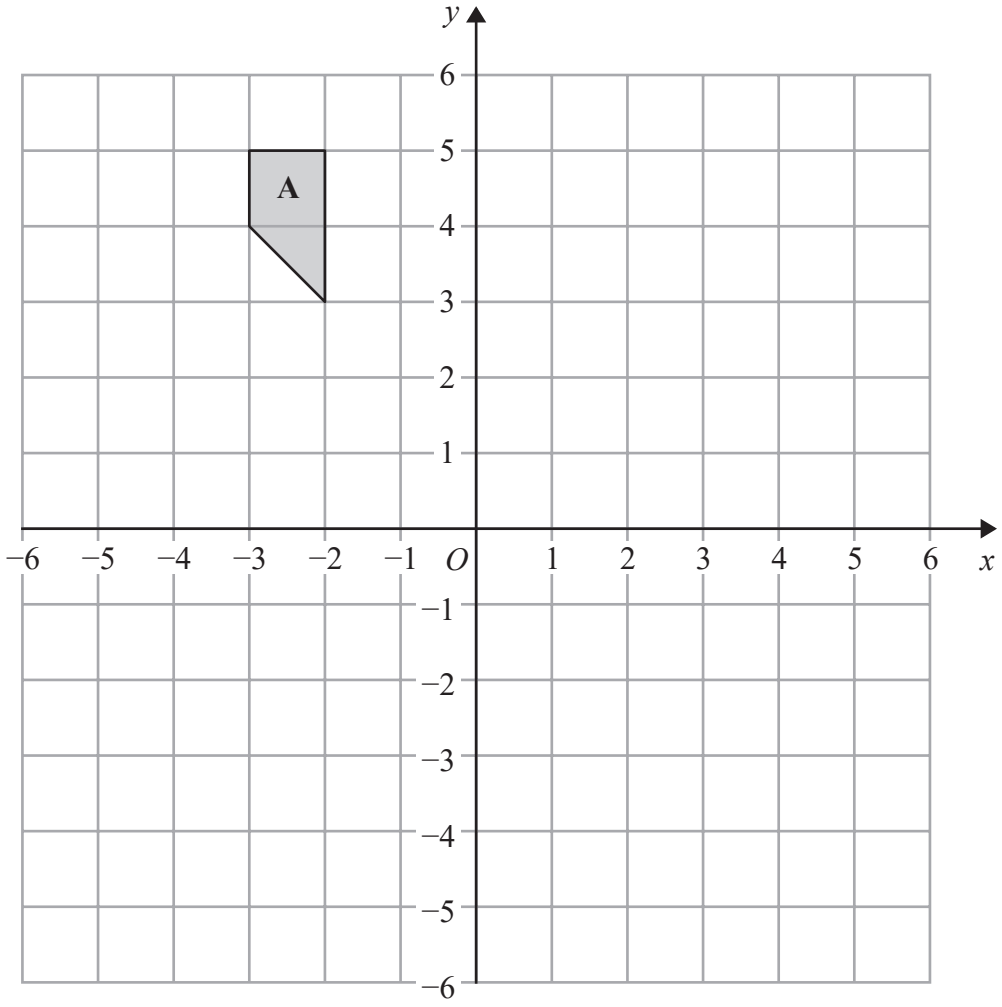
.....

.....

.....

(Total for Question 18 is 2 marks)

19



Rotate shape **A** 180° about (1, 0)

(Total for Question 19 is 2 marks)

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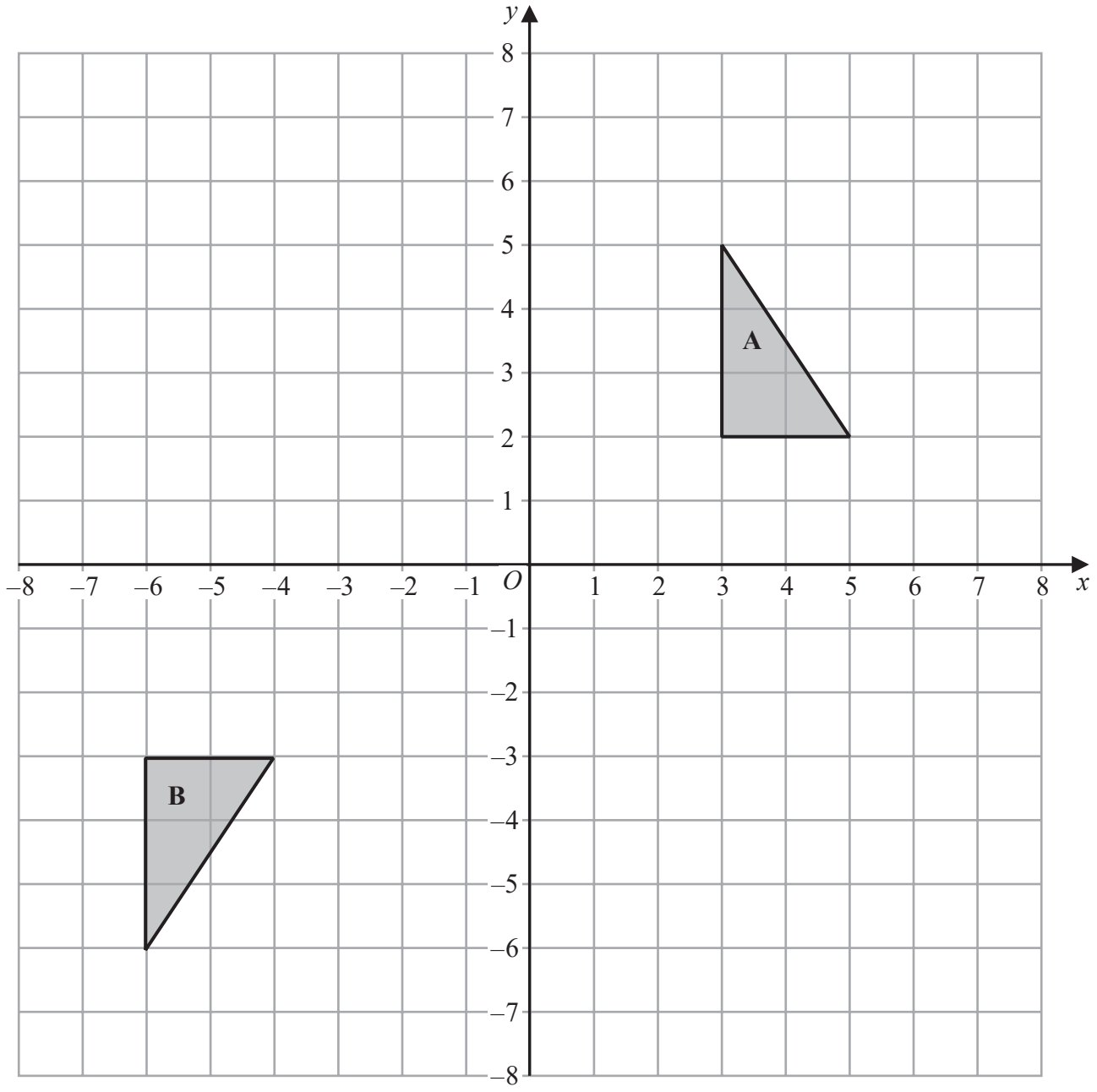
DO NOT WRITE IN THIS AREA

26



Shape **A** can be transformed to shape **B** by a reflection in the x-axis followed by a translation $\begin{pmatrix} c \\ d \end{pmatrix}$

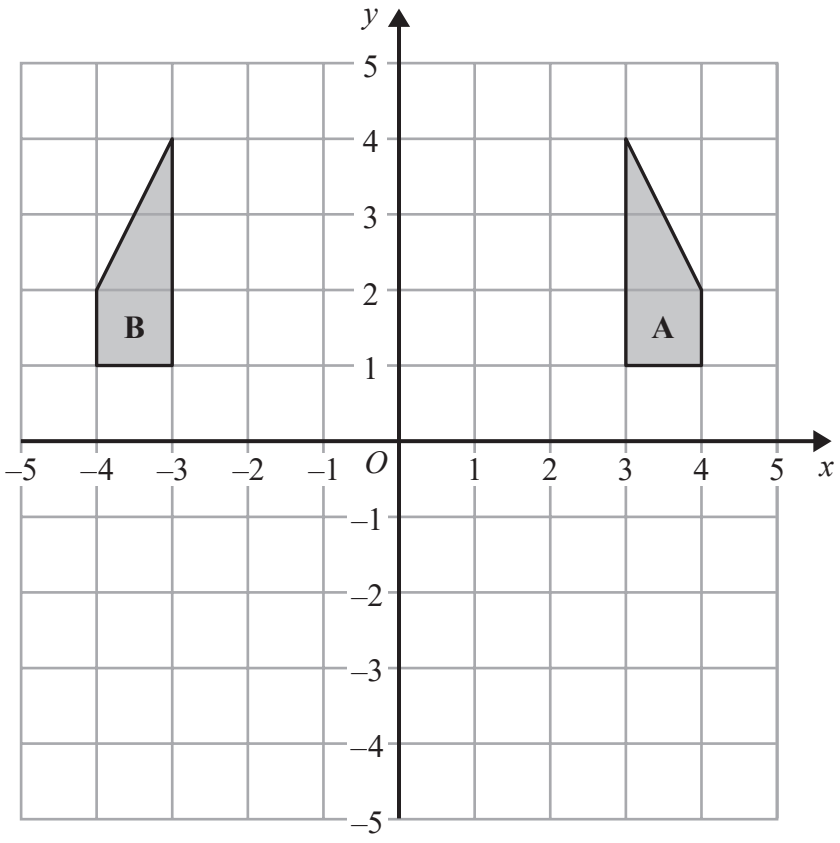
Find the value of c and the value of d.

$c =$ .....

$d =$ .....

(Total for Question 26 is 3 marks)

18



Describe fully the single transformation that maps shape **A** onto shape **B**.

.....

.....

(Total for Question 18 is 2 marks)

14 (a) Factorise $8 - 24m$

.....

(1)

(b) Factorise fully $4a^3b + 12ab^3$

.....

(2)

(Total for Question 14 is 3 marks)

15 (a) Write 7.9×10^{-1} as an ordinary number.

.....

(1)

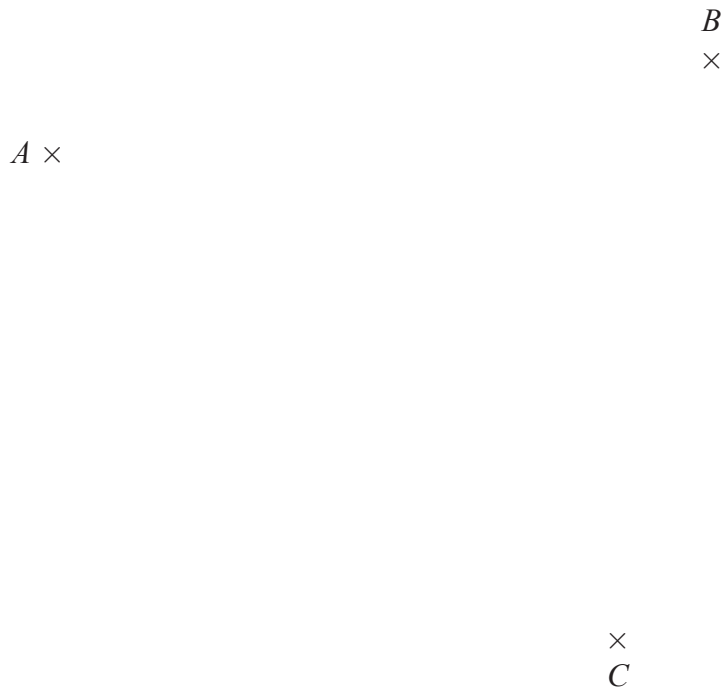
(b) Work out the value of $(3.7 \times 10^6) \times (5.8 \times 10^5)$
Give your answer in standard form.

.....

(2)

(Total for Question 15 is 3 marks)

16 A, B and C are three points on a map.



1 cm represents 100 metres.

Point T is 250 metres from point A.
Point T is equidistant from point B and point C.

On the map, show one of the possible positions for point T.

(Total for Question 16 is 3 marks)

17 The table shows the probabilities that a biased dice will land on 2, on 3, on 4, on 5 and on 6

Number on dice	**1**	**2**	**3**	**4**	**5**	**6**
Probability		0.11	0.13	0.06	0.18	0.2

Neymar rolls the biased dice 200 times.

Work out an estimate for the total number of times the dice will land on 1 or on 3

.....

(Total for Question 17 is 3 marks)

18 On Saturday, some adults and some children were in a theatre.
The ratio of the number of adults to the number of children was 7 : 3

Each person had a seat in the Circle or had a seat in the Stalls.

$\frac{3}{4}$ of the children had seats in the Stalls.

102 children had seats in the Circle.

There are exactly 2600 seats in the theatre.

On this Saturday, were there people on more than 55% of the seats?
You must show how you get your answer.

(Total for Question 18 is 5 marks)

20 Olly drove 68 km from Liverpool to Manchester.
He then drove 59 km from Manchester to Sheffield.

Olly's average speed from Liverpool to Manchester was 60 km/h.
Olly took 85 minutes to drive from Manchester to Sheffield.

(a) Work out Olly's average speed for his total drive from Liverpool to Sheffield.

..... km/h

(4)

Janie drove from Barnsley to York.

Janie's average speed from Barnsley to Leeds was 70 km/h.
Her average speed from Leeds to York was 60 km/h.

Janie says that the average speed from Barnsley to York can be found by working out the mean of 70 km/h and 60 km/h.

(b) If Janie is correct, what does this tell you about the two parts of Janie's journey?

.....

.....

(1)

(Total for Question 20 is 5 marks)

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22 Anil wants to invest £35 000 for 4 years in a bank.

Personal Bank	**Secure Bank**
Compound Interest	Compound Interest
2.1% for each year	4.8% for the first year 0.9% for each extra year

Which bank will give Anil the most interest at the end of 4 years?
You must show all your working.

(Total for Question 22 is 3 marks)

23 A number, n, is rounded to 2 decimal places.
The result is 8.93

Using inequalities, write down the error interval for n.

.....

(Total for Question 23 is 2 marks)

24 Solve $x^2 + 4x - 21 = 0$

.....

(Total for Question 24 is 3 marks)

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22

25 Here are the first six terms of an arithmetic sequence.

37 33 29 25 21

(a) Find an expression, in terms of n, for the nth term of this sequence.

.....

(2)

The nth term of a different sequence is $5n^2$
Nathan says that the 4th term of this sequence is 81

(b) Is Nathan right?
Show how you get your answer.

(1)

(Total for Question 25 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

14 (a) Factorise $5 - 10m$

.....

(1)

(b) Factorise fully $2a^2b + 6ab^2$

.....

(2)

(Total for Question 14 is 3 marks)

15 (a) Write 4.7×10^{-1} as an ordinary number.

.....

(1)

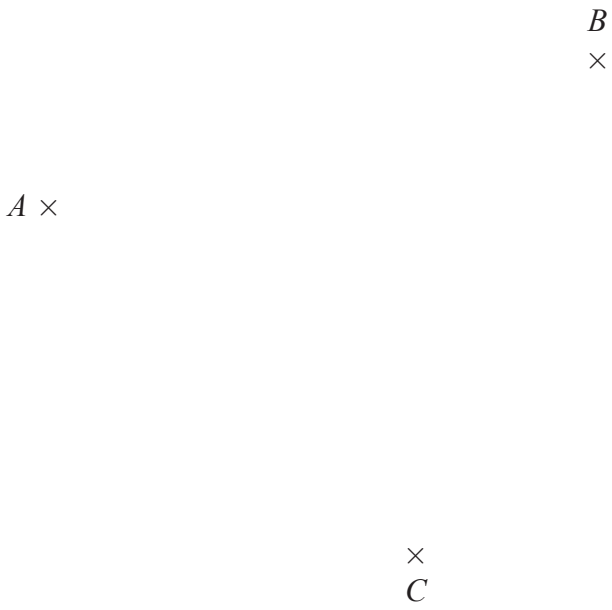
(b) Work out the value of $(2.4 \times 10^3) \times (9.5 \times 10^5)$
Give your answer in standard form.

.....

(2)

(Total for Question 15 is 3 marks)

16 *A*, *B* and *C* are three points on a map.



1 cm represents 100 metres.

Point *T* is 250 metres from point *A*.
Point *T* is equidistant from point *B* and point *C*.

On the map, show one of the possible positions for point *T*.

(Total for Question 16 is 3 marks)

17 The table shows the probabilities that a biased dice will land on 2, on 3, on 4, on 5 and on 6

Number on dice	**1**	**2**	**3**	**4**	**5**	**6**
Probability		0.17	0.18	0.09	0.15	0.1

Neymar rolls the biased dice 200 times.

Work out an estimate for the total number of times the dice will land on 1 or on 3

.....

(Total for Question 17 is 3 marks)

16 Solve the simultaneous equations

$$3x + y = -4$$
$$3x - 4y = 6$$

$x =$ .....

$y =$ .....

(Total for Question 16 is 3 marks)

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17 The table shows some information about the dress sizes of 25 women.

Dress size	Number of women
8	2
10	9
12	8
14	6

(a) Find the median dress size.

.....

(1)

3 of the 25 women have a shoe size of 7

Zoe says that if you choose at random one of the 25 women, the probability that she has either a shoe size of 7 or a dress size of 14 is $\frac{9}{25}$ because

$$\frac{3}{25} + \frac{6}{25} = \frac{9}{25}$$

(b) Is Zoe correct?
You must give a reason for your answer.

.....

.....

(1)

(Total for Question 17 is 2 marks)

18 Daniel bakes 420 cakes.
He bakes only vanilla cakes, banana cakes, lemon cakes and chocolate cakes.

$\frac{2}{7}$ of the cakes are vanilla cakes.

35% of the cakes are banana cakes.

The ratio of the number of lemon cakes to the number of chocolate cakes is 4 : 5

Work out the number of lemon cakes Daniel bakes.

.....

(Total for Question 18 is 5 marks)

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20 The density of apple juice is 1.05 grams per cm^3.

The density of fruit syrup is 1.4 grams per cm^3.

The density of carbonated water is 0.99 grams per cm^3.

25 cm^3 of apple juice are mixed with 15 cm^3 of fruit syrup and
280 cm^3 of carbonated water to make a drink with a volume of 320 cm^3.

Work out the density of the drink.
Give your answer correct to 2 decimal places.

.....g/cm^3

(Total for Question 20 is 4 marks)

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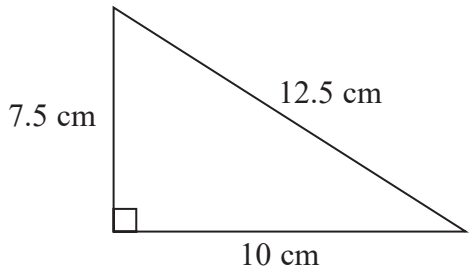
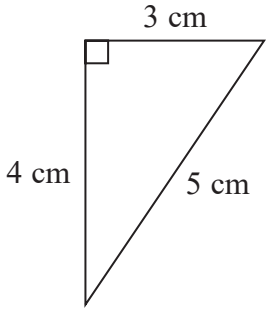
21





Show that these two triangles are mathematically similar.

(Total for Question 21 is 2 marks)

22 (a) Work out $\frac{2}{5} + \frac{1}{4}$

.....

(2)

(b) Write down the value of 2^{-3}

.....

(1)

(Total for Question 22 is 3 marks)

23 Write 36 as a product of its prime factors.

.....

(Total for Question 23 is 2 marks)

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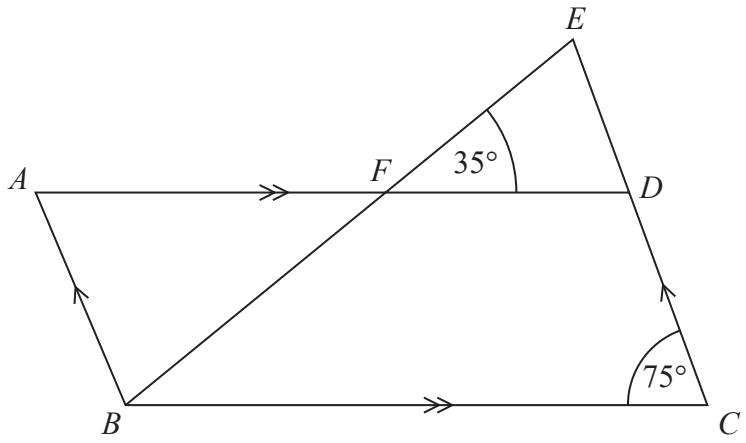
24 Kiaria is 7 years older than Jay.
Martha is twice as old as Kiaria.
The sum of their three ages is 77

Find the ratio of Jay's age to Kiaria's age to Martha's age.

.....

(Total for Question 24 is 4 marks)

25



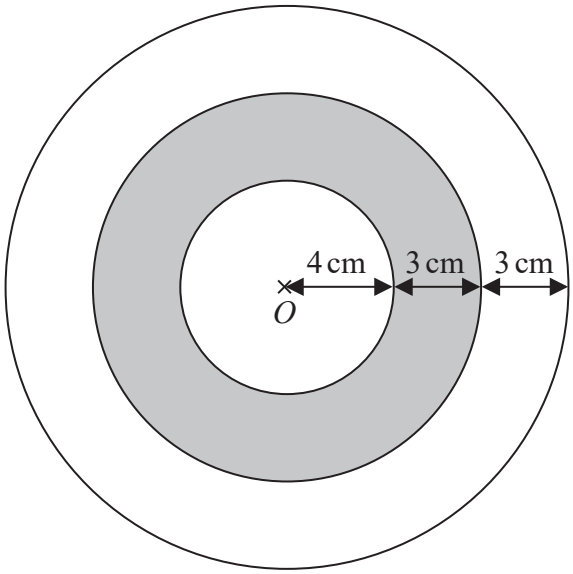
ABCD is a parallelogram.
EDC is a straight line.
F is the point on *AD* so that *BFE* is a straight line.

Angle *EFD* = 35°
Angle *DCB* = 75°

Show that angle *ABF* = 70°
Give a reason for each stage of your working.

(Total for Question 25 is 4 marks)

26 The diagram shows a logo made from three circles.



Each circle has centre O.

Daisy says that exactly $\frac{1}{3}$ of the logo is shaded.

Is Daisy correct?
You must show all your working.

(Total for Question 26 is 4 marks)

27 The table shows information about the weekly earnings of 20 people who work in a shop.

Weekly earnings (£x)	Frequency
$150 < x \leqslant 250$	1
$250 < x \leqslant 350$	11
$350 < x \leqslant 450$	5
$450 < x \leqslant 550$	0
$550 < x \leqslant 650$	3

(a) Work out an estimate for the mean of the weekly earnings.

£.....

(3)

Nadiya says,

"The mean may **not** be the best average to use to represent this information."

(b) Do you agree with Nadiya?
You must justify your answer.

.....

.....

(1)

(Total for Question 27 is 4 marks)

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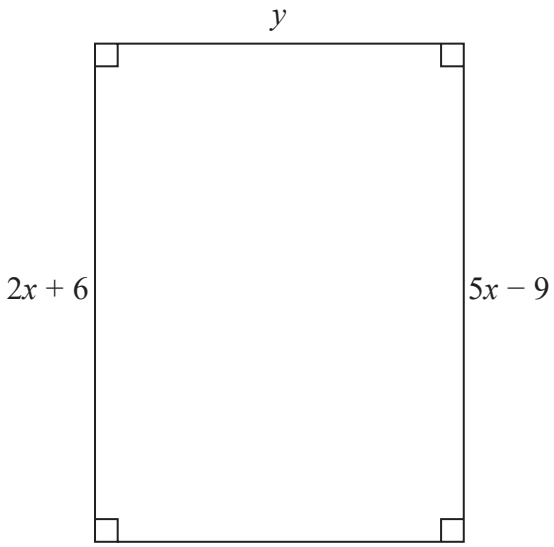
28 Here is a rectangle.



All measurements are in centimetres.

The area of the rectangle is 48 cm^2.

Show that $y = 3$

(Total for Question 28 is 4 marks)

30 In a sale, the normal price of a book is reduced by 30%.
The sale price of the book is £2.80

Work out the normal price of the book.

£.....

(Total for Question 30 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

13 Ellie makes hats.
She makes at least 17 hats per hour.
She is paid 46p for each hat she makes.

Reaze is a waiter.
He works 35 hours and is paid a total of £266

Show that Ellie's hourly rate of pay is more than Reaze's hourly rate of pay.

(Total for Question 13 is 3 marks)

14 a and b are odd numbers.

(a) Give an example to show that the value of $2(a + b)$ is a multiple of 4

(2)

(b) Show that, when a and b are both odd numbers, the value of $2(a + b)$ will always be a multiple of 4

(2)

(Total for Question 14 is 4 marks)

15 Mr Page uses oil to heat his home.

At the beginning of November there were 1000 litres of oil in his oil tank.

Mr Page bought enough oil to fill the tank completely.
He paid 50p per litre for this oil.
He paid a total amount of £750

At the end of February Mr Page had 600 litres of oil in the tank.
He bought enough oil to fill the tank completely.
The cost of oil had increased by 4%.

Work out the total amount Mr Page paid for the oil he bought in February.

£.....

(Total for Question 15 is 5 marks)

16 Solve $5x - 6 = 3(x - 1)$

$x =$ .....

(Total for Question 16 is 3 marks)

17 Emily buys a pack of 12 bottles of water.
The pack costs £5.64

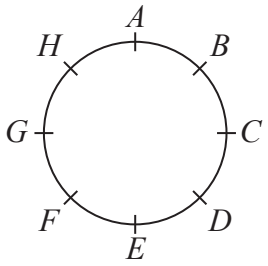
Emily sells all 12 bottles for 50p each.

Work out Emily's percentage profit.
Give your answer correct to 1 decimal place.

..... %

(Total for Question 17 is 3 marks)

18 Hasmeet walks once round a circle with diameter 80 metres.



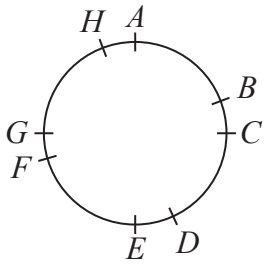
There are 8 points equally spaced on the circumference of the circle.

(a) Find the distance Hasmeet walks between one point and the next point.

.....m

(2)

Four of the points are moved, as shown in the diagram below.



Hasmeet walks once round the circle again.

(b) Has the mean distance that Hasmeet walks between one point and the next point changed?
You must give a reason for your answer.

.....

.....

(1)

(Total for Question 18 is 3 marks)

19 There are only blue cubes, yellow cubes and green cubes in a bag.

There are

twice as many blue cubes as yellow cubes
and four times as many green cubes as blue cubes.

Hannah takes at random a cube from the bag.

Work out the probability that Hannah takes a yellow cube.

.....

(Total for Question 19 is 3 marks)

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DO NOT WRITE IN THIS AREA

21 $p^3 \times p^x = p^9$

(a) Find the value of x.

$x =$ .....

(1)

$(7^2)^y = 7^{10}$

(b) Find the value of y.

$y =$ .....

(1)

$100^a \times 1000^b$ can be written in the form 10^w

(c) Show that $w = 2a + 3b$

(2)

(Total for Question 21 is 4 marks)

23 Use your calculator to work out $\sqrt{\dfrac{\sin 25° + \sin 40°}{\cos 25° - \cos 40°}}$

(a) Write down all the figures on your calculator display.

.....

(2)

(b) Write your answer to part (a) correct to 2 decimal places.

.....

(1)

(Total for Question 23 is 3 marks)

24 (a) Solve $2x^2 = 72$

.....

(2)

(b) Expand and simplify $(2x + 1)(3x - 2)$

.....

(2)

(c) Factorise $x^2 + 6x + 9$

.....

(1)

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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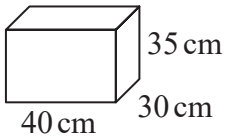
DO NOT WRITE IN THIS AREA

16 Chloe has a van.

She is going to use the van to deliver boxes.
Each box is a cuboid, 40 cm by 30 cm by 35 cm.



The space for boxes in the van has

maximum length	2.4 m
maximum width	1.5 m
maximum height	1.4 m

The space for boxes is empty.
Chloe wants to put as many boxes as possible into the van.

She can put 3 boxes into the van in one minute.
Assume that the space for boxes is in the shape of a cuboid.

(a) Work out how many minutes it should take Chloe to put as many boxes as possible into the van.

..... minutes
(4)

The space for boxes might **not** be in the shape of a cuboid.

(b) Explain how this could affect the time it would take Chloe to put as many boxes as possible into the van.

.....

.....

(1)

(Total for Question 16 is 5 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

22 There are only blue pens, green pens and red pens in a box.

The ratio of the number of blue pens to the number of green pens is 2 : 5
The ratio of the number of green pens to the number of red pens is 4 : 1

There are less than 100 pens in the box.

What is the greatest possible number of red pens in the box?

.....

(Total for Question 22 is 3 marks)

23 (a) Find the value of the reciprocal of 1.6
Give your answer as a decimal.

.....

(1)

Jess rounds a number, x, to one decimal place.
The result is 9.8

(b) Write down the error interval for x.

.....

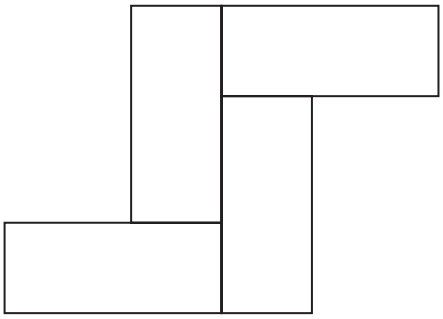
(2)

(Total for Question 23 is 3 marks)

24 Here is a rectangle.

The length of the rectangle is 7 cm longer than the width of the rectangle.

4 of these rectangles are used to make this 8-sided shape.



The perimeter of the 8-sided shape is 70 cm.

Work out the area of the 8-sided shape.

..... cm^2

(Total for Question 24 is 5 marks)

25 Work out $(13.8 \times 10^{7}) \times (5.4 \times 10^{-12})$
Give your answer as an ordinary number.

.....

(Total for Question 25 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

26 When a drawing pin is dropped it can land point down or point up.

Lucy, Mel and Tom each dropped the drawing pin a number of times.

The table shows the number of times the drawing pin landed point down and the number of times the drawing pin landed point up for each person.

	Lucy	**Mel**	**Tom**
point down	31	53	16
point up	14	27	9

Rachael is going to drop the drawing pin once.

(a) Whose results will give the best estimate for the probability that the drawing pin will land point up?
Give a reason for your answer.

.....

.....

(1)

Stuart is going to drop the drawing pin twice.

(b) Use all the results in the table to work out an estimate for the probability that the drawing pin will land point up the first time and point down the second time.

.....

(2)

(Total for Question 26 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

27 Solve the simultaneous equations

$$x + 3y = 12$$
$$5x - y = 4$$

$x =$ .....

$y =$ .....

(Total for Question 27 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

(b) Work out the total surface area of the pyramid.

.....

(4)

(Total for Question 23 is 6 marks)

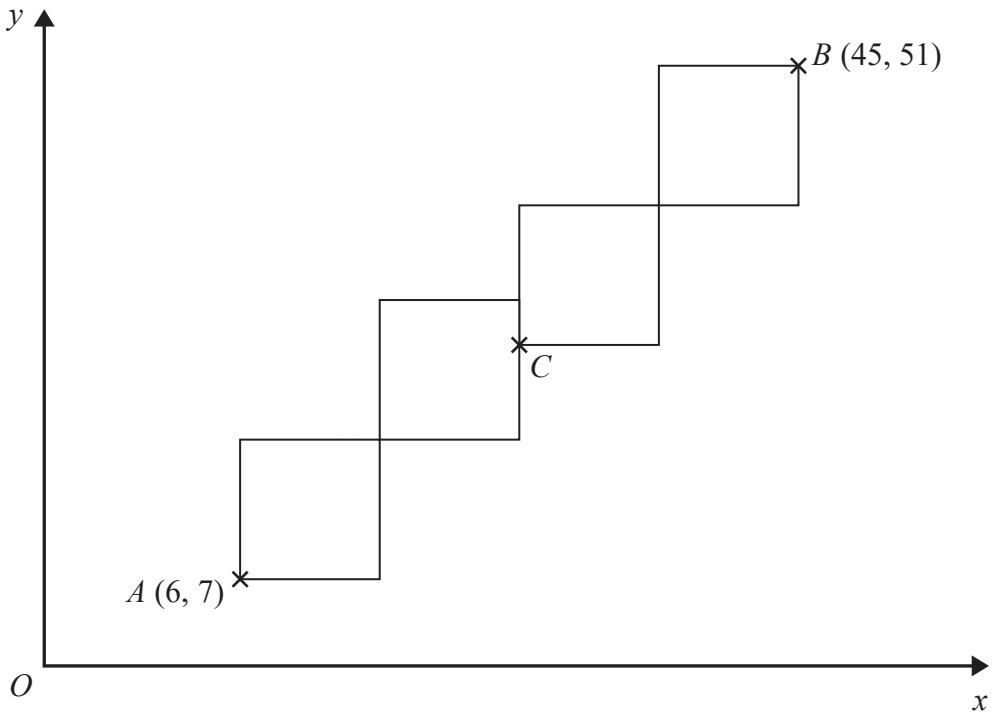
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

24 A pattern is made from four identical squares.

The sides of the squares are parallel to the axes.



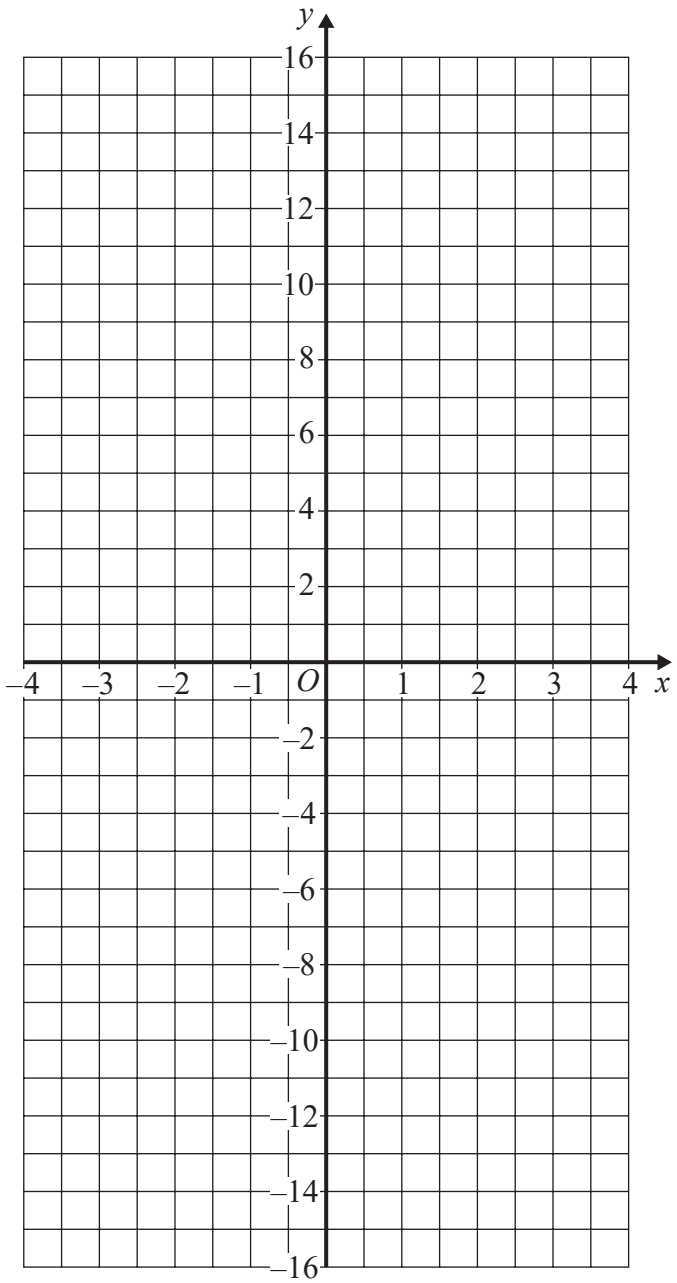
Point A has coordinates (6, 7)
Point B has coordinates (45, 51)
Point C is marked on the diagram.

Work out the coordinates of C.

(..... , ...)

(Total for Question 24 is 5 marks)

25 On the grid below, draw the graph of $y = 2 - 3x$ for values of x from -3 to 3



(Total for Question 25 is 3 marks)

26 $\mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$

Work out $2\mathbf{a} + 7\mathbf{b}$ as a column vector.

$\begin{pmatrix} \cdots\cdots \\ \cdots\cdots \end{pmatrix}$

(Total for Question 26 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write 6324 correct to the nearest thousand.

.....

(Total for Question 1 is 1 mark)

2 (a) Write the following numbers in order of size.
Start with the smallest number.

−6 6 −5 0 12

.....

(1)

(b) Write the following numbers in order of size.
Start with the smallest number.

0.078 0.78 0.87 0.708

.....

(1)

(Total for Question 2 is 2 marks)

3 Write 20% as a fraction.

.....

(Total for Question 3 is 1 mark)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

4 Here is a list of four fractions.

$$\frac{4}{16} \qquad \frac{2}{8} \qquad \frac{15}{60} \qquad \frac{3}{9}$$

One of these fractions is **not** equivalent to $\frac{1}{4}$

Write down this fraction.

.....

(Total for Question 4 is 1 mark)

5 Write down the first even multiple of 7

.....

(Total for Question 5 is 1 mark)

6 (a) Simplify $3 \times 4t$

.....

(1)

(b) Simplify $8a - 3a + 2a$

.....

(1)

(Total for Question 6 is 2 marks)

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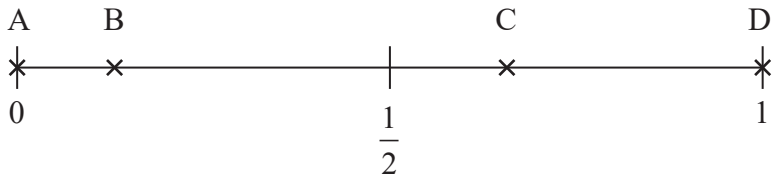
DO NOT WRITE IN THIS AREA

7 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 7 is 5 marks)

23 Raya buys a van for £17015 plus VAT at 20%

Raya pays a deposit for the van.
She then pays the rest of the cost in 12 equal payments of £850.75 each month.

Find the ratio of the deposit Raya pays to the total of the 12 equal payments.
Give your answer in its simplest form.

.....

(Total for Question 23 is 5 marks)

(c) Use your graph to find estimates of the solutions to the equation $x^2 - x - 7 = -2$

.....

(2)

(Total for Question 24 is 6 marks)

25 A force of 80 newtons acts on an area of 30 cm^2

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The force is increased by 20 newtons.
The area is increased by 6 cm^2

Helen says,

"The pressure decreases by less than 20%"

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

(Total for Question 25 is 3 marks)

16 Marla buys some bags of buttons.

There are 19 buttons or 20 buttons or 21 buttons or 22 buttons in each bag.

The table gives some information about the number of buttons in each bag.

Number of buttons	Frequency
19	.....
20	7
21	3
22	1

The total number of buttons is 320

Complete the table.

(Total for Question 16 is 3 marks)

17 Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits
225 g butter 110 g caster sugar 275 g plain flour 75 g chocolate chips

Lucas has the following ingredients.

900 g butter
1000 g caster sugar
1000 g plain flour
225 g chocolate chips

What is the greatest number of biscuits Lucas can make?
You must show your working.

.....

(Total for Question 17 is 3 marks)

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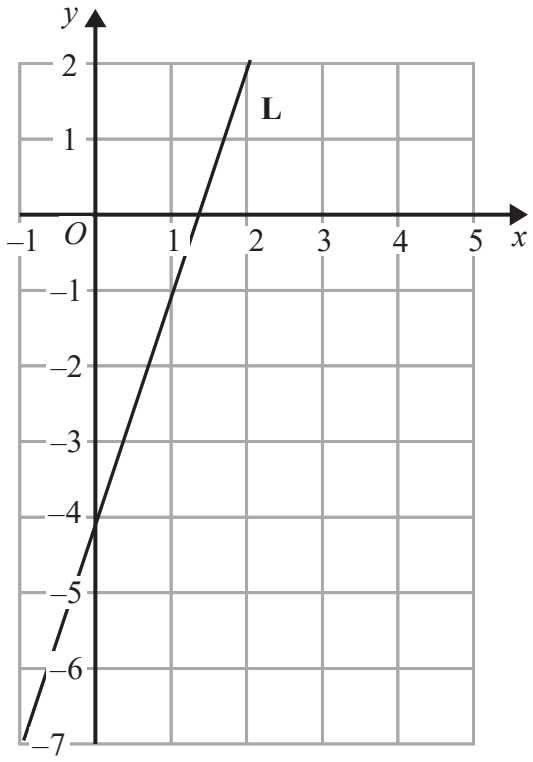
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

22 The line **L** is shown on the grid.



Find an equation for **L**.

.....

(Total for Question 22 is 3 marks)

23 Raya buys a van for £8500 plus VAT at 20%

Raya pays a deposit for the van.
She then pays the rest of the cost in 12 equal payments of £531.25 each month.

Find the ratio of the deposit Raya pays to the total of the 12 equal payments.
Give your answer in its simplest form.

.....

(Total for Question 23 is 5 marks)

(c) Use your graph to find estimates of the solutions to the equation $x^2 - x - 6 = -2$

.....

(2)

(Total for Question 24 is 6 marks)

25 A force of 70 newtons acts on an area of 20 cm^2

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The force is increased by 10 newtons.
The area is increased by 10 cm^2

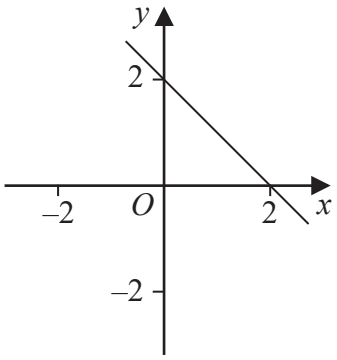
Helen says,

"The pressure decreases by less than 20%"

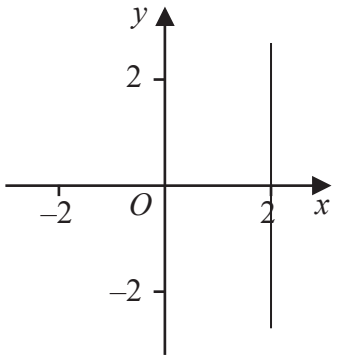
Is Helen correct?
You must show how you get your answer.

(Total for Question 25 is 3 marks)

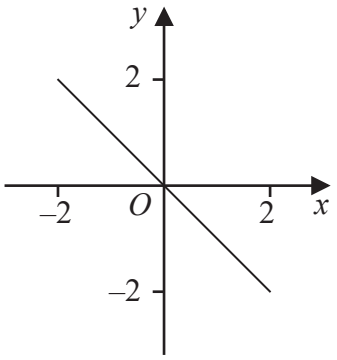
13 Here are six straight line graphs.



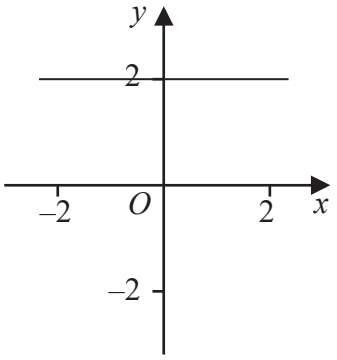
Graph **A**



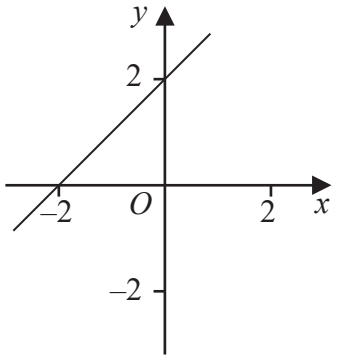
Graph **B**



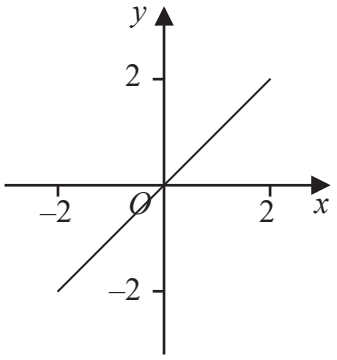
Graph **C**



Graph **D**



Graph **E**



Graph **F**

Match each equation in the table to the correct graph.
Write the letter of the graph in the table.

Equation	Graph
$y = 2-x$	
$y = x$	
$y=x+2$	

(Total for Question 13 is 2 marks)

14 Here are the marks 30 students got in a French test.

77	82	84	69	80	64	70	81	75	91
87	67	80	70	94	76	81	69	71	77
66	67	82	67	73	76	61	64	76	89

(a) Show this information in a stem and leaf diagram.

(3)

One of these students is going to be chosen at random.

The pass mark in the French test is 71

Omar writes,

The probability that this student failed the French test is $\frac{2}{3}$

Omar is wrong.

(b) Explain why.

.....

.....

(2)

(Total for Question 14 is 5 marks)

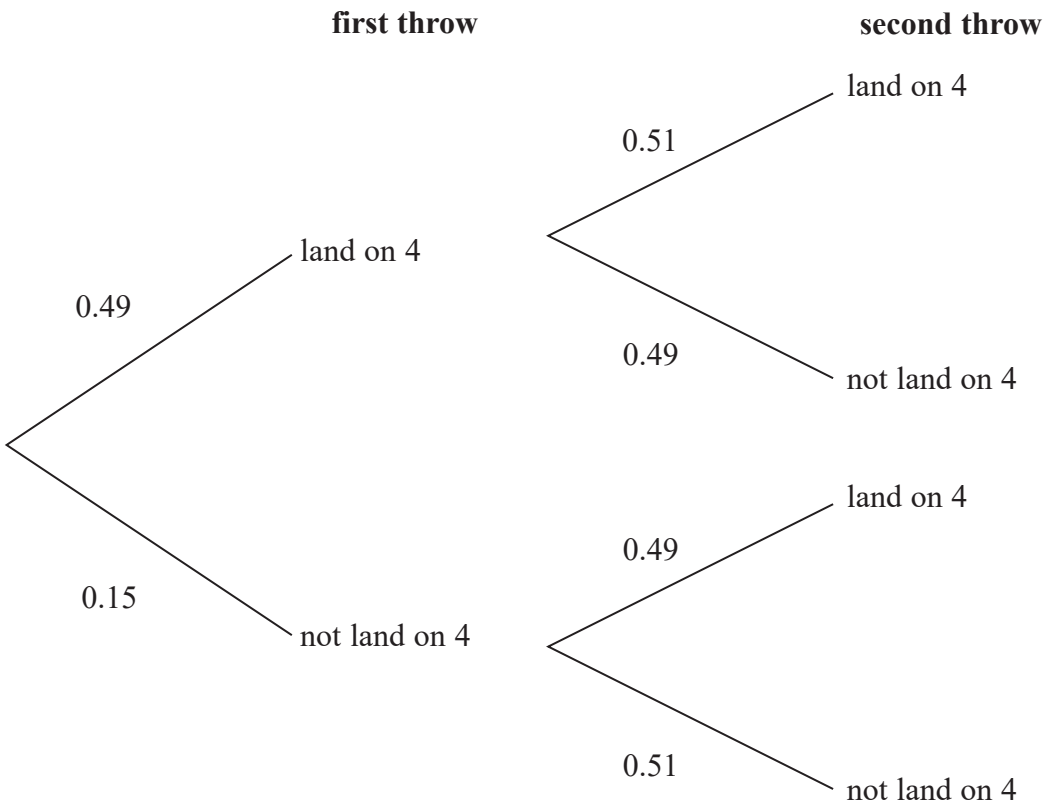
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

22 When a biased 6-sided dice is thrown once, the probability that it will land on 4 is 0.49
The biased dice is thrown twice.

Amir draws this probability tree diagram.
The diagram is **not** correct.



Write down **two** things that are wrong with the probability tree diagram.

1 .....

.....

2 .....

.....

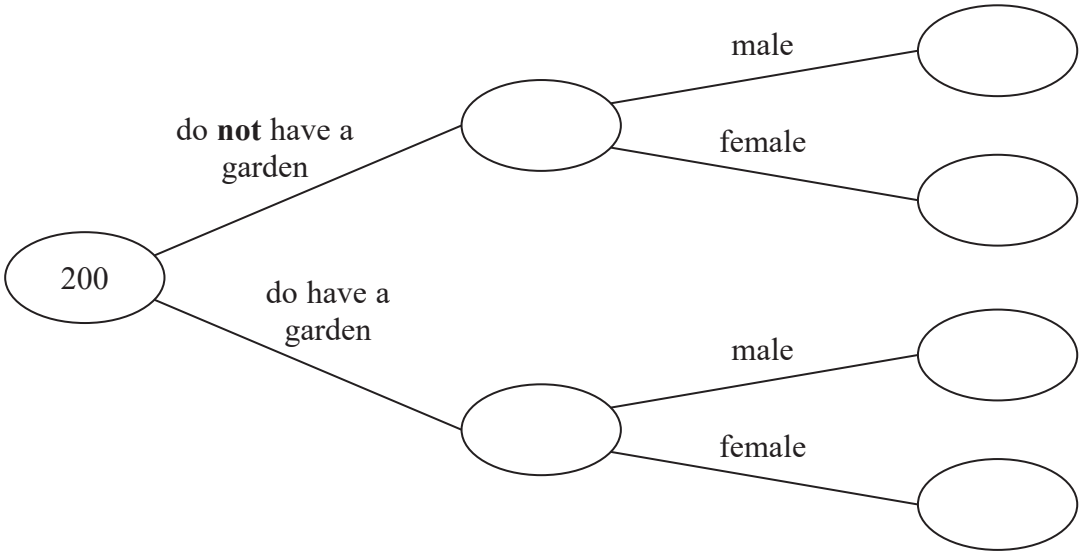
(Total for Question 22 is 2 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

12 200 people live in a village.

23 people do **not** have a garden.
10 males do **not** have a garden.
95 people are male.

(a) Use this information to complete the frequency tree.



(3)

One of the people who does **not** have a garden is chosen at random.

(b) Write down the probability that this person is female.

.....

(2)

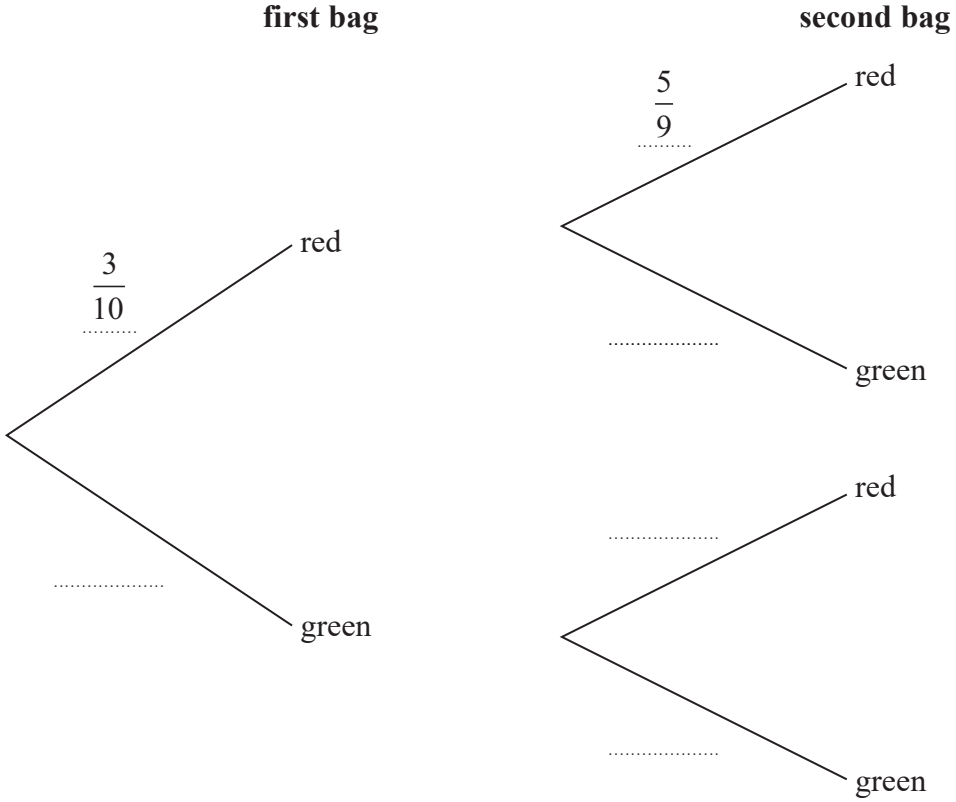
(Total for Question 12 is 5 marks)

27 Amina has two bags.

In the first bag there are 3 red balls and 7 green balls.
In the second bag there are 5 red balls and 4 green balls.

Amina takes at random a ball from the first bag.
She then takes at random a ball from the second bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Amina takes two red balls.

.....

(2)

(Total for Question 27 is 4 marks)

24 There are some counters in a bag.
The counters are red or white or blue or yellow.

Bob is going to take at random a counter from the bag.

The table shows each of the probabilities that the counter will be blue or will be yellow.

Colour	red	white	blue	yellow
Probability			0.48	0.16

There are 18 blue counters in the bag.

The probability that the counter Bob takes will be red is twice the probability that the counter will be white.

(a) Work out the number of red counters in the bag.

.....

(4)

A marble is going to be taken at random from a box of marbles.
The probability that the marble will be silver is 0.5

There must be an even number of marbles in the box.

(b) Explain why.

.....

.....

(1)

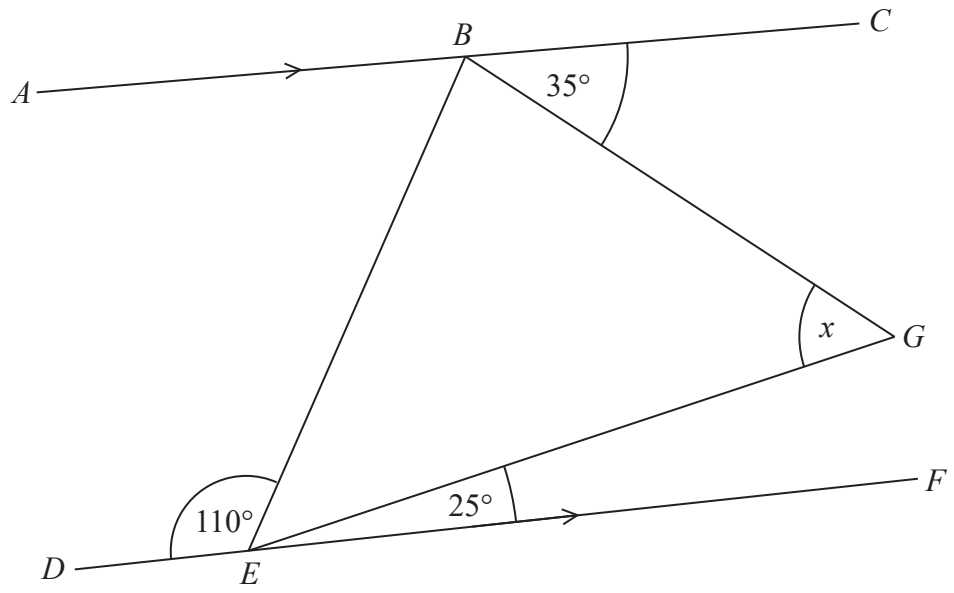
(Total for Question 24 is 5 marks)

25 Solve $\frac{5 - x}{4} = 3x - 7$

$x =$ .....

(Total for Question 25 is 3 marks)

22 *BEG* is a triangle.



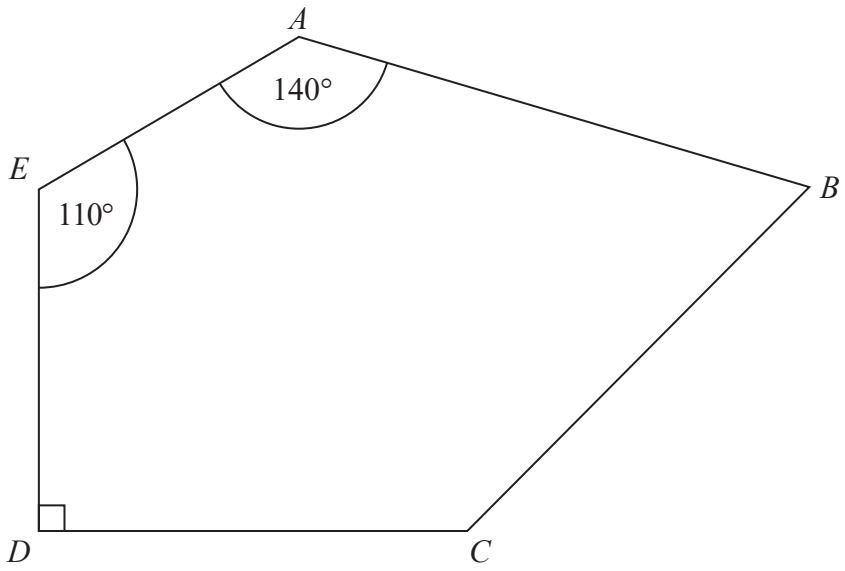
ABC and *DEF* are parallel lines.

Work out the size of angle *x*.
Give a reason for each stage of your working.

.....°

(Total for Question 22 is 4 marks)

26 *ABCDE* is a pentagon.



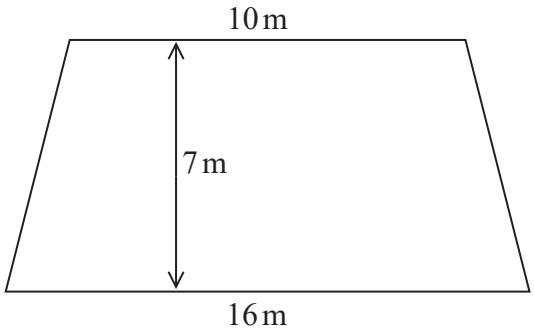
Angle *BCD* = 2 × angle *ABC*

Work out the size of angle *BCD*.
You must show all your working.

°

(Total for Question 26 is 5 marks)

24 The diagram shows a floor in the shape of a trapezium.



£16.99

John is going to paint the floor.

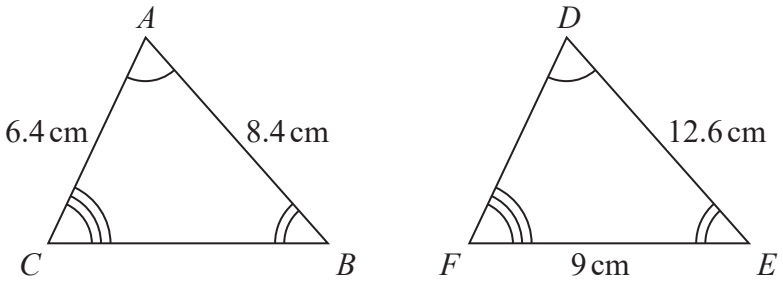
Each 5 litre tin of paint costs £16.99
1 litre of paint covers an area of 2 m^2

John has £160 to spend on paint.

Has John got enough money to buy all the paint he needs?
You must show how you get your answer.

(Total for Question 24 is 5 marks)

27 Triangle *ABC* and triangle *DEF* are similar.



(a) Work out the length of *DF*.

..... cm

(2)

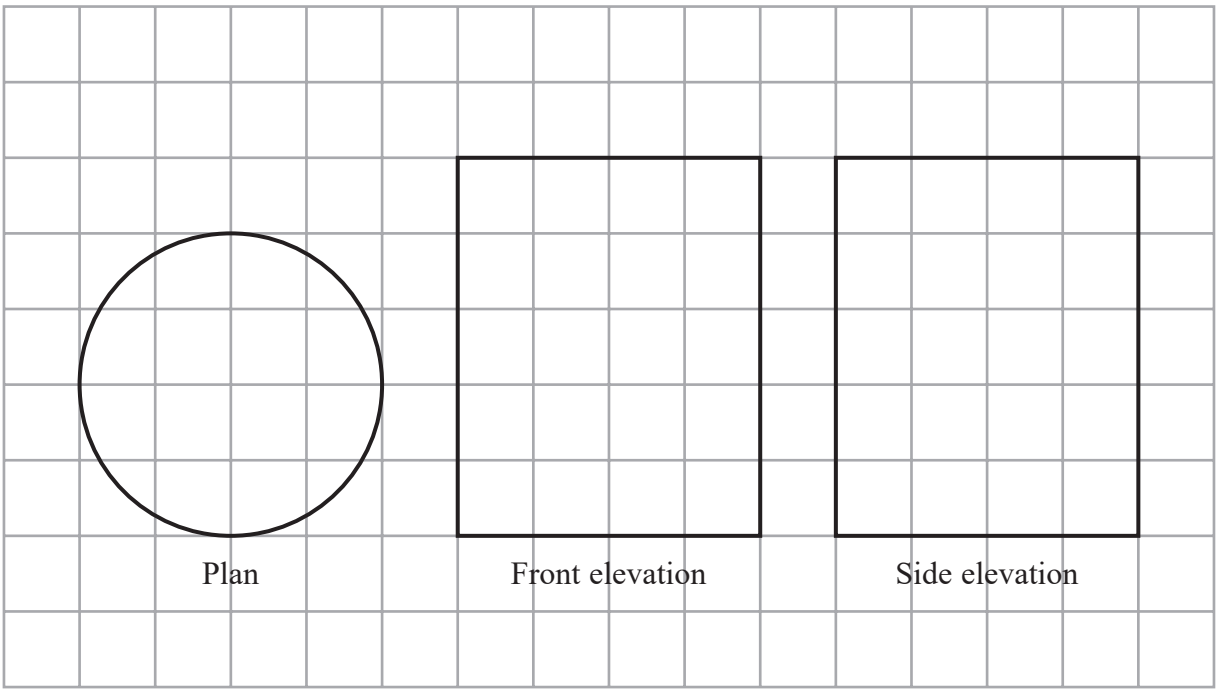
(b) Work out the length of *CB*.

..... cm

(2)

(Total for Question 27 is 4 marks)

25 The diagram shows the plan, front elevation and side elevation of a solid shape, drawn on a centimetre grid.



In the space below, draw a sketch of the solid shape.
Give the dimensions of the solid on your sketch.

(Total for Question 25 is 2 marks)

27 A shop sells packs of black pens, packs of red pens and packs of green pens.

There are

3 pens in each pack of black pens
8 pens in each pack of red pens
5 pens in each pack of green pens

On Monday,

number of packs of black pens sold : number of packs of red pens sold : number of packs of green pens sold = 9: 4 : 3

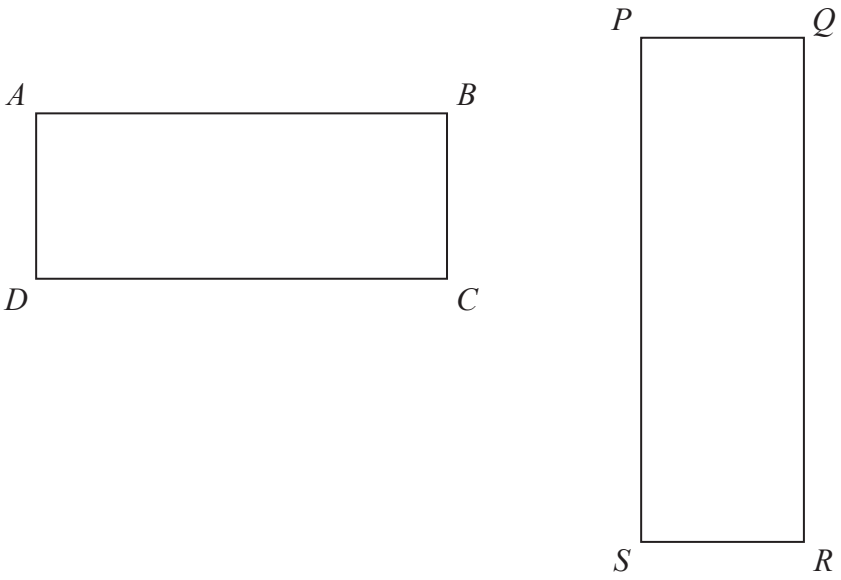
A total of 296 pens were sold.

Work out the number of green pens sold.

.....

(Total for Question 27 is 4 marks)

28 Here are two rectangles.



$QR = 15\,\text{cm}$
$BC = PQ$

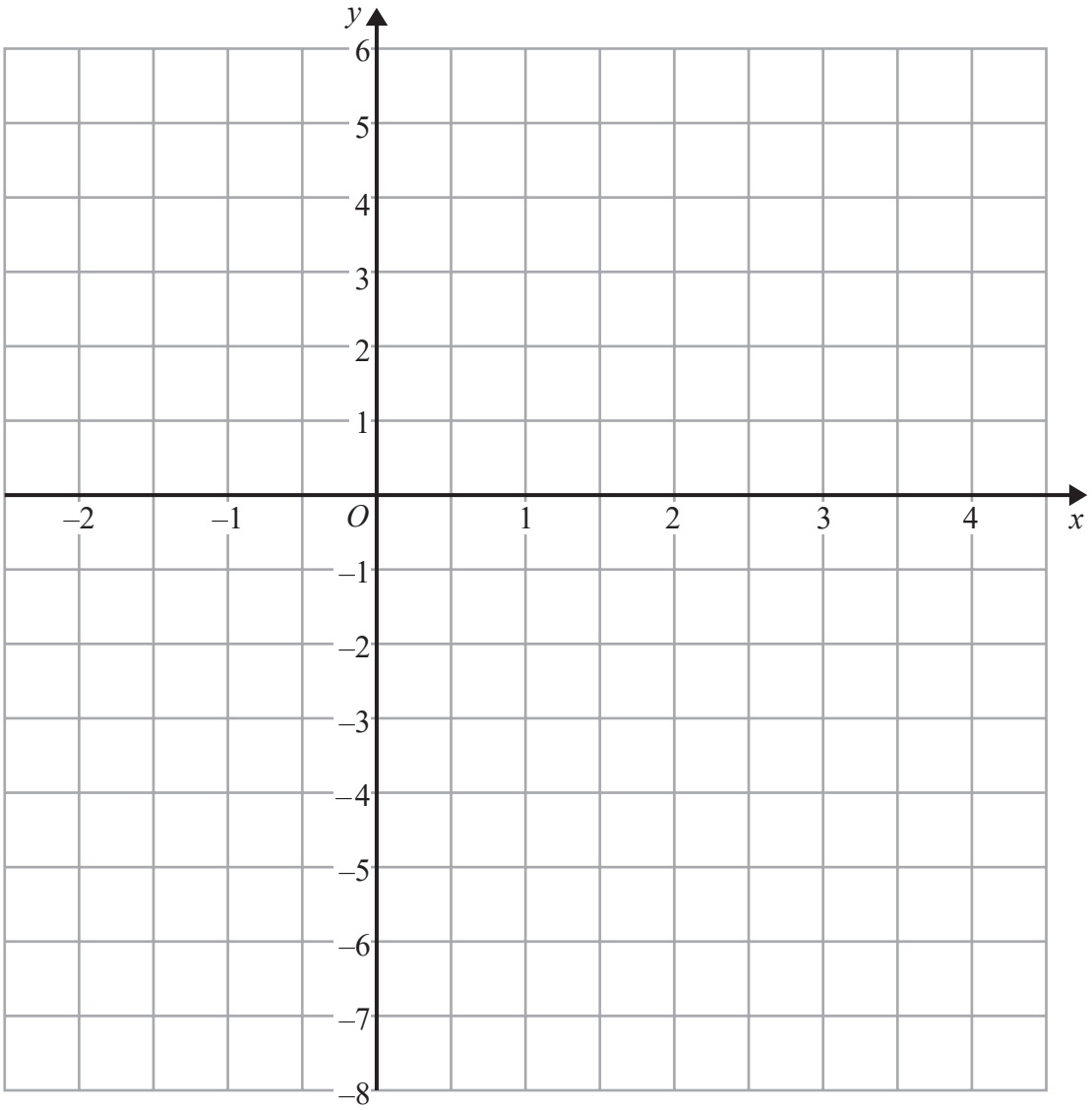
The perimeter of $ABCD$ is 38 cm
The area of $PQRS$ is $75\,\text{cm}^2$

Find the length of AB.

..... cm

(Total for Question 28 is 4 marks)

21 On the grid below, draw the graph of $y = 2x - 4$ for values of x from -2 to 4



(Total for Question 21 is 3 marks)

22 Hannah is planning a day trip for 210 students.

She asks a sample of 30 students where they want to go.
Each student chooses one place.

The table shows information about her results.

Place	Number of students
Theme Park	8
Theatre	6
Sports Centre	9
Seaside	7

(i) Work out how many of the 210 students you think will want to go to the Theme Park.

.....

(2)

(ii) State any assumption you made **and** explain how this may affect your answer.

.....

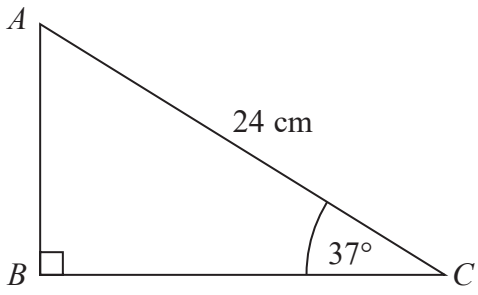
.....

.....

(1)

(Total for Question 22 is 3 marks)

24 *ABC* is a right-angled triangle.



Calculate the length of *AB*.
Give your answer correct to 2 decimal places.

.....cm

(Total for Question 24 is 2 marks)

25 Sally used her calculator to work out the value of a number *y*.

The answer on her calculator display began

8.6

Complete the error interval for *y*.

..... $\leqslant y <$ .....

(Total for Question 25 is 2 marks)

28 Here are the first five terms of a Fibonacci sequence.

6 6 12 18

(a) Write down the next two terms of the sequence.

..... , ...

(1)

The first three terms of a different Fibonacci sequence are

k k $2k$

(b) Find the 8th term of this sequence.

.....

(2)

(Total for Question 28 is 3 marks)

29 $\mathbf{a} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 3 \\ 7 \end{pmatrix}$

Work out $\mathbf{a} - 3\mathbf{b}$ as a column vector.

$\begin{pmatrix} \text{.....} \\ \text{.....} \end{pmatrix}$

(Total for Question 29 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

25 Katy invests £200 000 in a savings account for 4 years.
The account pays compound interest at a rate of 1.5 % per annum.

Calculate the total amount of interest Katy will get at the end of 4 years.

£.....

(Total for Question 25 is 3 marks)

30 Solve the simultaneous equations

$$3x - 4y = 11$$
$$9x + 2y = 5$$

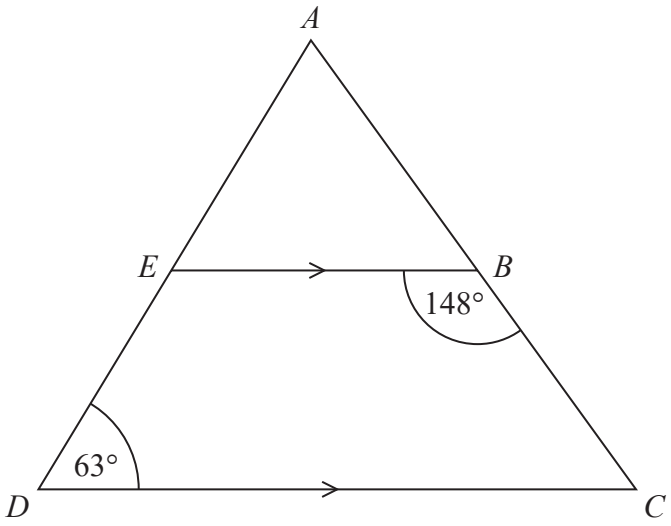
$x =$ .....

$y =$ .....

(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

25 *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 25 is 5 marks)

26 The table shows information about the heights, in cm, of a group of Year 9 girls.

least height	150 cm
median	165 cm
greatest height	170 cm

This stem and leaf diagram shows information about the heights, in cm, of a group of 15 Year 9 boys.

15	8 9 9
16	4 5 7 7 8
17	0 3 4 4 7
18	0 2

Key: 15 | 8 represents 158 cm

Compare the distribution of the heights of the girls with the distribution of the heights of the boys.

.....

.....

.....

.....

.....

.....

(Total for Question 26 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

22 The stem and leaf diagram shows the test scores of 23 students from School **A**.

3	0
4	1 2 4 4 5 7
5	3 4 4 6 7 8 8 9
6	0 8 8 9 9
7	1 3 9

Key:
3 | 0 represents 30

23 students from School **B** did the same test.

Their median score was 56
The range of their scores was 47

Compare the distribution of the test scores of the students from School **A** with the distribution of the test scores of the students from School **B**.

(Total for Question 22 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

29 Given that $\frac{a}{b} = \frac{2}{5}$ and $\frac{b}{c} = \frac{3}{4}$

find $a : b : c$

.....

(Total for Question 29 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

30 (a) Make q the subject of $p = 6q + 7$

.....

(2)

(b) Simplify $(m^{-2})^{-3}$

.....

(1)

(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

19 Adam, Linda and Rytis share an amount of money.

Linda gets three times as much money as Rytis gets.
Linda gets half as much money as Adam gets.

What fraction of the amount of money does Linda get?

.....

(Total for Question 19 is 2 marks)

20 Pens and pencils are sold in a shop.

12 pencils cost £1.80

The ratio of the cost of a pen to the cost of a pencil is 7 : 3

Work out the cost of 5 pens.

£.....

(Total for Question 20 is 4 marks)

25 The cost of a first class stamp increased from 76p to 85p.
The cost of a second class stamp increased from 65p to 66p.

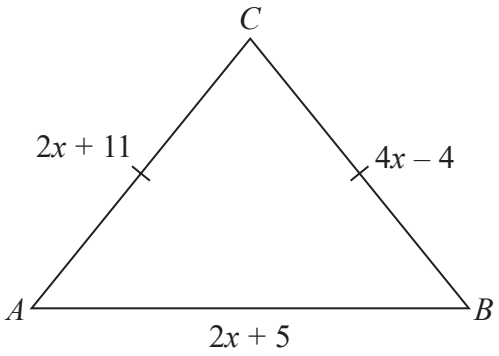
Filip says,

> "The percentage increase in the cost of a first class stamp is more than 7 times the percentage increase in the cost of a second class stamp."

Is Filip correct?
You must show all your working.

(Total for Question 25 is 4 marks)

26 The diagram shows triangle ABC.



In the diagram, all measurements are in centimetres.

$AC = BC$

The perimeter of the triangle is 72 cm.

Work out the area of the triangle.

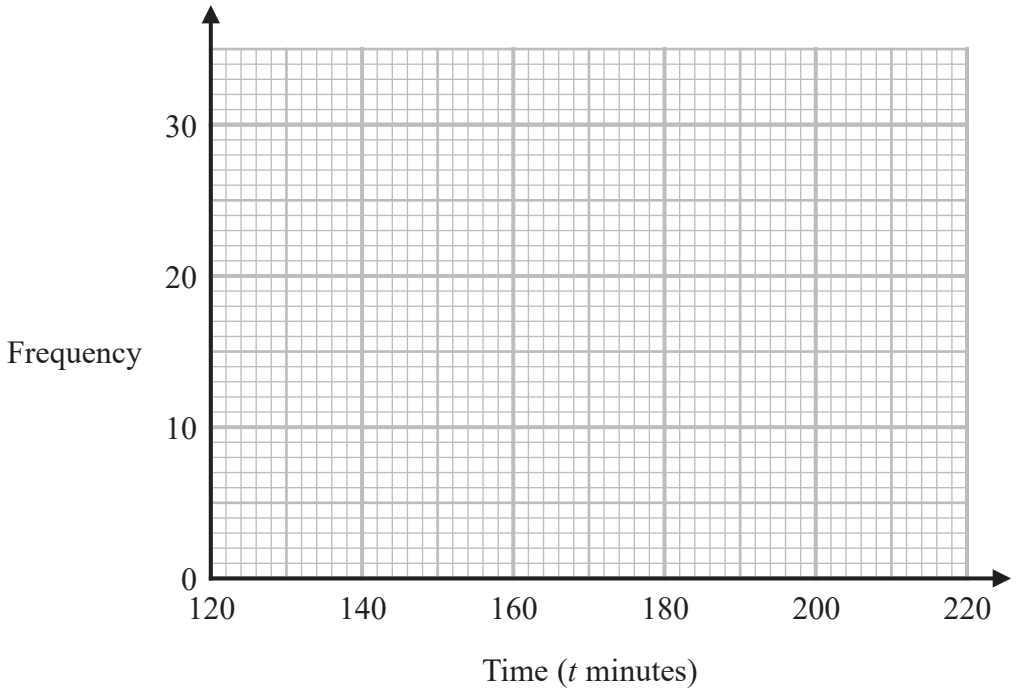
..... cm^2

(Total for Question 26 is 5 marks)

17 The table shows information about the times, in minutes, 100 people took to complete a bike race.

Time (t minutes)	Frequency
$120 \leqslant t < 140$	12
$140 \leqslant t < 160$	28
$160 \leqslant t < 180$	30
$180 \leqslant t < 200$	22
$200 \leqslant t < 220$	8

On the grid below, draw a frequency polygon for this information.



(Total for Question 17 is 2 marks)

18 (a) Write 3.402×10^5 as an ordinary number.

.....

(1)

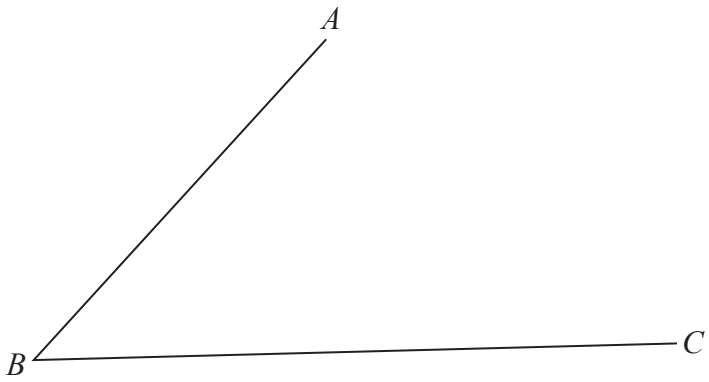
(b) Write 0.8026 in standard form.

.....

(1)

(Total for Question 18 is 2 marks)

19 Use ruler and compasses to construct the bisector of angle *ABC*.
You must show your construction lines.



(Total for Question 19 is 2 marks)

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

21 Robyn buys a total of 240 pens and pencils, where

number of pens : number of pencils = 3 : 5

Robyn pays 9p for each pen.
She sells each pen for 11p.

Robyn pays 6p for each pencil.
She sells each pencil for 10p.

Robyn sells all of the pens and pencils.

Work out Robyn's percentage profit.
Give your answer correct to 1 decimal place.
You must show all your working.

.....%

(Total for Question 21 is 5 marks)

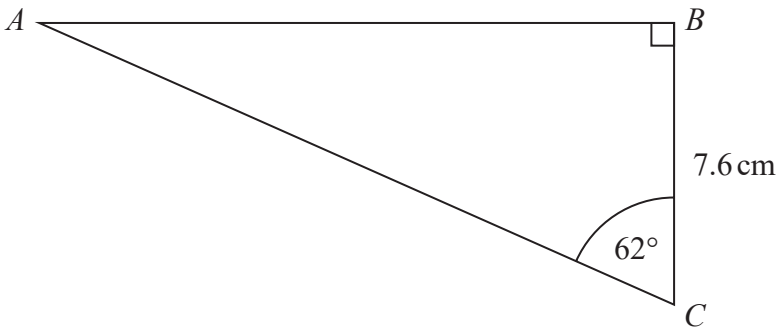
23 Jana used her calculator to find the value of a number t.
The answer on her calculator began 10.2

Complete the error interval for t.

..... $\leqslant t <$ .....

(Total for Question 23 is 2 marks)

24 ABC is a right-angled triangle.



Calculate the length of AB.
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 24 is 2 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

25 (a) Simplify fully $2x^3y^5 \times 7x^2y$

.....

(2)

(b) Simplify $(m^2)^{-3}$

.....

(1)

(Total for Question 25 is 3 marks)

26 Peter invests £4500 in a savings account for 3 years.
He gets 1.8% per year compound interest.

Work out the total amount of interest Peter gets.

£.....

(Total for Question 26 is 3 marks)

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA

21 (a) Write 84 as a product of its prime factors.

.....

(2)

(b) Find the lowest common multiple (LCM) of 60 and 84

.....

(2)

(Total for Question 21 is 4 marks)

23 Carlo puts tins into small boxes and into large boxes.

He puts 6 tins into each small box.
He puts 20 tins into each large box.

Carlo puts a total of 3000 tins into the boxes so that

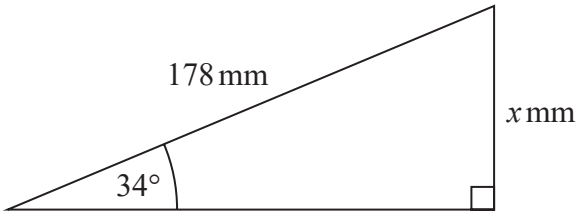
number of tins in small boxes : number of tins in large boxes = 2 : 3

Carlo says that less than 30% of the boxes filled with tins are large boxes.

Is Carlo correct?
You must show all your working.

(Total for Question 23 is 5 marks)

25



Work out the value of x.
Give your answer correct to 1 decimal place.

.....

(Total for Question 25 is 2 marks)

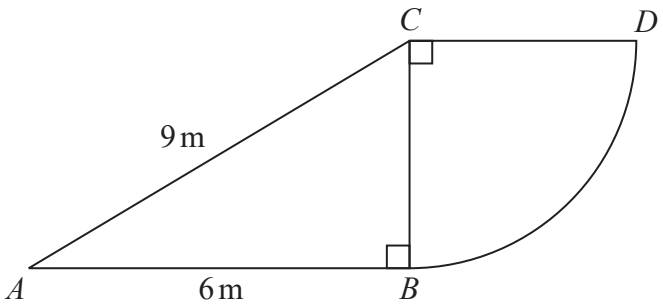
26 $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Find $2\mathbf{a} - 3\mathbf{b}$ as a column vector.

$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

(Total for Question 26 is 2 marks)

27 The diagram shows a right-angled triangle and a quarter circle.



The right-angled triangle ABC has angle $ABC = 90°$
The quarter circle has centre C and radius CB.

Work out the area of the quarter circle.
Give your answer correct to 3 significant figures.
You must show all your working.

..... m^2

(Total for Question 27 is 4 marks)

28 Each exterior angle of a regular polygon is 15°

Work out the number of sides of the polygon.

.....

(Total for Question 28 is 2 marks)

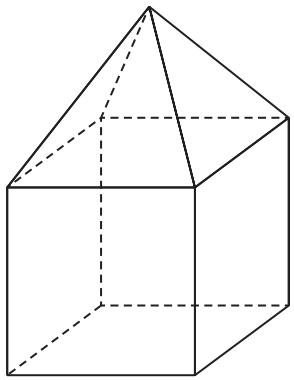
29 Write down the gradient of the line with equation $y = 2x + 3$

.....

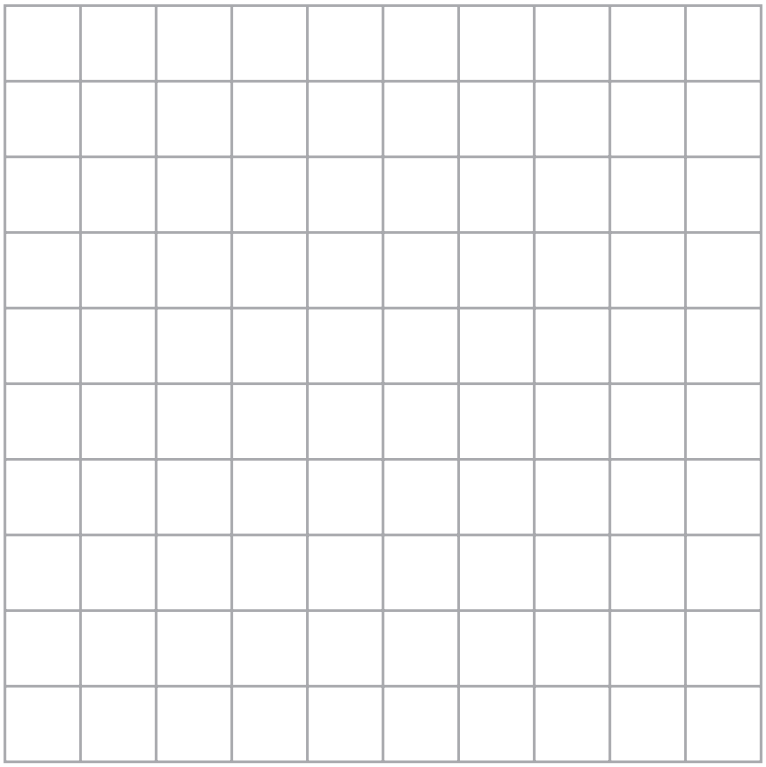
(Total for Question 29 is 1 mark)

TOTAL FOR PAPER IS 80 MARKS

22 Here is a solid made from a square-based pyramid and a cube.
Each edge of the solid has length 6 cm.

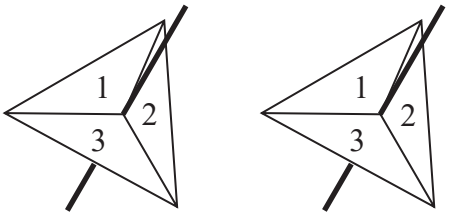


On the centimetre grid, draw the plan of this solid.



(Total for Question 22 is 2 marks)

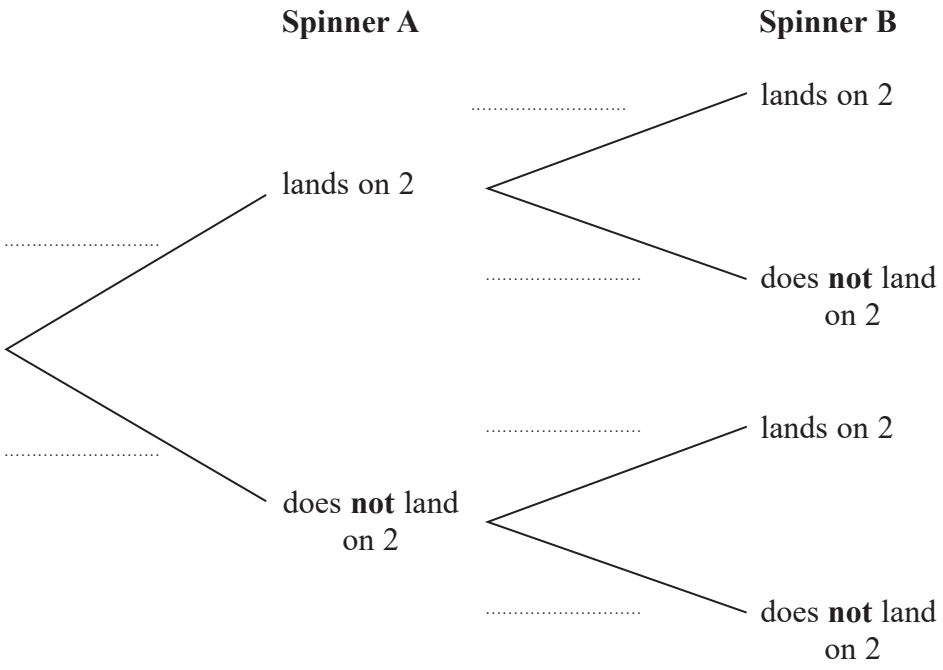
27 Amanda has two fair 3-sided spinners.



Spinner A **Spinner B**

Amanda spins each spinner once.

(a) Complete the probability tree diagram.



(2)

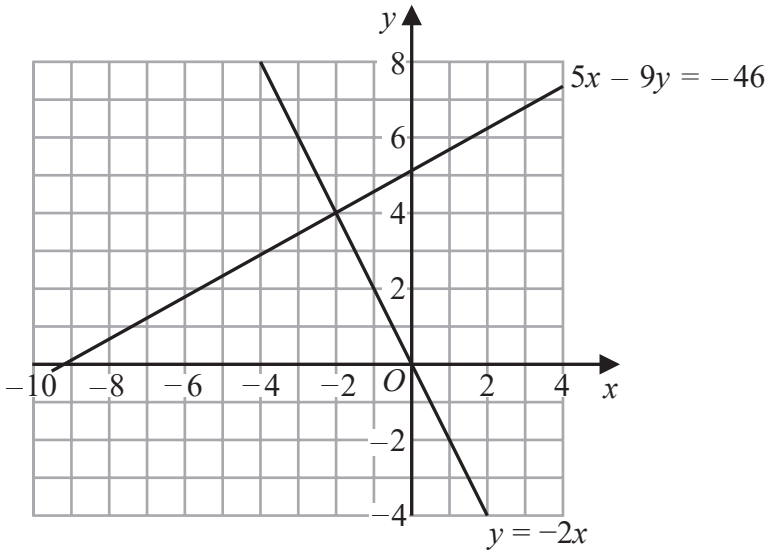
(b) Work out the probability that Spinner A lands on 2 and Spinner B does **not** land on 2

.....

(2)

(Total for Question 27 is 4 marks)

28



(a) Use these graphs to solve the simultaneous equations

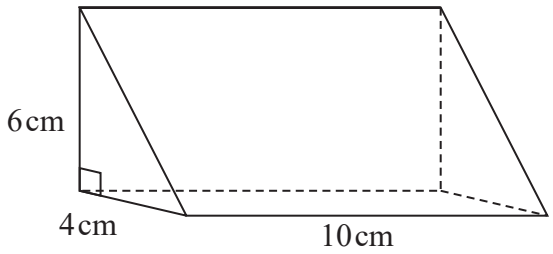
$$5x - 9y = -46$$
$$y = -2x$$

$x =$ .....

$y =$ .....

(1)

29 The diagram shows a solid triangular prism.



The prism is made from wood with a density of 0.8 g/cm³

Work out the mass of this prism.

..... g

(Total for Question 29 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

17 Heidi wants to make some biscuits using this recipe.

Makes 12 biscuits
125 g butter 200 g flour 50 g sugar

Heidi thinks that she has,

500 g butter
700 g flour
250 g sugar

Assuming that these weights are correct,

(a) work out the greatest number of biscuits Heidi can make.
You must show all your working.

.....

(4)

Heidi is wrong.
She has more than 250 g of sugar.

(b) Does this affect the greatest number of biscuits Heidi can make?
Give a reason for your answer.

.....

.....

.....

(1)

(Total for Question 17 is 5 marks)

19 Robin buys a watch for £80
He sells the watch for £56

Work out his percentage loss.

.....%

(Total for Question 19 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

20 (a) Work out 3.67×4.2

.....

(3)

(b) Work out $59.84 \div 1.6$

.....

(3)

(Total for Question 20 is 6 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

23 At the end of 2017

the value of Tamara's house was £220 000
the value of Rahim's house was £160 000

At the end of 2019

the value of Tamara's house had decreased by 20%
the value of Rahim's house had increased by 30%

At the end of 2019, whose house had the greater value?
You must show how you get your answer.

(Total for Question 23 is 4 marks)

24 Rosie, Matilda and Ibrahim collect stickers.

$$\text{number of stickers Rosie has} : \text{number of stickers Matilda has} : \text{number of stickers Ibrahim has} = 4 : 7 : 15$$

Ibrahim has 24 more stickers than Matilda.

Ibrahim has more stickers than Rosie.
How many more?

.....

(Total for Question 24 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

28 The equation of a straight line **L** is $y = 3 - 4x$

(i) Write down the gradient of **L**.

.....

(1)

(ii) Write down the coordinates of the point where **L** crosses the y-axis.

(..... , ...)

(1)

(Total for Question 28 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA

27 Solve $x^2 - 7x - 18 = 0$

.....

(Total for Question 27 is 3 marks)

28 In a sale, the normal price of a boat is reduced by 15%
The sale price of the boat is £272 000

Work out the normal price of the boat.

£.....

(Total for Question 28 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

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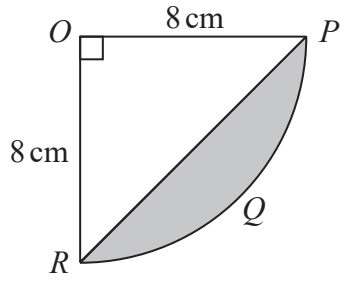
DO NOT WRITE IN THIS AREA

27 The diagram shows a sector $OPQR$ of a circle, centre O and radius 8 cm.



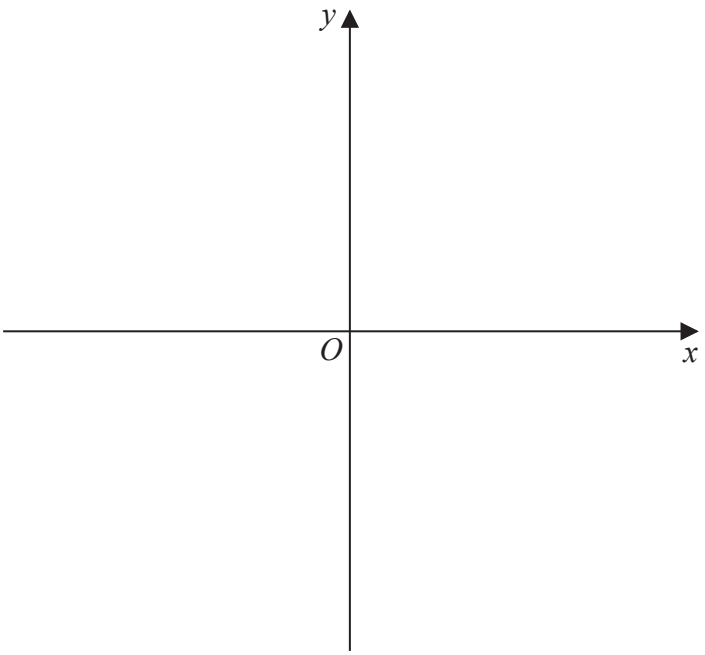
OPR is a triangle.

Work out the area of the shaded segment PQR.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 27 is 4 marks)

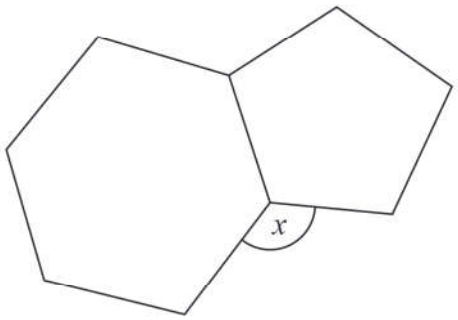
28 Sketch the graph of $y = \frac{1}{x}$



(Total for Question 28 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

27 Here is a regular hexagon and a regular pentagon.



Work out the size of the angle marked x.
You must show all your working.

.....°

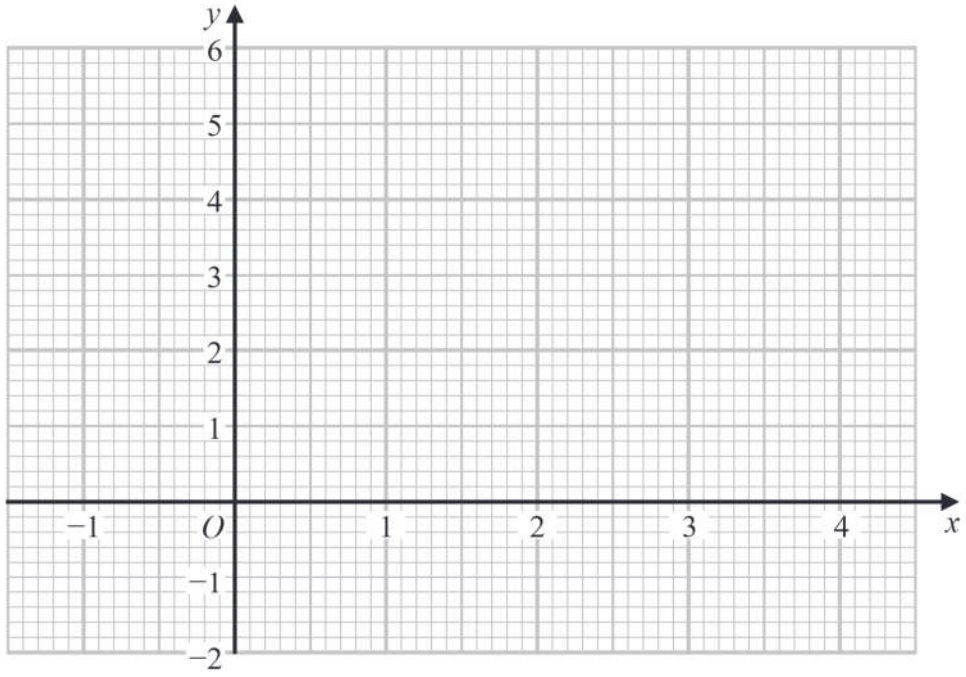
(Total for Question 27 is 3 marks)

28 (a) Complete the table of values for $y = x^2 - 3x + 1$

x	-1	0	1	2	3	4
y		1	-1			

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x + 1$ for values of x from -1 to 4



(2)

(c) Using your graph, find estimates for the solutions of the equation $x^2 - 3x + 1 = 0$

.....

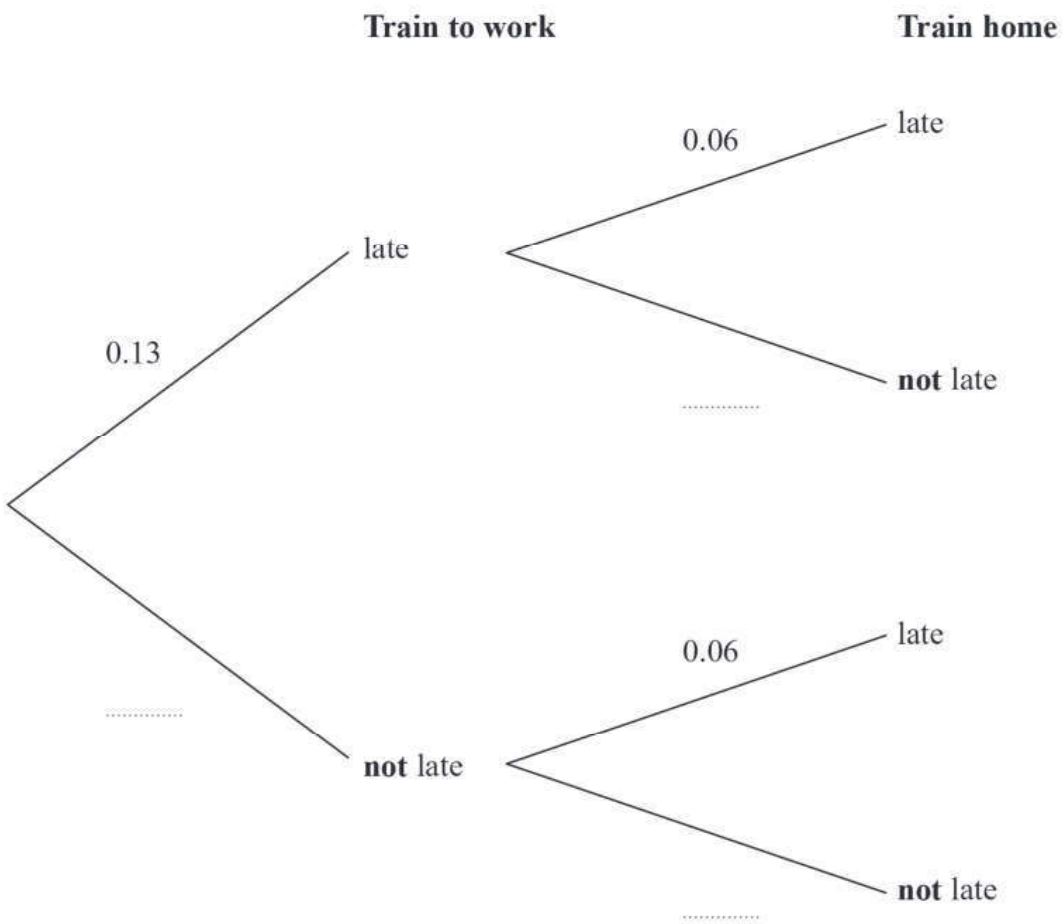
(2)

(Total for Question 28 is 6 marks)

20 Lorena gets a train at the same time each morning to go to work.
She gets a train at the same time each evening to come home.

The probability tree diagram shows the probabilities of each train arriving late.

(a) Complete the probability tree diagram.



(2)

For a day that Lorena goes to work,

(b) work out the probability that the train to work and the train home will both arrive late.

.....

(2)

(Total for Question 20 is 4 marks)

21 (a) Simplify $(x^3)^5$

.....

(1)

(b) Expand and simplify $4(x + 3) + 7(4 - 2x)$

.....

(2)

(c) Factorise fully $15x^3 + 3x^2y$

.....

(2)

(Total for Question 21 is 5 marks)

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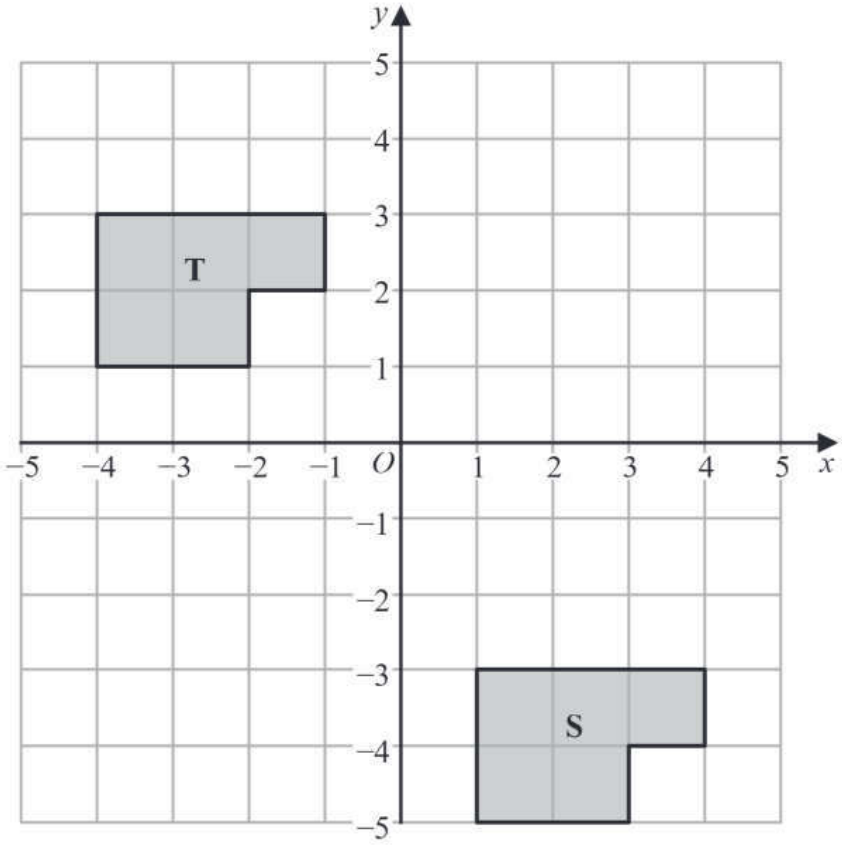
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

22



Describe fully the single transformation that maps shape **S** onto shape **T**.

.....

.....

.....

(Total for Question 22 is 2 marks)

23 The length of a football pitch is 90 metres, correct to the nearest metre.

Complete the error interval for the length of the football pitch.

..... m ⩽ length < ..... m

(Total for Question 23 is 2 marks)

24 Festival A will be in a rectangular field with an area of 80 000 m^2
The greatest number of people allowed to attend Festival A is 425

Festival B will be in a rectangular field 700 m by 2000 m.
The greatest number of people allowed to attend Festival B is 6750

The area per person allowed for Festival B is greater than the area per person allowed for Festival A.

(a) How much greater?
Give your answer correct to the nearest whole number.

..... m^2

(4)

Callum says,

"300 cm^2 is the same as 3 m^2 because there are 100 cm in 1 m so you divide by 100"

Callum's method is wrong.

(b) Explain why.

.....

.....

.....

(1)

(Total for Question 24 is 5 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

25 The points L, M and N are such that LMN is a straight line.

The coordinates of L are $(-3, 1)$

The coordinates of M are $(4, 9)$

Given that $LM : MN = 2 : 3$,

find the coordinates of N.

(..... , ...)

(Total for Question 25 is 4 marks)

26 A new phone cost £679
The value of the phone decreases at a rate of 4% per year.

Work out the value of the phone at the end of 3 years.

£.....

(Total for Question 26 is 3 marks)

27 In Spain, Sam pays 27 euros for 18 litres of petrol.
In Wales, Leo pays £40.80 for 8 gallons of the same type of petrol.

1 euro = £0.85
4.5 litres = 1 gallon

Sam thinks that petrol is cheaper in Spain than in Wales.

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

(Total for Question 27 is 4 marks)

28 Solve the simultaneous equations

$$5x + 2y = 27$$

$$6x + 4y = 28$$

$x =$ .....

$y =$ .....

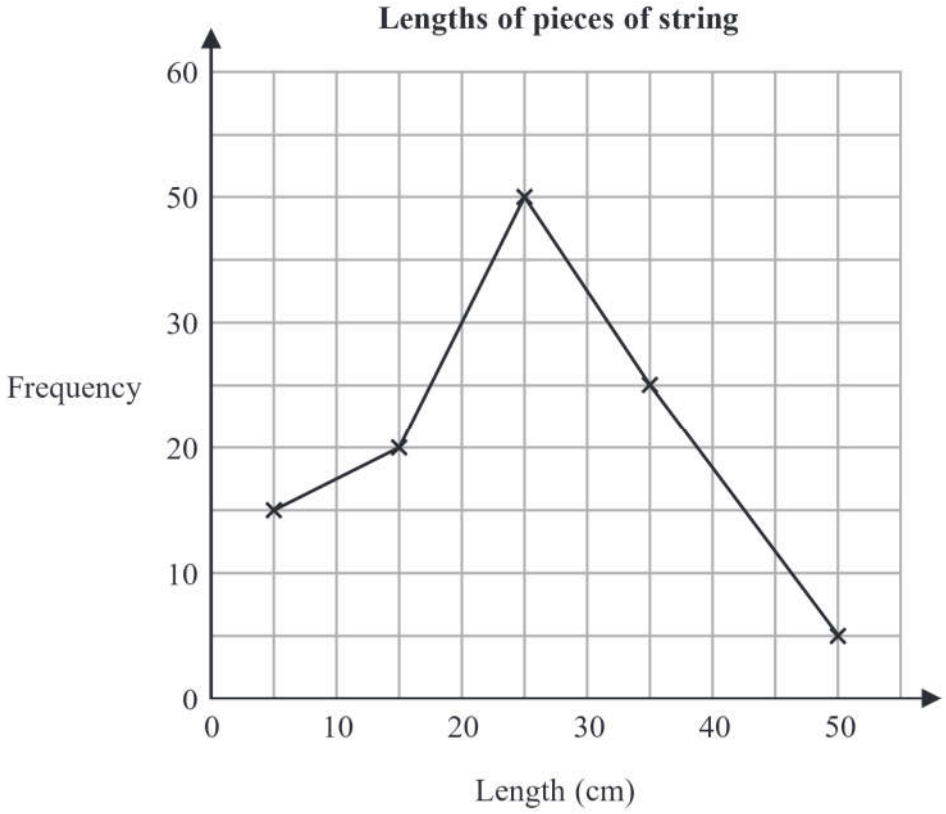
(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

26 The table gives information about the lengths, in cm, of some pieces of string.

Length (t cm)	Frequency
$0 < t \leqslant 10$	15
$10 < t \leqslant 20$	20
$20 < t \leqslant 30$	50
$30 < t \leqslant 40$	25
$40 < t \leqslant 50$	5

Amos draws a frequency polygon for the information in the table.



Write down **two** mistakes that Amos has made.

1 .....

.....

2 .....

.....

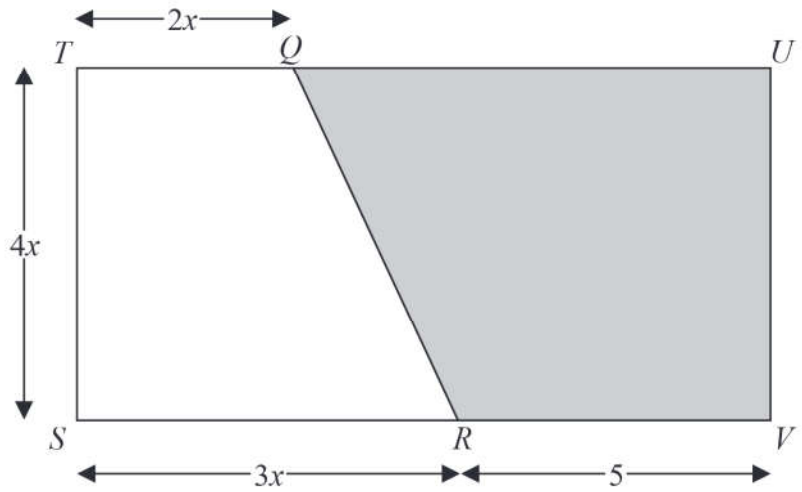
(Total for Question 26 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

28 The diagram shows rectangle $STUV$.
TQU and SRV are straight lines.
All measurements are in cm.



The area of trapezium $QUVR$ is A cm^2

Show that $A = 2x^2 + 20x$

(Total for Question 28 is 3 marks)

23 A car factory is going to make four different car models **A**, **B**, **C** and **D**.

80 people are asked which of the four models they would be most likely to buy.

The table shows information about the results.

Car model	Number of people
A	23
B	15
C	30
D	12

The factory is going to make 40 000 cars next year.

Work out how many model **B** cars the factory should make next year.

.....

(Total for Question 23 is 2 marks)

24 Rizwan writes down three numbers a, b and c

$$a : b = 1 : 3$$
$$b : c = 6 : 5$$

(a) (i) Find $a : b : c$

.....

(2)

(ii) Express a as a fraction of the total of the three numbers a, b and c

.....

(2)

Emma writes down three numbers m, n and p

$$n = 2m$$
$$p = 5n$$

(b) Find $m : p$

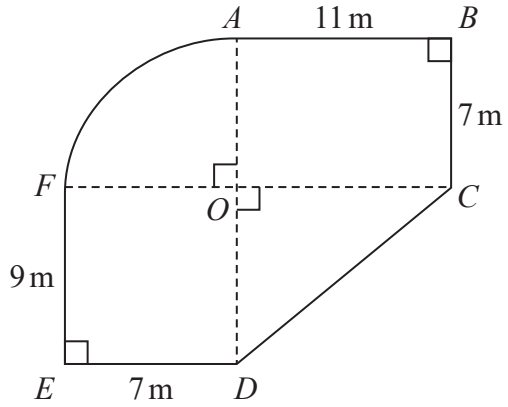
.....

(2)

(Total for Question 24 is 6 marks)

21 The diagram shows a plan of Jason's garden.

ABCO and *DEFO* are rectangles.
CDO is a right-angled triangle.
AFO is a sector of a circle with centre *O* and angle *AOF* = 90°



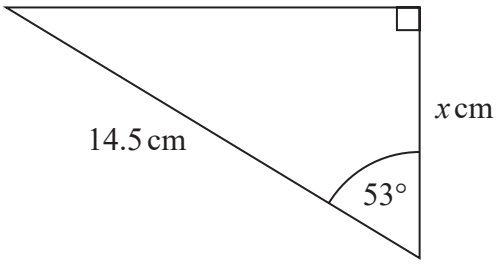
Jason is going to cover his garden with grass seed.
Each bag of grass seed covers 14 m^2 of garden.
Each bag of grass seed costs £10.95

Work out how much it will cost Jason to buy all the bags of grass seed he needs.

£.....

(Total for Question 21 is 5 marks)

22



Work out the value of x.
Give your answer correct to 3 significant figures.

$x =$ .....

(Total for Question 22 is 2 marks)

23 Ella invests £7000 for 2 years in an account paying compound interest.

In the first year, the rate of interest is 3%
In the second year, the rate of interest is 1.5%

Work out the value of Ella's investment at the end of 2 years.

£.....

(Total for Question 23 is 3 marks)

25 (a) Find the value of the reciprocal of 0.8

.....

(1)

$x = 4700$ correct to 2 significant figures.

(b) Complete the error interval for x.

..... $\leqslant x <$ .....

(2)

(Total for Question 25 is 3 marks)

26 The population of a town increased by 9% between 2018 and 2019
The population in 2019 was 165 680

Calculate the population in 2018

.....

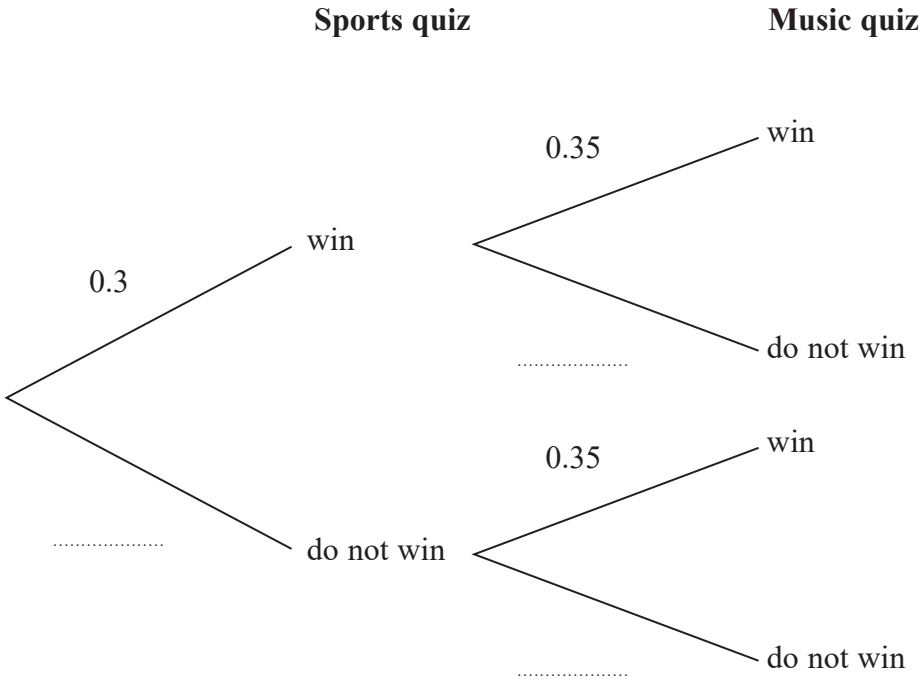
(Total for Question 26 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

26 One weekend the Keddie family is going to do a sports quiz and a music quiz.

The probability that the family will win the sports quiz is 0.3
The probability that the family will win the music quiz is 0.35

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that the Keddie family will win both the sports quiz and the music quiz.

.....

(2)

(Total for Question 26 is 4 marks)

27 (a) Change 8000 cm^3 to m^3

..... m^3
(1)

(b) Change a speed of 180 km per hour to metres per second.

..... metres per second
(3)

(Total for Question 27 is 4 marks)

28 There are 30 women and 20 men at a gym.

The mean height of all 50 people is 167.6 cm
The mean height of the 20 men is 182 cm

Work out the mean height of the 30 women.

..... cm

(Total for Question 28 is 3 marks)

29 (a) Write 6.75×10^{-4} as an ordinary number.

.....

(1)

(b) Work out $\dfrac{2.56 \times 10^{6} \times 4.12 \times 10^{-3}}{1.6 \times 10^{-2}}$

Give your answer in standard form.

.....

(2)

(Total for Question 29 is 3 marks)

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DO NOT WRITE IN THIS AREA

30 $\mathbf{a} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ $\mathbf{c} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$

(a) Work out as a column vector

(i) $\mathbf{a} + \mathbf{b}$

$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

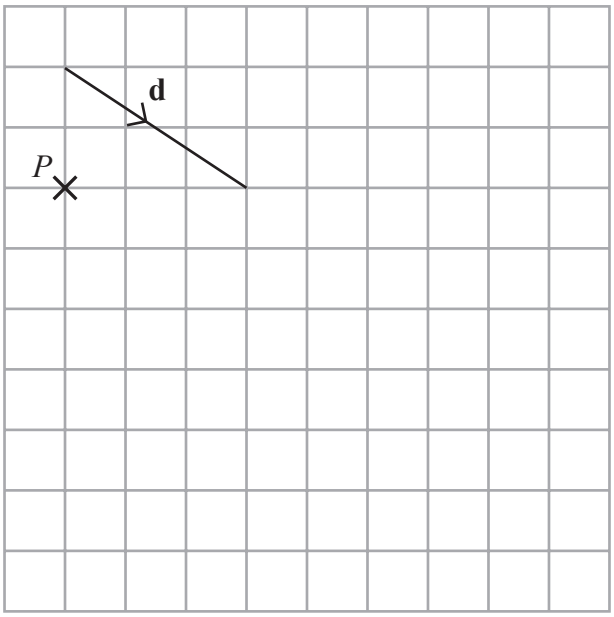
(1)

(ii) $2\mathbf{a} - \mathbf{c}$

$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

(2)

The vector **d** is drawn on the grid.



(b) From the point P, draw the vector $2\mathbf{d}$

(1)

(Total for Question 30 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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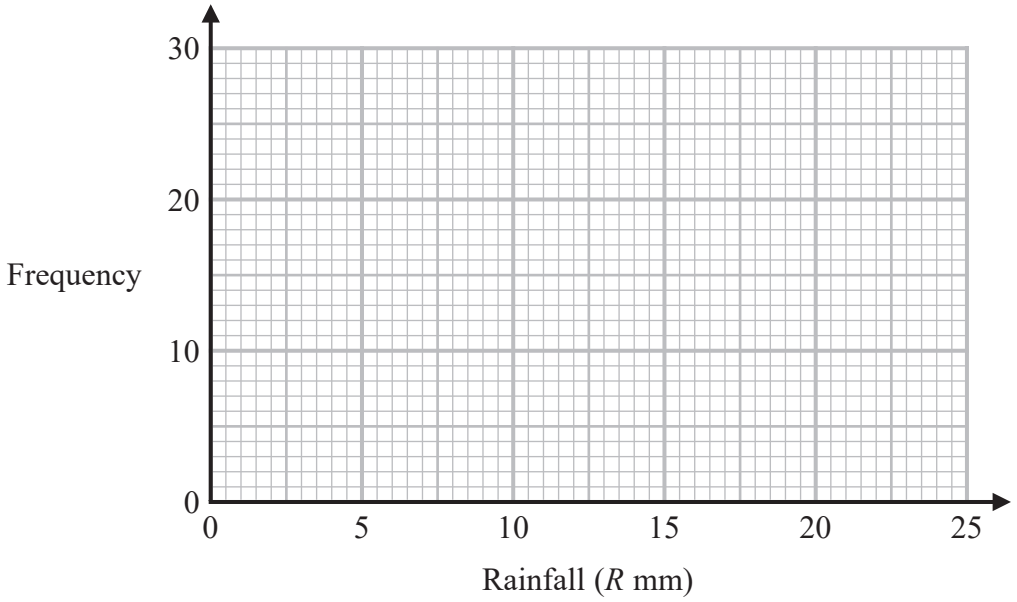
23 The table shows information about the daily rainfall in a town for 60 days.

Rainfall (R mm)	Frequency
$0 \leqslant R < 5$	8
$5 \leqslant R < 10$	24
$10 \leqslant R < 15$	13
$15 \leqslant R < 20$	11
$20 \leqslant R < 25$	4

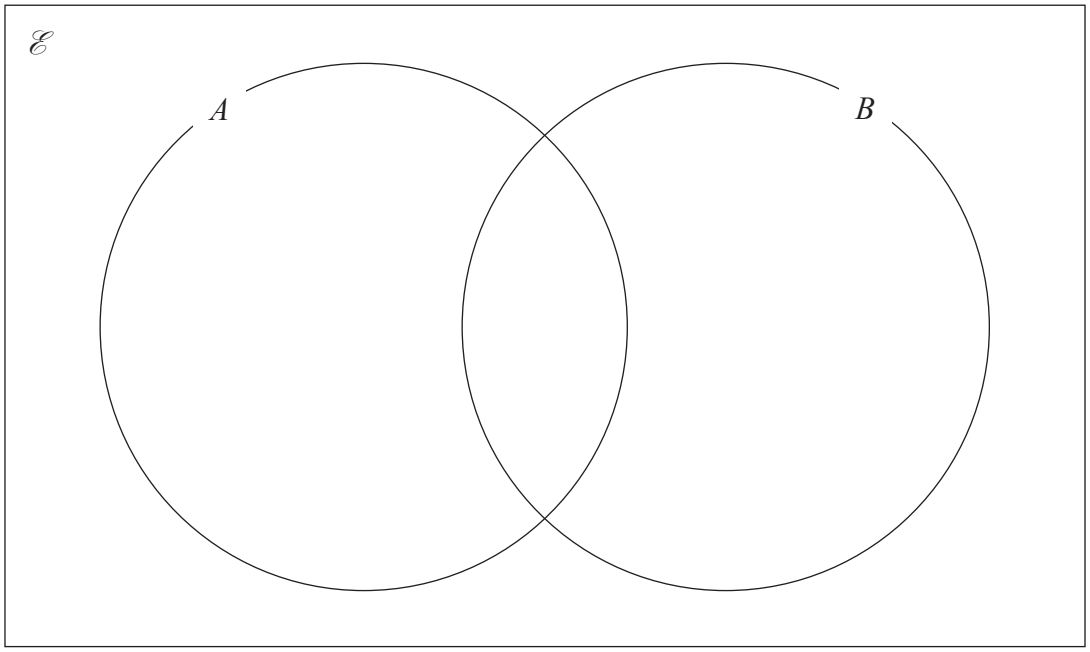
Draw a frequency polygon for this information.



(Total for Question 23 is 2 marks)

24 $\mathscr{E}$ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
A = {odd numbers}
B = {square numbers}

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set $\mathscr{E}$

(b) Find the probability that this number is in the set B'

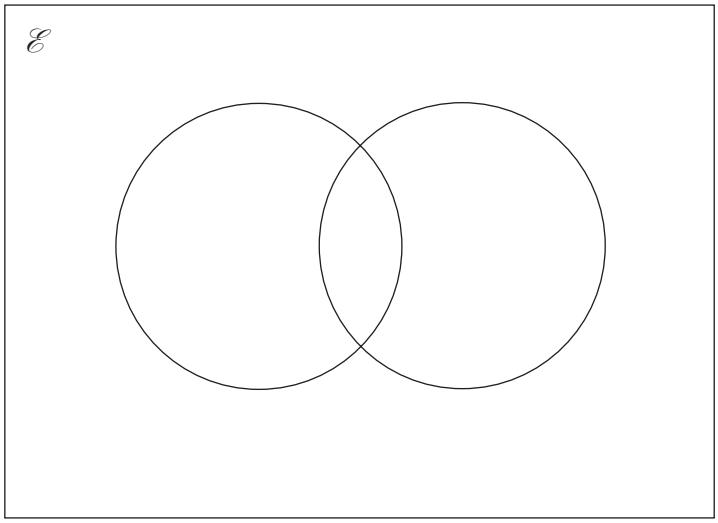
.....

(2)

(Total for Question 24 is 5 marks)

15 $\mathscr{E}$ = {odd numbers less than 30}
A = {3, 9, 15, 21, 27}
B = {5, 15, 25}

(a) Complete the Venn diagram to represent this information.



(4)

A number is chosen at random from the universal set, $\mathscr{E}$.

(b) What is the probability that the number is in the set $A \cup B$?

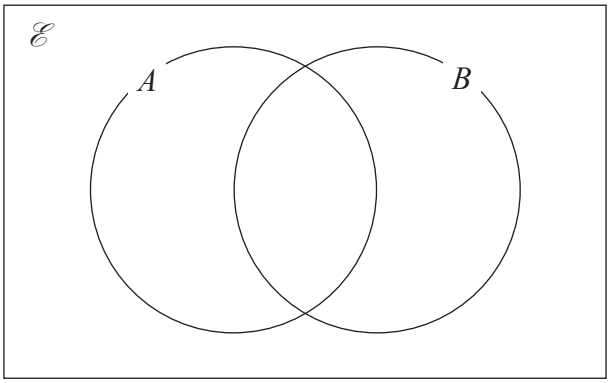
.....

(2)

(Total for Question 15 is 6 marks)

22 $\mathscr{E}$ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
A = {even numbers}
B = {factors of 10}

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set, $\mathscr{E}$

(b) Find the probability that this number is in the set $A \cap B$

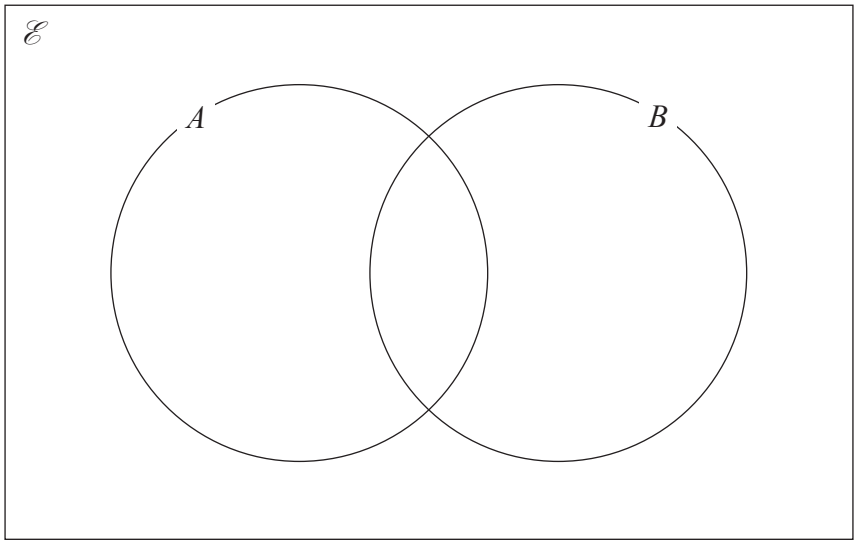
.....

(2)

(Total for Question 22 is 5 marks)

21 $\mathscr{E}$ = {even numbers less than 19}
A = {6, 12, 18}
B = {2, 6, 14, 18}

Complete the Venn diagram for this information.



(Total for Question 21 is 3 marks)

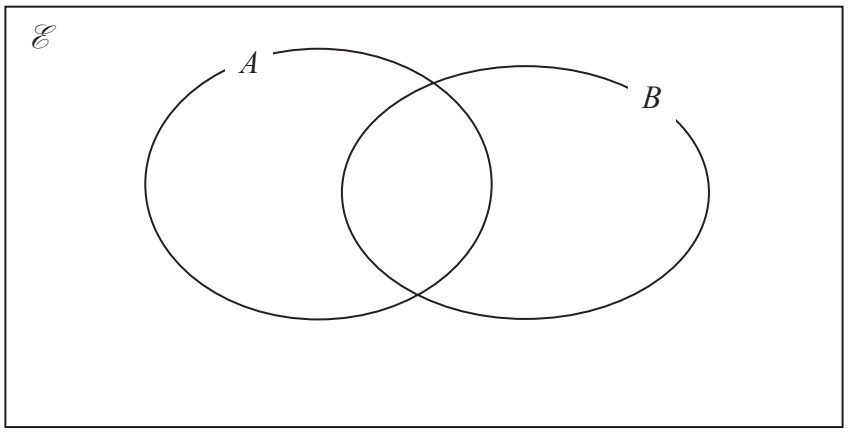
22 Work out $4\frac{1}{5} - 2\frac{2}{3}$

Give your answer as a mixed number.

.....

(Total for Question 22 is 3 marks)

24 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$
$A = \{1, 5, 6, 8, 9\}$
$B = \{2, 6, 9\}$



(a) Complete the Venn diagram to represent this information.

(3)

A number is chosen at random from the universal set $\mathscr{E}$.

(b) Find the probability that the number is in the set $A \cap B$

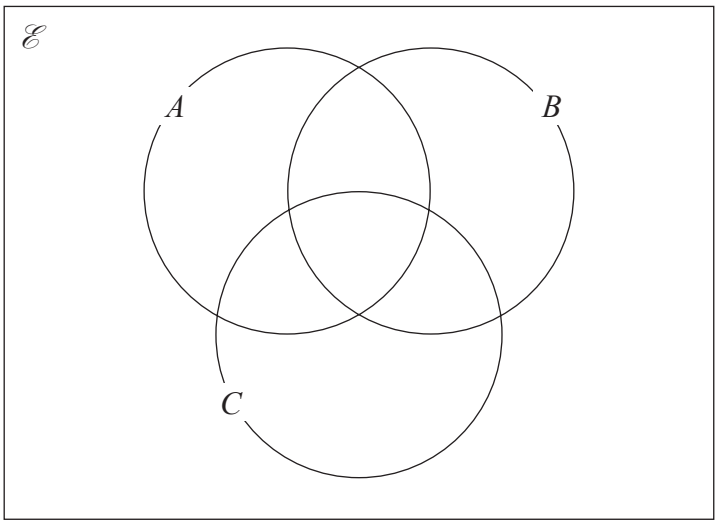
.....

(2)

(Total for Question 24 is 5 marks)

20 $\mathscr{E}$ = {even numbers between 1 and 25}
A = {2, 8, 10, 14}
B = {6, 8, 20}
C = {8, 18, 20, 22}

(a) Complete the Venn diagram for this information.



(4)

A number is chosen at random from $\mathscr{E}$.

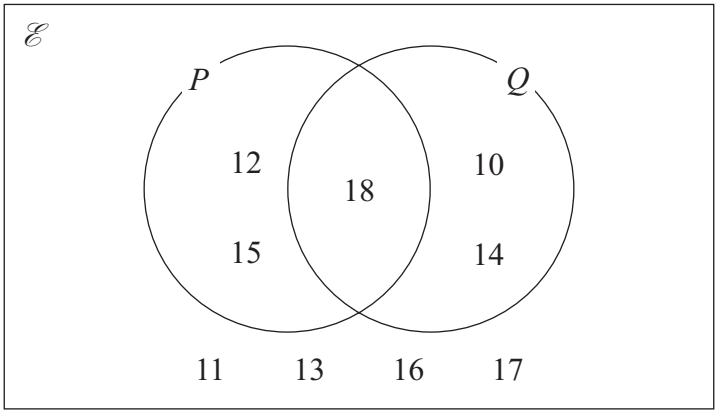
(b) Find the probability that the number is a member of $A \cap B$.

.....

(2)

(Total for Question 20 is 6 marks)

23 Here is a Venn diagram.



(a) Write down the numbers that are in set P'

.....

(1)

A number is chosen at random from the universal set, $\mathscr{E}$

(b) Find the probability that this number is in the set $P \cup Q$

.....

(2)

(Total for Question 23 is 3 marks)

26 The price of a holiday increases by 20%
This 20% increase adds £240 to the price of the holiday.

Work out the price of the holiday before the increase.

£.....

(Total for Question 26 is 2 marks)

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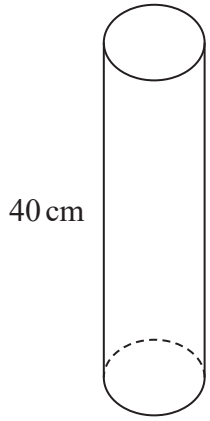
27 The diagram shows a solid cylinder on a horizontal floor.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The cylinder has a

volume of $1200\,\text{cm}^3$
height of 40 cm.

The cylinder exerts a force of 90 newtons on the floor.

Work out the pressure on the floor due to the cylinder.

..... newtons/cm^2

(Total for Question 27 is 3 marks)

29 Work out the value of $\dfrac{4^{-6} \times 4^{9}}{4}$

.....

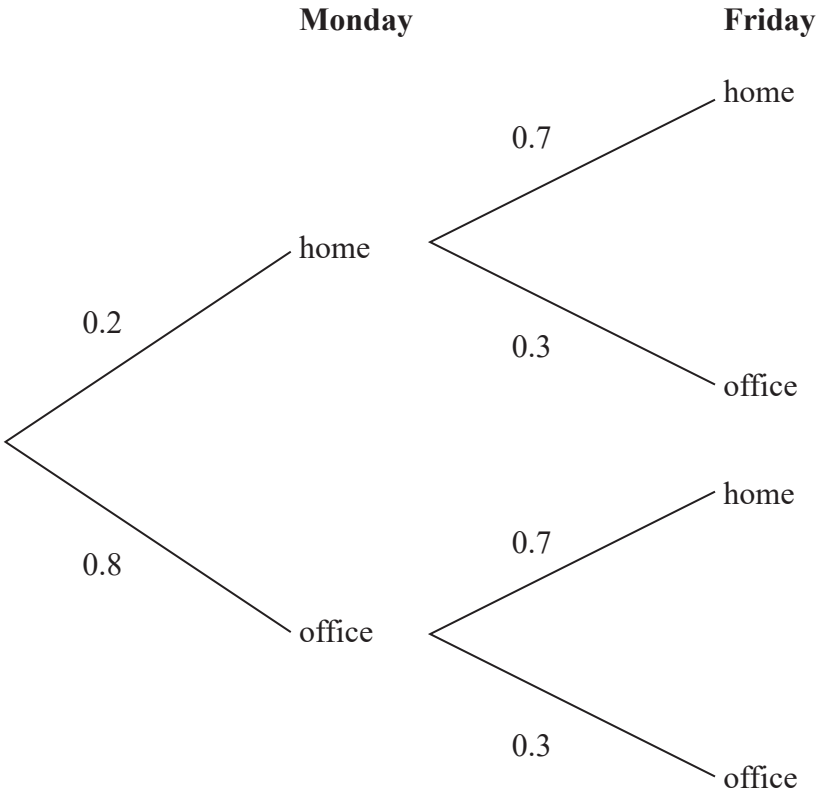
(Total for Question 29 is 2 marks)

30 Write down the exact value of $\cos 60°$

.....

(Total for Question 30 is 1 mark)

31 The probability tree diagram shows the probabilities that Shayla will work at home or will work at the office on two days next week.



Work out the probability that Shayla will work at home on Monday and work at the office on Friday.

.....

(Total for Question 31 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

Foundation Tier Formulae Sheet

Perimeter, area and volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

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

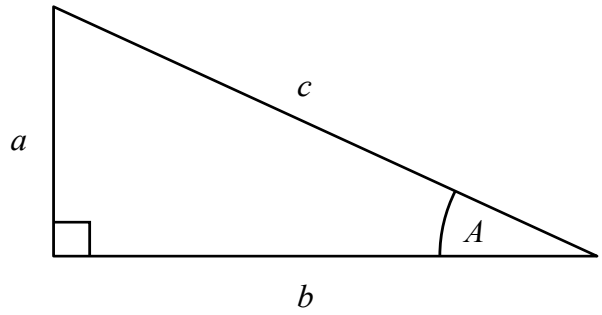
Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle = $2\pi r = \pi d$

Area of a circle = πr^2

Pythagoras' Theorem and Trigonometry



In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

$a^2 + b^2 = c^2$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

$\sin A = \frac{a}{c}$ $\cos A = \frac{b}{c}$ $\tan A = \frac{a}{b}$

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is number of times that the interest is compounded:

Total accrued = $P\left(1+\frac{r}{100}\right)^n$

Probability

Where P (A) is the probability of outcome A and P (B) is the probability of outcome B:

P (A or B) = P (A) + P (B) – P (A and B)

END OF EXAM AID

26 A number, d, is rounded to 1 decimal place.
The result is 12.7

Complete the error interval for d.

..... $\leqslant d <$ .....

(Total for Question 26 is 2 marks)

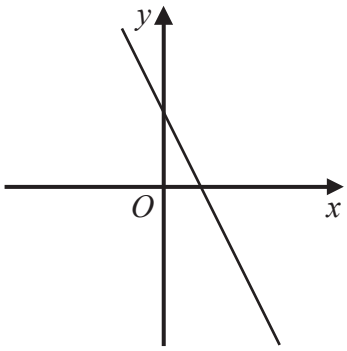
27 Tamsin buys a house with a value of £150 000
The value of Tamsin's house increases by 4% each year.

Rachel buys a house with a value of £160 000
The value of Rachel's house increases by 1.5% each year.

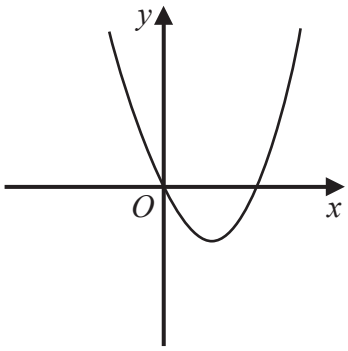
At the end of 2 years, whose house has the greater value?
You must show how you get your answer.

(Total for Question 27 is 4 marks)

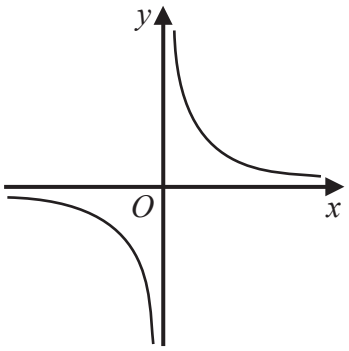
28 Here are five graphs.



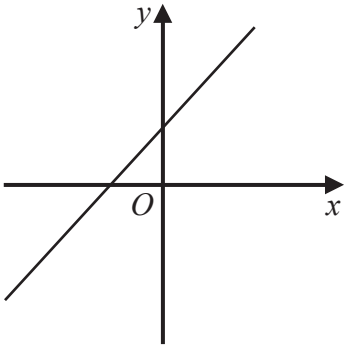
A



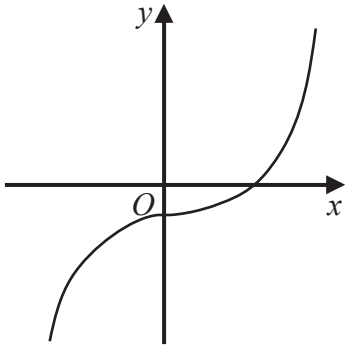
B



C



D



E

The table shows the equations of these graphs.

Equation	Graph
$y = x^2 - 4x$	
$y = x + 3$	
$y = x^3 - 2$	
$y = \frac{1}{x}$	
$y = 5 - 2x$	

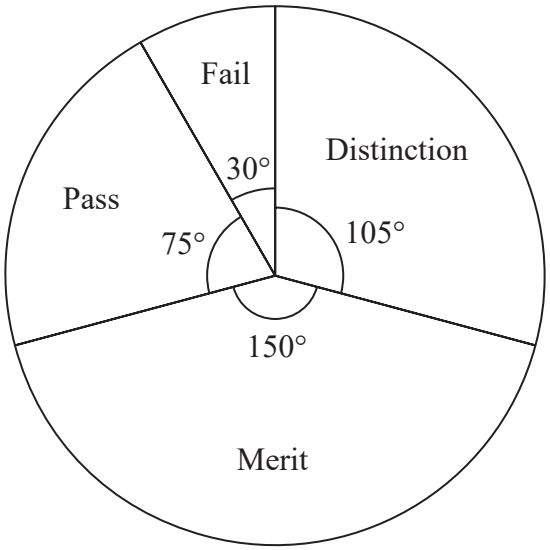
Match the letter of each graph with its equation.

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

12 Some students took a guitar exam.

The pie chart shows information about the grades the students got.



(a) Write down the modal grade.

.....

(1)

7 students got distinction.

(b) Work out the total number of students who took the guitar exam.

.....

(3)

(Total for Question 12 is 4 marks)

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Rowena stayed at the beach for $1\frac{1}{2}$ hours.

She then drove home without stopping.
Rowena arrived home at 16 00

(b) On the grid, complete the travel graph.

(2)

(c) Work out the average speed for the journey from the beach to Rowena's home.

..... miles per hour

(1)

(Total for Question 13 is 5 marks)

14 120 boxes cost £6
270 bags cost £10

A bag is cheaper than a box.

How much cheaper?
Give your answer in pence correct to 1 decimal place.

.....p

(Total for Question 14 is 4 marks)

15 There are only red beads and green beads in a bag.

number of red beads : number of green beads = 1 : 4

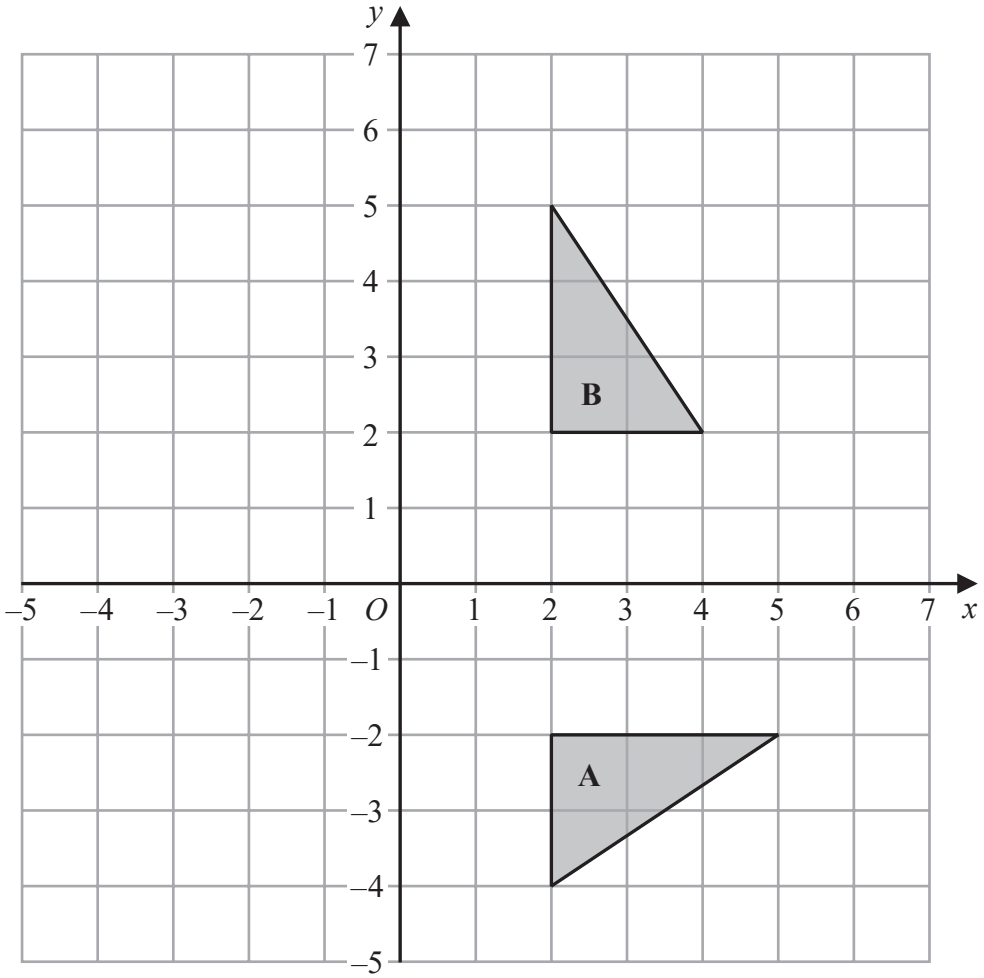
There are 35 red beads in the bag.

Work out the total number of beads in the bag.

.....

(Total for Question 15 is 2 marks)

16



Describe fully the single transformation that maps shape **A** onto shape **B**.

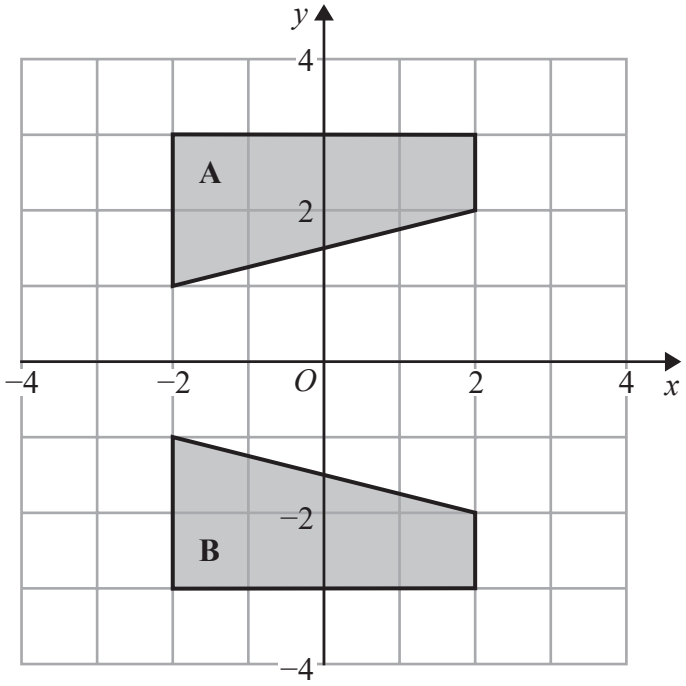
.....

.....

.....

(Total for Question 16 is 2 marks)

14



Describe fully the single transformation that maps shape **A** onto shape **B**.

.....

(Total for Question 14 is 2 marks)

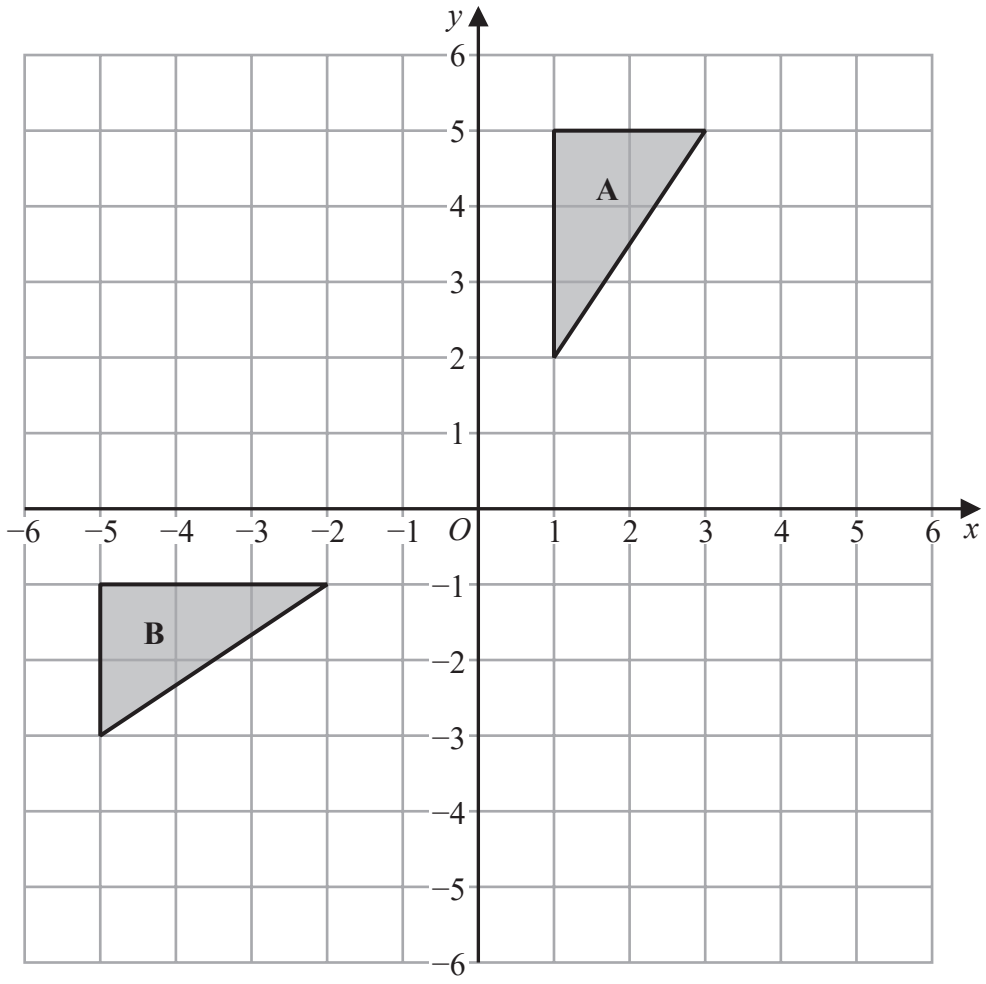
15 The ratio of the cost of one metre of cotton fabric to the cost of one metre of silk fabric is 2 : 5

Complete the table of costs.

	2 m	**6 m**	**8 m**	**9 m**
cotton fabric	£6			
silk fabric				

(Total for Question 15 is 3 marks)

21



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

.....

.....

(Total for Question 21 is 2 marks)

17 The diagram shows the position of town T.

Town R is 55 km from town T on a bearing of 065°

Mark the position of town R with a cross (×).
Use a scale of 1 cm to 10 km.

(Total for Question 17 is 2 marks)

18 Solve $4(2x - 3) = 20$

$x =$ .....

(Total for Question 18 is 3 marks)

19 Jenny invests £3000 for 6 years at y% simple interest per year.

At the end of the 6 years, Jenny has received a total of £450 in interest.

Work out the value of y.

$y =$ .....

(Total for Question 19 is 3 marks)

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20 (a) Simplify $(m^2)^3$

.....

(1)

(b) Simplify $x^5 \times x^8$

.....

(1)

(c) Expand $4p(p^2 + 3p)$

.....

(2)

(Total for Question 20 is 4 marks)

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27 A solid cuboid is made of metal.

The metal has a density of $9\,g/cm^3$
The volume of the cuboid is $72\,cm^3$

Work out the mass of the cuboid.

..... g

(Total for Question 27 is 2 marks)

28 (a) Write $(9 \times 10^4) : (4.5 \times 10^6)$ in the form $1 : n$ where n is an integer.

.....

(2)

(b) Write the following numbers in order of size.
Start with the smallest number.

5.625×10^4 5625 $56\,250 \times 10^{-3}$ $0.005\,625 \times 10^5$

.....

(2)

(Total for Question 28 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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24 Mano has three shelves of books.

There are x books on shelf **A**.
There are $(3x + 1)$ books on shelf **B**.
There are $(2x - 5)$ books on shelf **C**.

There is a total of 44 books on the three shelves.

All the books have the same mass.

The books on shelf **B** have a total mass of 7500 g.

Work out the total mass of the books on shelf **A**.

..... g

(Total for Question 24 is 5 marks)

25 Andy, Luke and Tina share some sweets in the ratio 1 : 6 : 14

Tina gives $\frac{3}{7}$ of her sweets to Andy.

Tina then gives $12\frac{1}{2}\%$ of the rest of her sweets to Luke.

Tina says,

"Now all three of us have the same number of sweets."

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

(Total for Question 25 is 4 marks)

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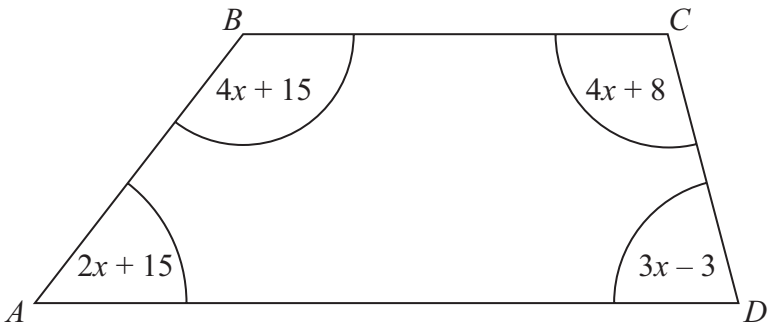
26 *ABCD* is a quadrilateral.

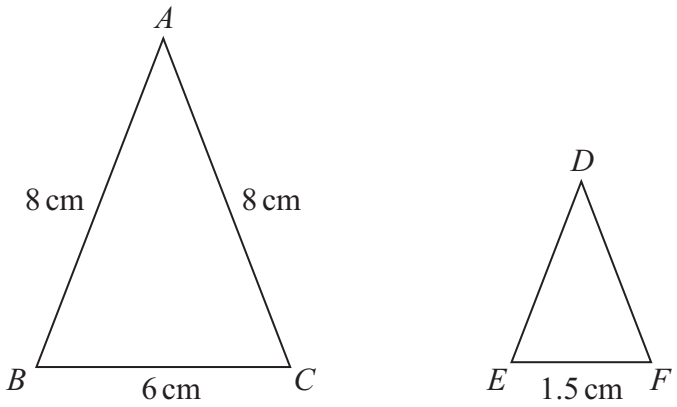


All angles are measured in degrees.

Show that *ABCD* is a trapezium.

(Total for Question 26 is 4 marks)

27 *ABC* and *DEF* are two similar isosceles triangles.



$DE = DF$

Work out the length of DE.

..... cm

(Total for Question 27 is 2 marks)

28 The table shows information about the weights of 120 oranges.

Weight (w grams)	Frequency
$50 < w \leqslant 100$	34
$100 < w \leqslant 150$	29
$150 < w \leqslant 200$	27
$200 < w \leqslant 250$	19
$250 < w \leqslant 300$	11

(a) Find the class interval that contains the median.

.....

(1)

(b) Calculate an estimate for the mean weight of the 120 oranges.
Give your answer correct to 3 significant figures.

..... grams

(3)

(Total for Question 28 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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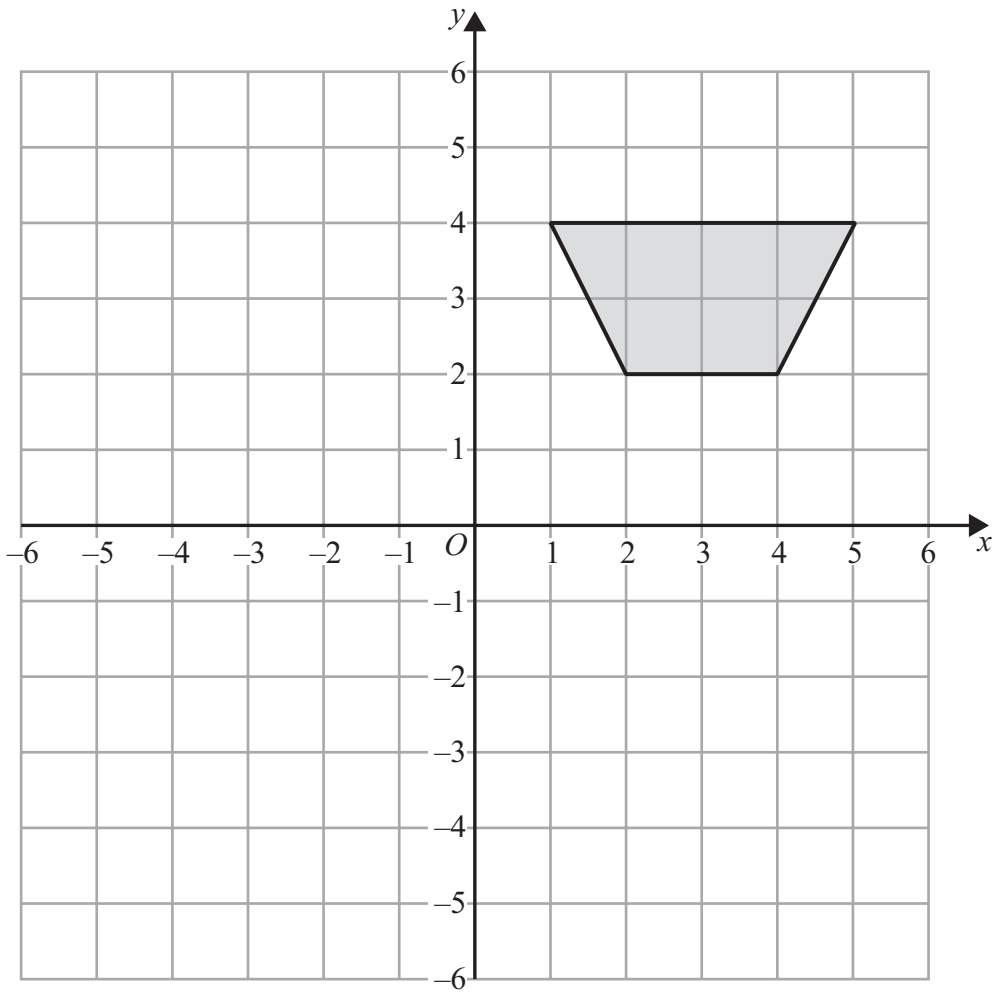
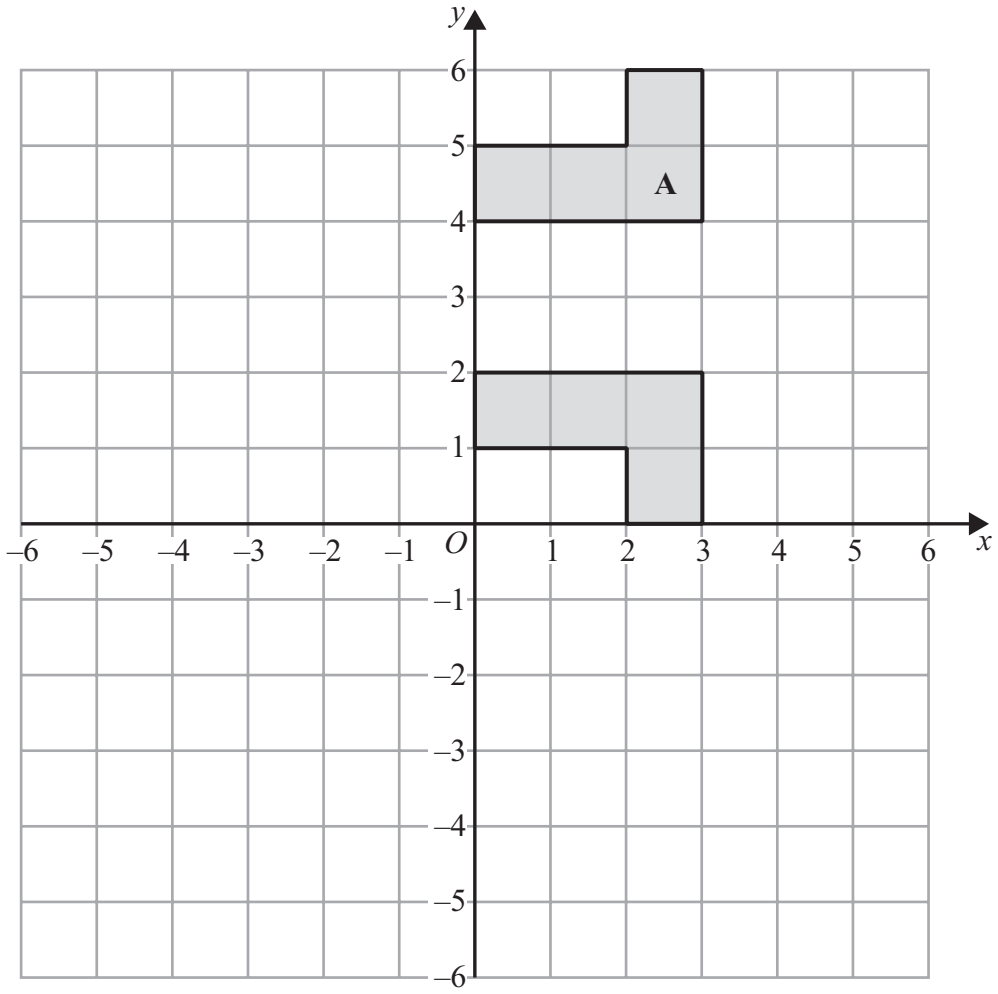
18



(a) On the grid above, rotate the shaded shape 180° about (0, 0)

(2)



Mike was asked to

'Reflect shape **A** in the line with equation $x = 3$'

Mike's answer is shown on the grid.
His answer is wrong.

(b) Explain why.

.....

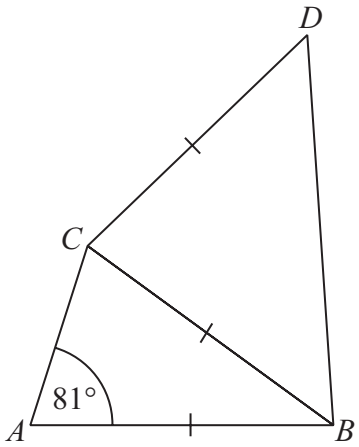
.....

.....

(1)

(Total for Question 18 is 3 marks)

20 ABC and BCD are isosceles triangles.



$AB = BC = CD$
Angle $CAB = 81°$

Angle $BCD = 4 \times$ angle ABC

Find

the size of angle ABC : the size of angle CBD

Give your answer in the form $1 : n$
You must show all your working.

.....

(Total for Question 20 is 5 marks)

21 (a) Factorise $6x - 15$

.....

(1)

(b) Factorise $m^2 + 5m$

.....

(1)

(Total for Question 21 is 2 marks)

22 Find the highest common factor (HCF) of 63 and 105

.....

(Total for Question 22 is 2 marks)

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23 (a) (i) Write 5.3×10^4 as an ordinary number.

.....

(1)

(ii) Write 7.4×10^{-5} as an ordinary number.

.....

(1)

(b) Calculate the value of $9.7 \times 10^6 + 2.45 \times 10^7$
Give your answer in standard form.

.....

(2)

(Total for Question 23 is 4 marks)

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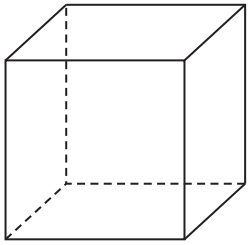
27 The diagram shows a solid cube placed on a horizontal table.



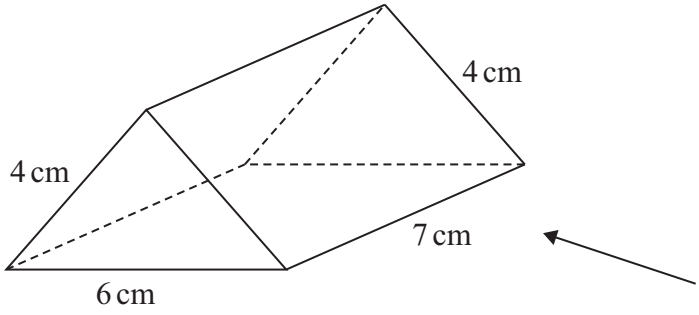
$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The pressure on the table due to the cube is 3.5 newtons/cm^2
The force exerted by the cube on the table is 504 newtons.

Show that the total surface area of the cube is less than 900 cm^2

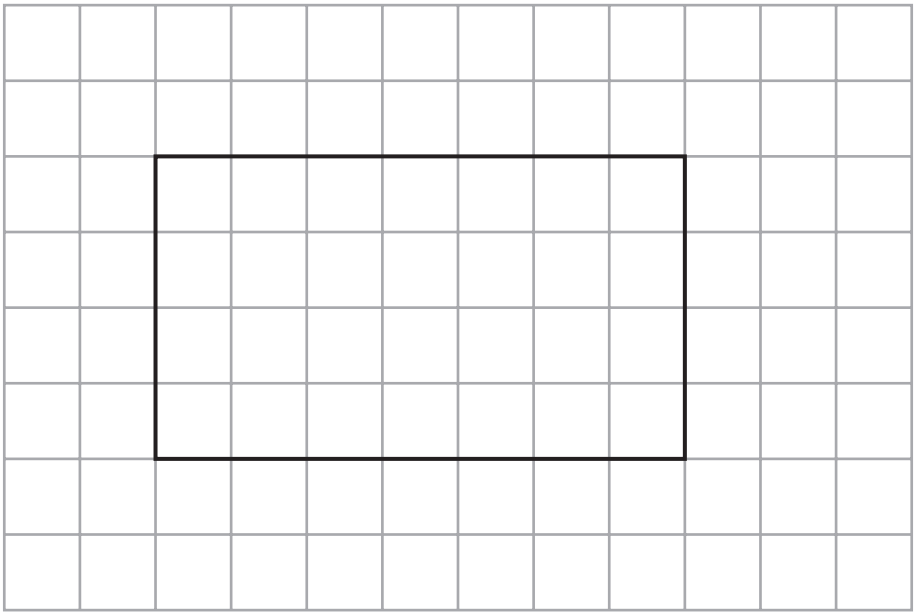
(Total for Question 27 is 3 marks)

24 The diagram shows a solid triangular prism.



Rana is trying to draw the side elevation of the solid prism from the direction of the arrow.

Here is her answer on a centimetre grid.



(a) Explain why Rana's side elevation is not correct.

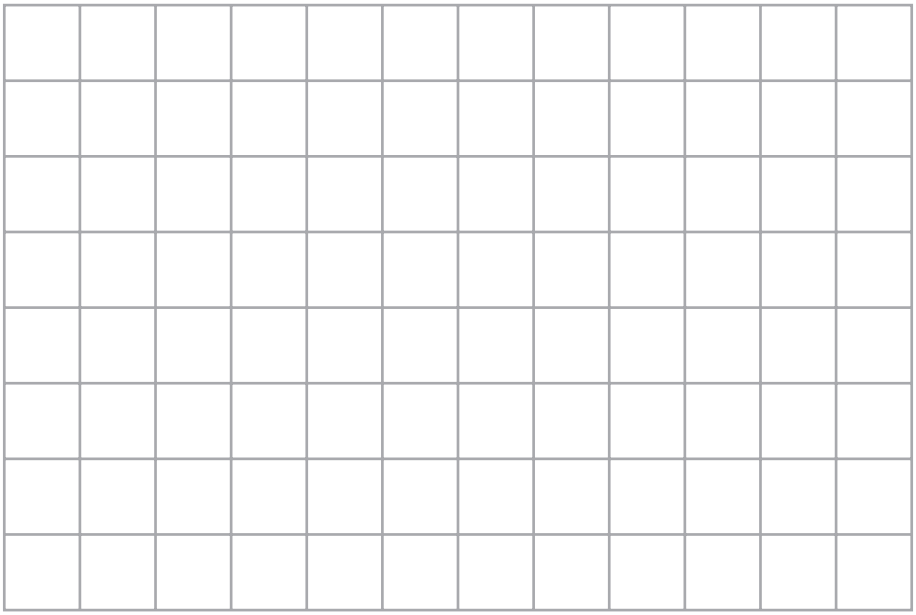
.....

.....

.....

(1)

(b) On the centimetre grid below, draw a plan of the solid prism.



(2)

(Total for Question 24 is 3 marks)

25 A company has 25 000 workers.
The number of workers increases at a rate of 6% per year for 3 years.

Calculate the total number of workers at the end of the 3 years.

.....

(Total for Question 25 is 4 marks)

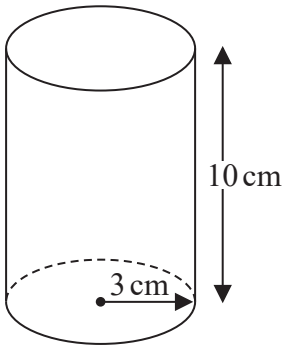
27 $1.25 \times 10^{-12} = k \times (4 \times 10^{-20})$

Work out the value of k.
Give your answer in standard form.

$k =$ .....

(Total for Question 27 is 2 marks)

28 The diagram shows a solid cylinder with base radius 3 cm and height 10 cm.



The cylinder is made from steel.
It has a mass of 2250 g.

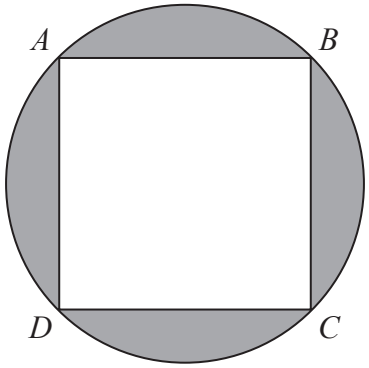
Work out the density of the steel.
Give your answer correct to 3 significant figures.

..... g/cm^3

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

29 A, B, C and D are points on a circle such that $ABCD$ is a square.



The square $ABCD$ has sides of length 3.5 cm.

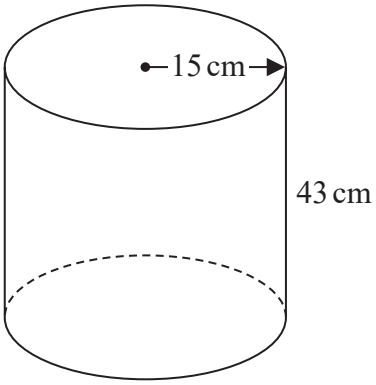
Calculate the circumference of the circle.
Give your answer correct to 1 decimal place.
You must show all your working.

..... cm

(Total for Question 29 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

28 The diagram shows an empty tank in the shape of a cylinder.



The cylinder has radius 15 cm and height 43 cm.

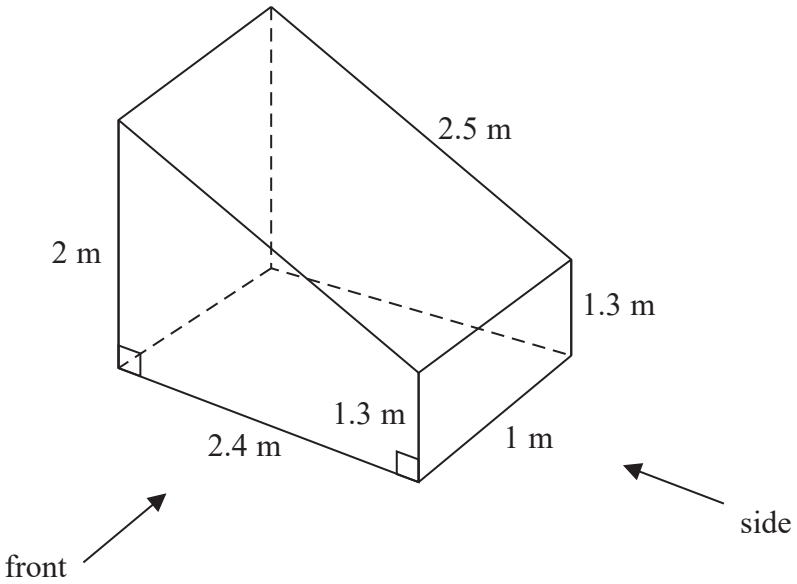
Water flows into the tank at a rate of 0.47 litres per minute.

Calculate the number of minutes it will take to completely fill the tank.
Give your answer correct to the nearest minute.

..... minutes

(Total for Question 28 is 4 marks)

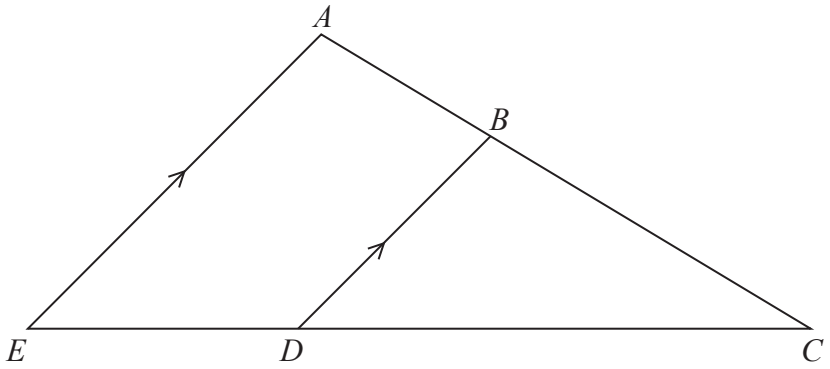
19 The diagram shows a prism with a cross section in the shape of a trapezium.



On the centimetre grid below, draw the front elevation and the side elevation of the prism.
Use a scale of 2 cm to 1 m.

(Total for Question 19 is 4 marks)

21



ABC and *EDC* are straight lines.
EA is parallel to *DB*.

EC = 4.05 cm.
DC = 2.7 cm.
DB = 1.3 cm.

(a) Work out the length of *AE*.

..... cm

(2)

AC = 3.075 cm.

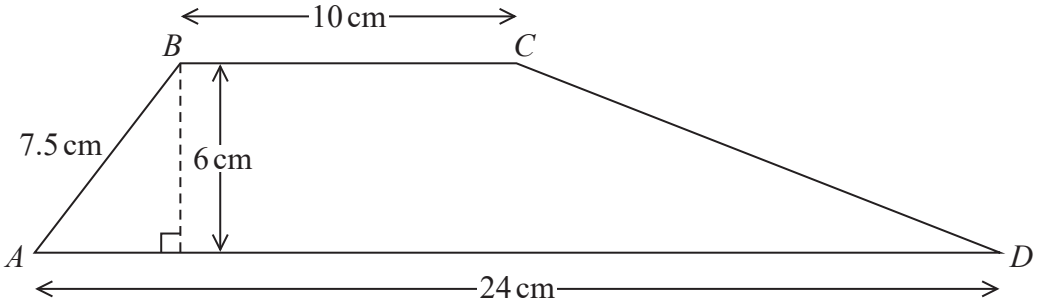
(b) Work out the length of *AB*.

..... cm

(2)

(Total for Question 21 is 4 marks)

22 *ABCD* is a trapezium.



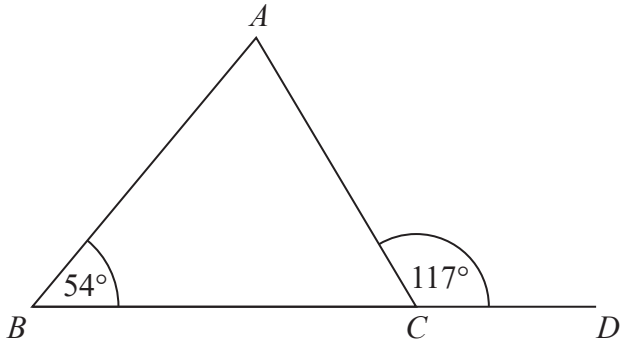
Work out the size of angle *CDA*.
Give your answer correct to 1 decimal place.

.....°

(Total for Question 22 is 5 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

7

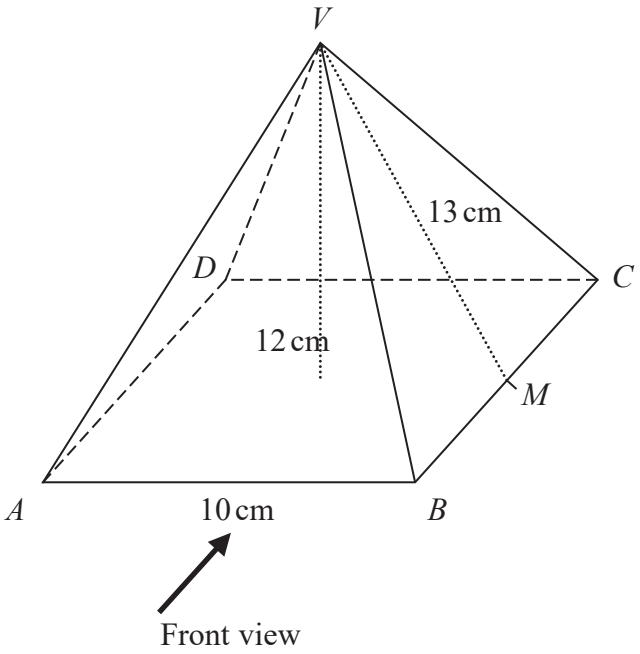


BCD is a straight line.
ABC is a triangle.

Show that triangle *ABC* is an isosceles triangle.
Give a reason for each stage of your working.

(Total for Question 7 is 4 marks)

23 Here is a solid square-based pyramid, *VABCD*.

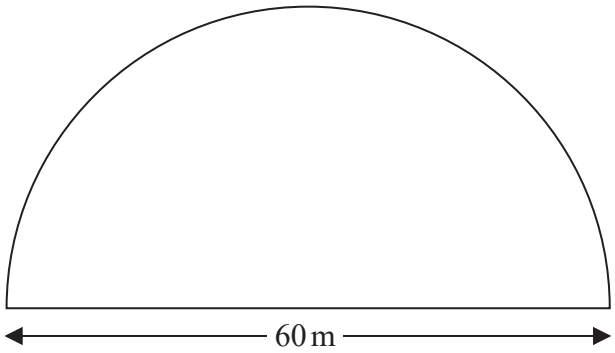


The base of the pyramid is a square of side 10 cm.
The height of the pyramid is 12 cm.
M is the midpoint of *BC* and *VM* = 13 cm.

(a) Draw an accurate front elevation of the pyramid from the direction of the arrow.

(2)

19 A farmer has a field in the shape of a semicircle of diameter 60 m.



The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £34.68 per metre of fence plus £210 for each day's work

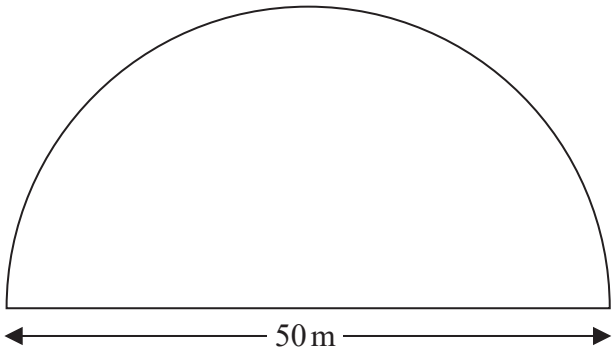
Jim takes four days to build the fence.

Work out the total cost.

£.....

(Total for Question 19 is 5 marks)

19 A farmer has a field in the shape of a semicircle of diameter 50 m.



The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

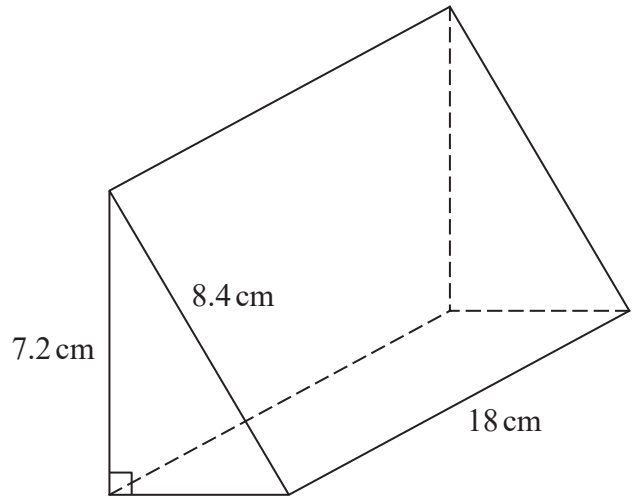
Jim takes three days to build the fence.

Work out the total cost.

£.....

(Total for Question 19 is 5 marks)

26 Here is a triangular prism.



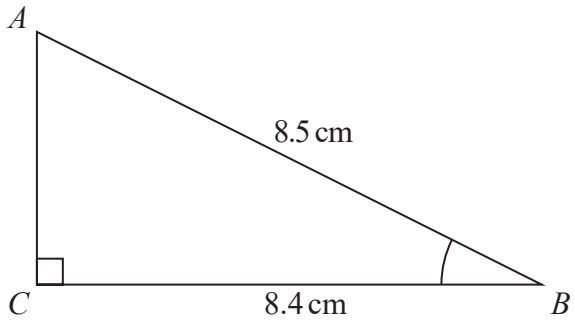
Work out the volume of the prism.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

23 *ABC* is a right-angled triangle.



(a) Work out the size of angle *ABC*.
Give your answer correct to 1 decimal place.

.....°

(2)

The length of the side *AB* is reduced by 1 cm.

The length of the side *BC* is still 8.4 cm.
Angle *ACB* is still 90°

(b) Will the value of cos *ABC* increase or decrease?
You must give a reason for your answer.

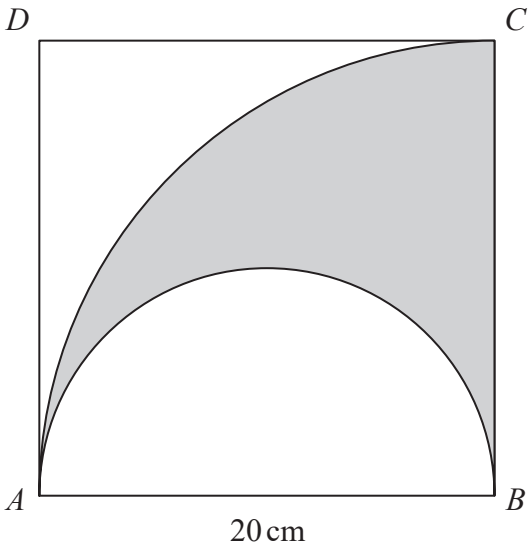
.....

.....

(1)

(Total for Question 23 is 3 marks)

26 The diagram shows a square $ABCD$ with sides of length 20 cm.
It also shows a semicircle and an arc of a circle.

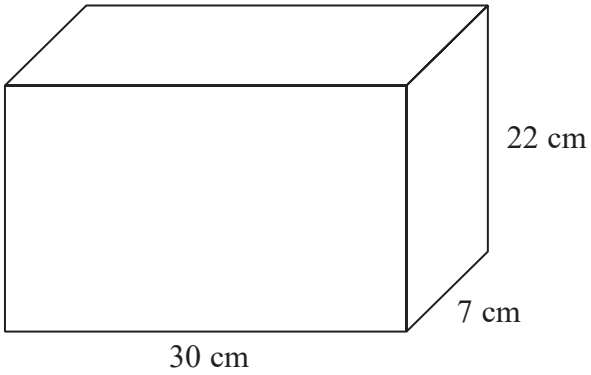


AB is the diameter of the semicircle.
AC is an arc of a circle with centre B.

Show that $\dfrac{\text{area of shaded region}}{\text{area of square}} = \dfrac{\pi}{8}$

(Total for Question 26 is 4 marks)

23 A container is in the shape of a cuboid.



The container is $\frac{2}{3}$ full of water.

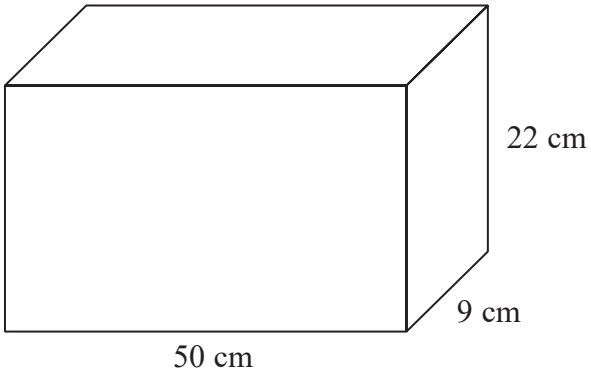
A cup holds 245 m*l* of water.

What is the greatest number of cups that can be completely filled with water from the container?

.....

(Total for Question 23 is 4 marks)

23 A container is in the shape of a cuboid.



The container is $\frac{2}{3}$ full of water.

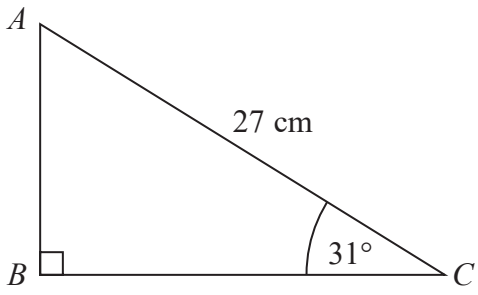
A cup holds 245 m*l* of water.

What is the greatest number of cups that can be completely filled with water from the container?

.....

(Total for Question 23 is 4 marks)

24 *ABC* is a right-angled triangle.



Calculate the length of *AB*.
Give your answer correct to 2 decimal places.

.....cm

(Total for Question 24 is 2 marks)

25 Sally used her calculator to work out the value of a number *y*.

The answer on her calculator display began

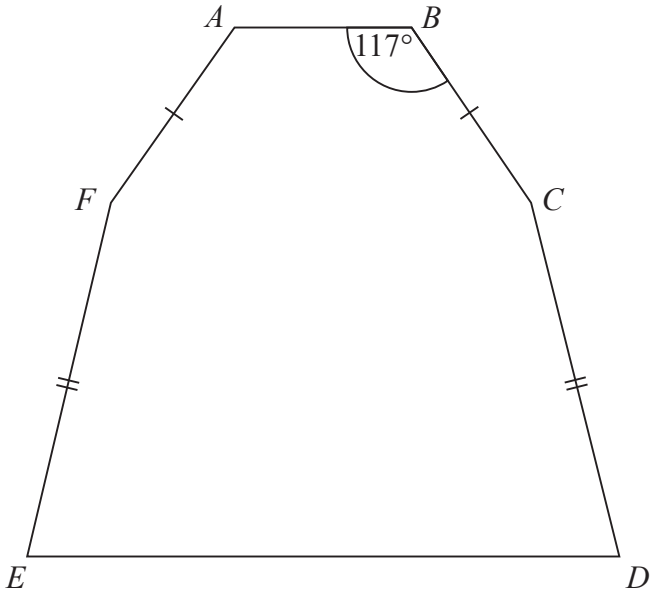
8.9

Complete the error interval for *y*.

..... $\leqslant y <$ .....

(Total for Question 25 is 2 marks)

28 The diagram shows a hexagon.
The hexagon has one line of symmetry.



$FA = BC$
$EF = CD$
Angle $ABC = 117°$

Angle $BCD = 2 \times$ angle CDE

Work out the size of angle AFE.
You must show all your working.

.....°

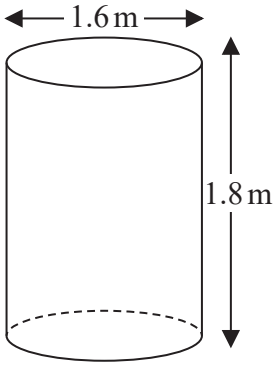
(Total for Question 28 is 4 marks)

29 Jeremy has to cover 3 tanks completely with paint.

Each tank is in the shape of a cylinder with a top and a bottom.
The tank has a diameter of 1.6 m and a height of 1.8 m.

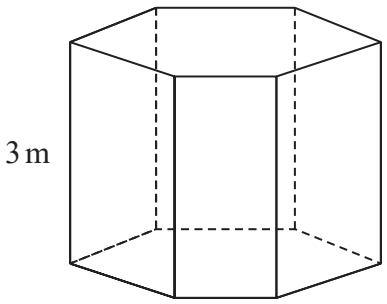
Jeremy has 7 tins of paint.
Each tin of paint covers 5 m^2

Has Jeremy got enough paint to cover completely the 3 tanks?
You must show how you get your answer.



(Total for Question 29 is 5 marks)

27 The diagram shows a prism placed on a horizontal floor.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The prism has height 3 m
The volume of the prism is 18 m^3

The pressure on the floor due to the prism is 75 newtons/m^2

Work out the force exerted by the prism on the floor.

..... newtons

(Total for Question 27 is 3 marks)

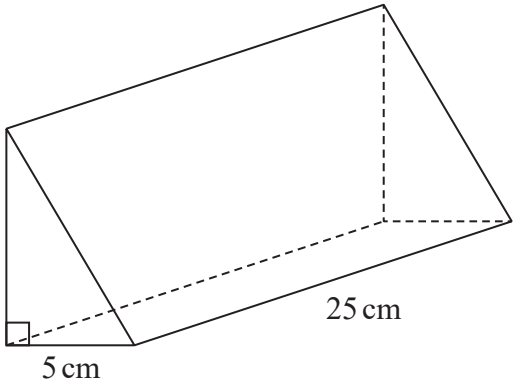
28 Write these numbers in order of size.
Start with the smallest number.

6.72×10^5 67.2×10^{-4} 672×10^4 0.000 672

....

(Total for Question 28 is 2 marks)

25 The diagram shows a prism.



The cross section of the prism is a right-angled triangle.
The base of the triangle has length 5 cm

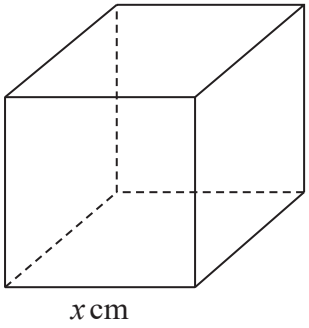
The prism has length 25 cm
The prism has volume 750 cm^3

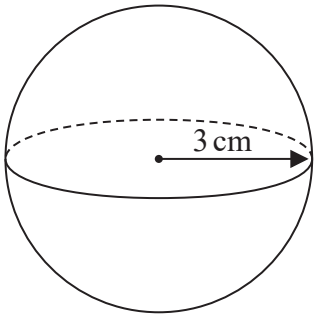
Work out the height of the prism.

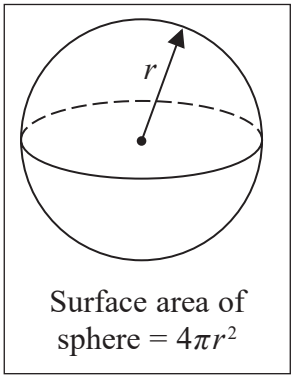
..... cm

(Total for Question 25 is 3 marks)

26 The diagram shows a cube with edges of length x cm and a sphere of radius 3 cm.







The surface area of the cube is equal to the surface area of the sphere.

Show that $x = \sqrt{k\pi}$ where k is an integer.

(Total for Question 26 is 4 marks)

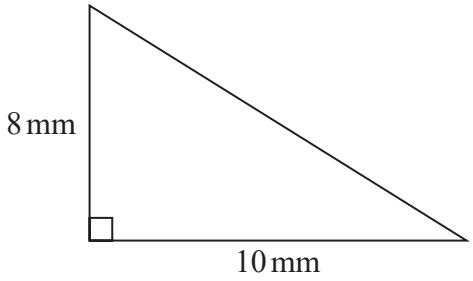
27 Freddie measured the length of a pencil as 7.2 cm correct to 1 decimal place.

Complete the error interval for the length, p cm, of the pencil.

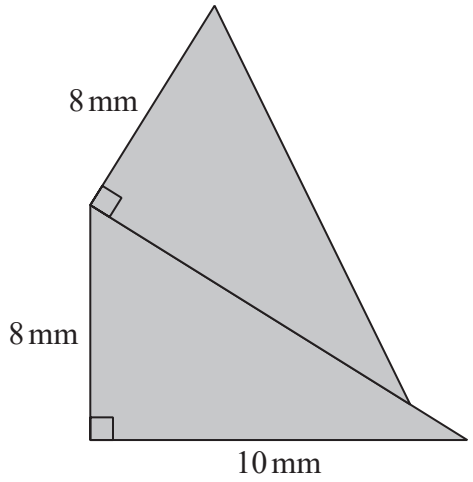
..... $\leqslant p <$ .....

(Total for Question 27 is 2 marks)

25 Here is a right-angled triangle.



The shaded shape below is made from two of these triangles.

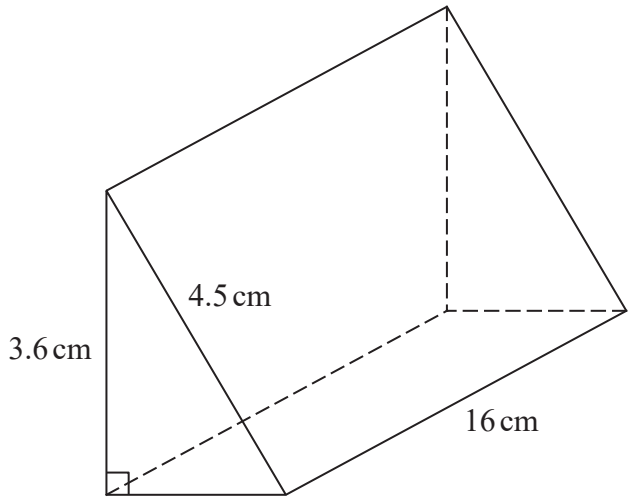


Work out the perimeter of the shaded shape.
Give your answer correct to 3 significant figures.

..... mm

(Total for Question 25 is 4 marks)

26 Here is a triangular prism.



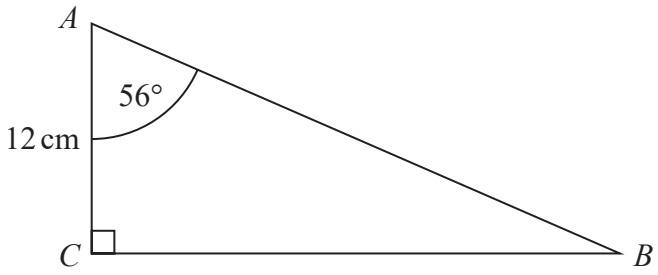
Work out the volume of the prism.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

26 *ABC* is a right-angled triangle.

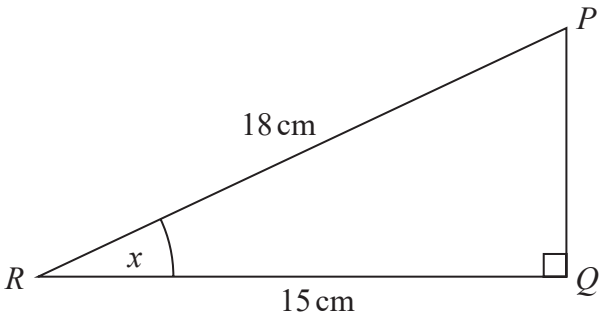


(a) Work out the length of *BC*.
Give your answer correct to 1 decimal place.

..... cm

(2)

PQR is a right-angled triangle.



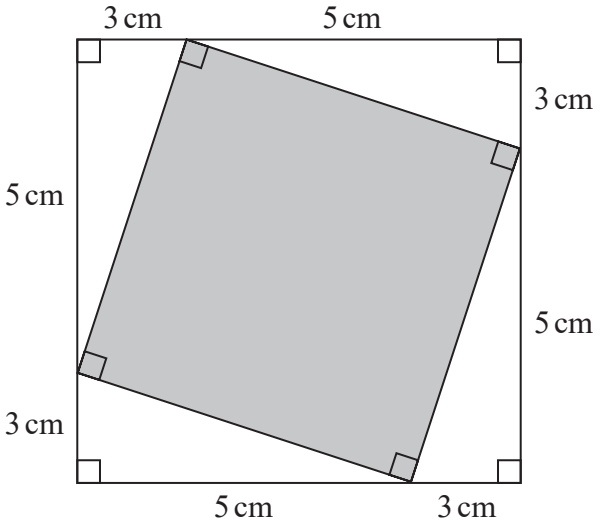
(b) Work out the size of the angle marked *x*.
Give your answer correct to 1 decimal place.

.....°

(2)

(Total for Question 26 is 4 marks)

19 This diagram shows two squares.

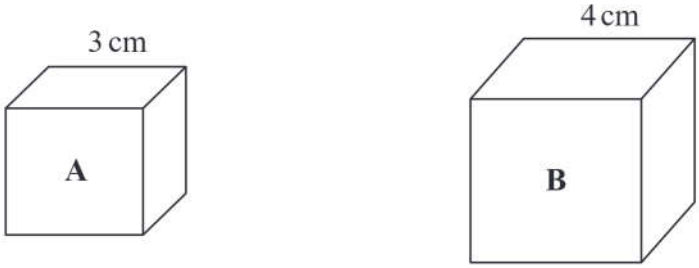


Work out the area of the square shown shaded in the diagram.

.....

(Total for Question 19 is 4 marks)

29 Here are two cubes, **A** and **B**.



Cube **A** has a mass of 81 g.

Cube **B** has a mass of 128 g.

Work out

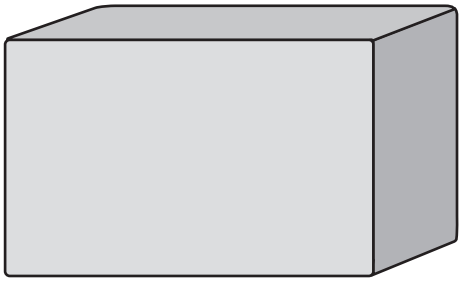
the density of cube **A** : the density of cube **B**

Give your answer in the form $a : b$, where a and b are integers.

.....

(Total for Question 29 is 3 marks)

25



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

A storage tank exerts a force of 10 000 newtons on the ground.

The base of the tank in contact with the ground is a 4 m by 2 m rectangle.

Work out the pressure on the ground due to the tank.

..... newtons / m^2

(Total for Question 25 is 2 marks)

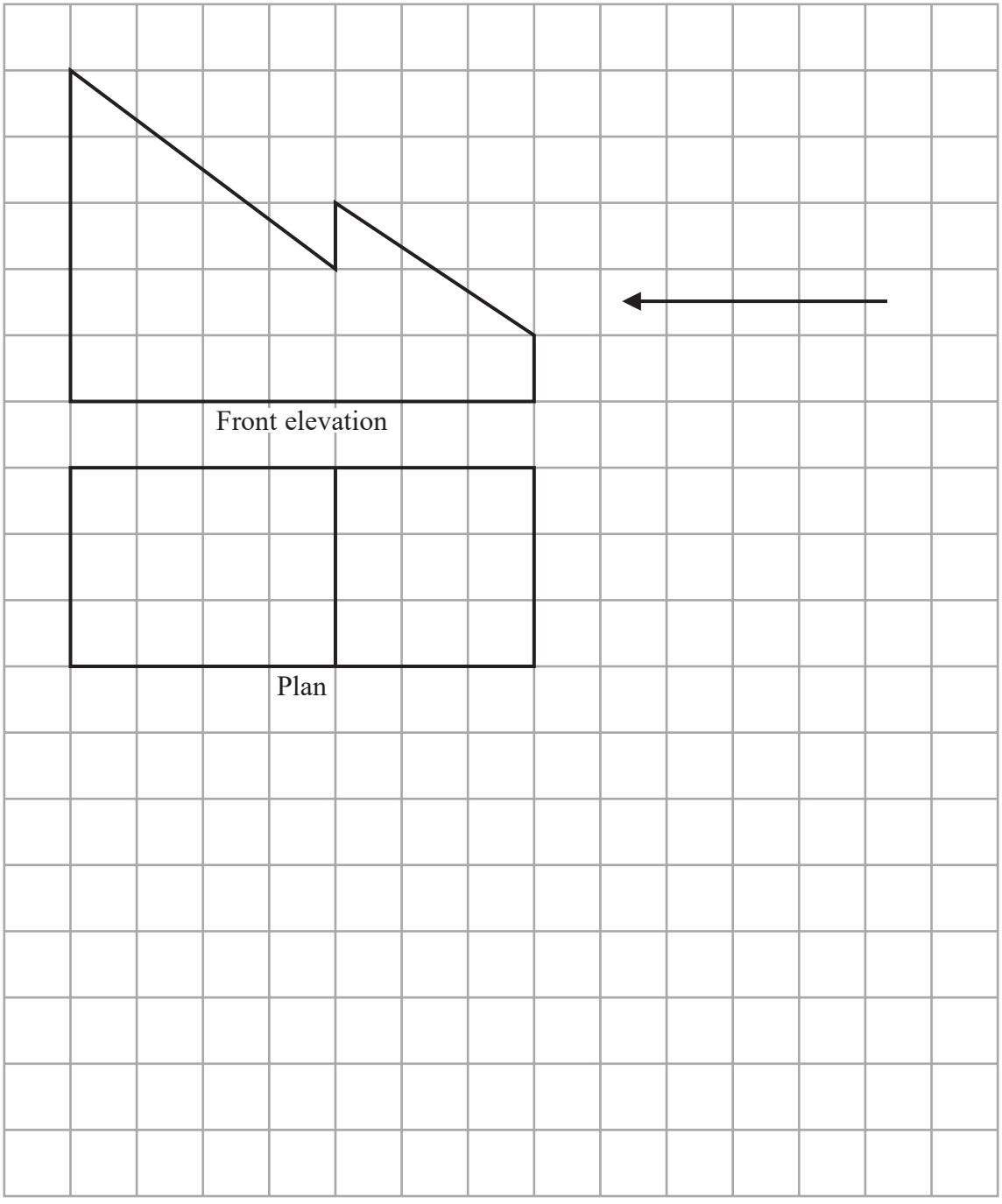
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

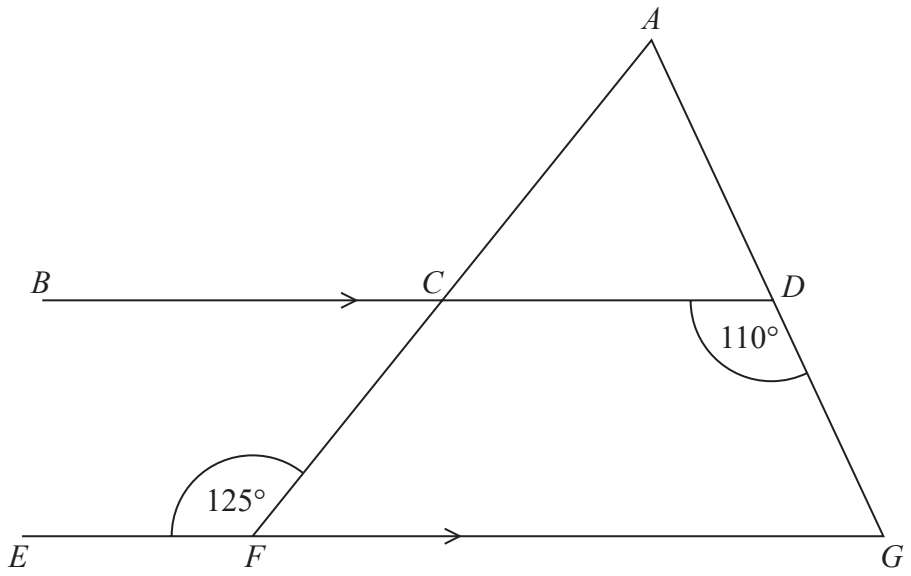
19 The front elevation and the plan of a solid are shown on the grid.

On the grid, draw the side elevation of the solid from the direction of the arrow.



(Total for Question 19 is 2 marks)

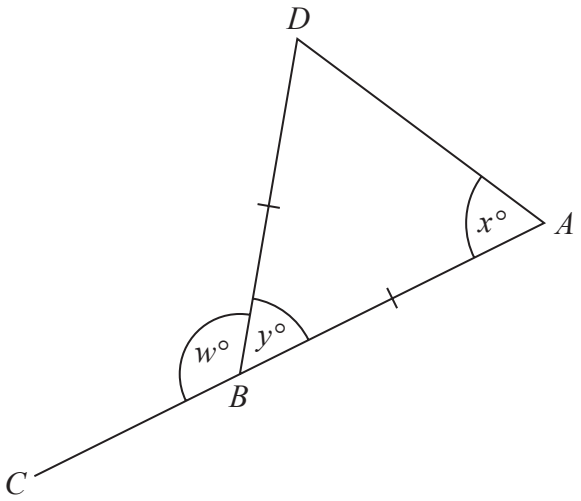
22 *ACF* and *ADG* are straight lines.
BCD and *EFG* are parallel lines.



Show that triangle *ACD* is isosceles.
Give a reason for each stage of your working.

(Total for Question 22 is 5 marks)

23 The diagram shows an isosceles triangle ABD and the straight line ABC.



$BA = BD$

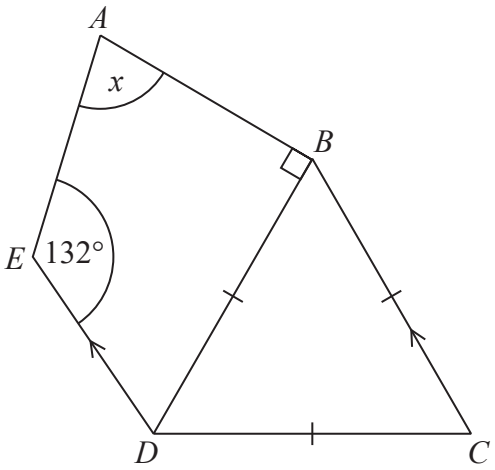
$x : y = 2 : 1$

Work out the value of w.

$w =$ .....

(Total for Question 23 is 4 marks)

19 The diagram shows a quadrilateral *ABDE* and an equilateral triangle *BCD*.



CB is parallel to *DE*.

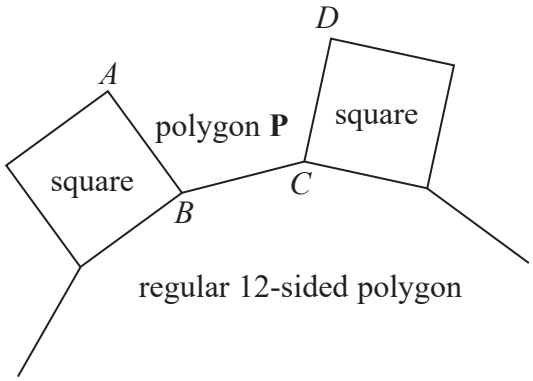
Angle *AED* = 132°

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

°

(Total for Question 19 is 4 marks)

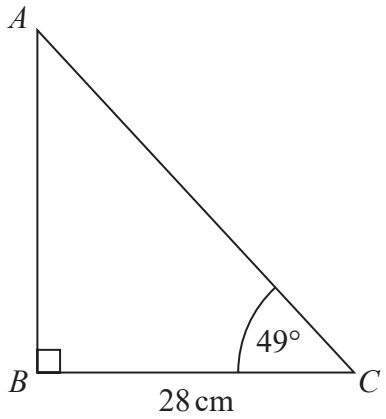
19 In the diagram, AB, BC and CD are three sides of a regular polygon **P**.



Show that polygon **P** is a hexagon.
You must show your working.

(Total for Question 19 is 4 marks)

29 ABC is a right-angled triangle.



Calculate the length of AB.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 29 is 2 marks)

26 Habib has two identical tins.

He puts 600 grams of flour into one of the tins.
The flour fills the tin completely.
The density of the flour is 0.6 g/cm^3

Habib puts 600 grams of salt into the other tin.
The salt does **not** fill the tin completely.
The volume of the space in the tin that is **not** filled with salt is 700 cm^3

Work out the density of the salt.
You must show all your working.

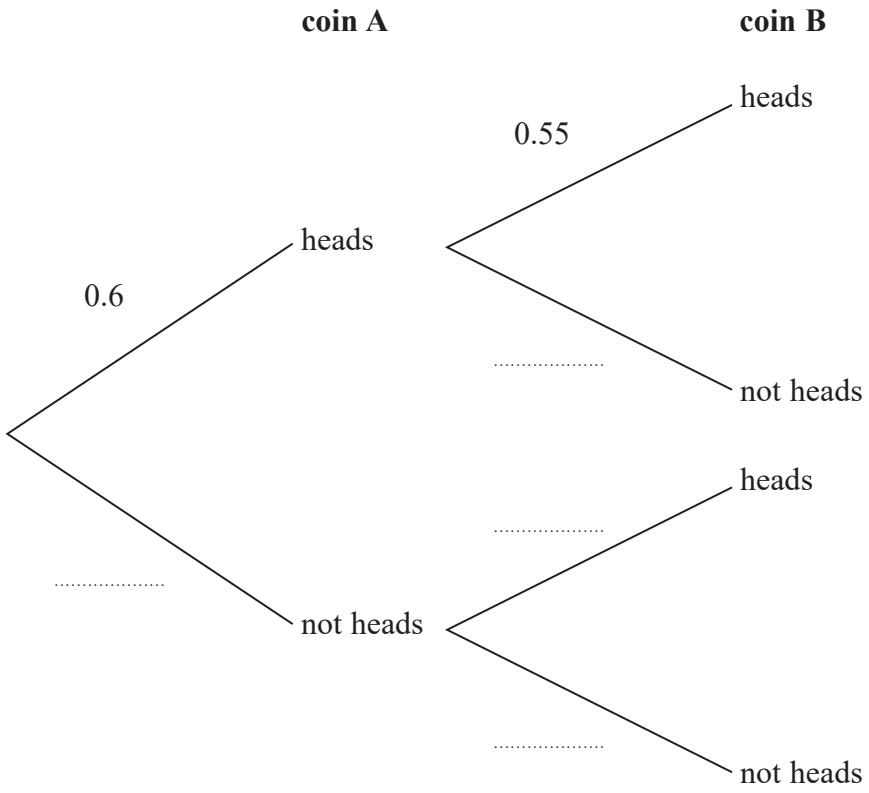
..... g/cm^3

(Total for Question 26 is 4 marks)

27 Tim has two biased coins, coin **A** and coin **B**.
He is going to throw both coins.

The probability that coin **A** will land on heads is 0.6
The probability that coin **B** will land on heads is 0.55

(a) Complete the probability tree diagram.



(2)

Tim throws coin **A** once and he throws coin **B** once.

(b) Work out the probability that both coins land on heads.

.....

(2)

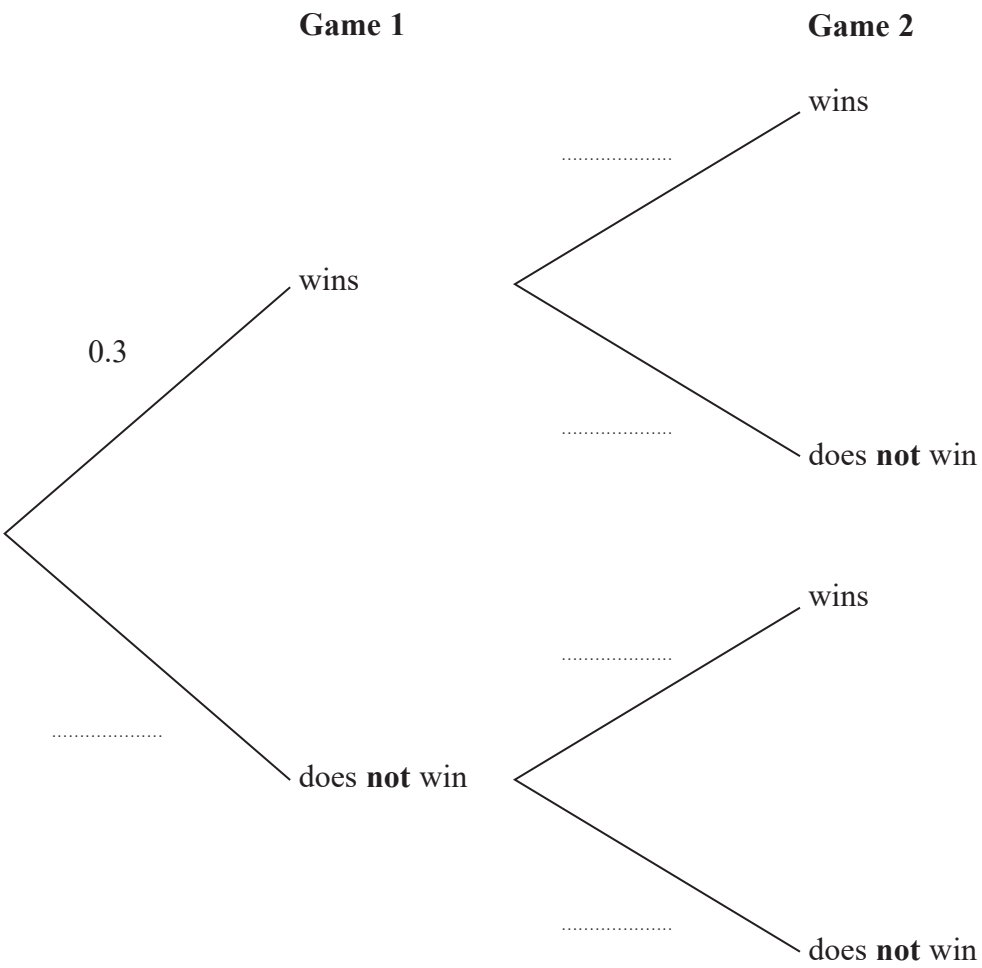
(Total for Question 27 is 4 marks)

20 Dan is playing cards.

The probability that he will win a game of cards is 0.3

Dan plays two games of cards.

(a) Complete the probability tree diagram.



(2)

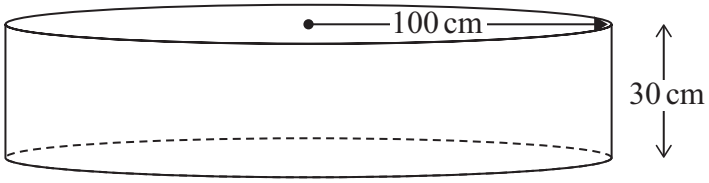
(b) Work out the probability that Dan does **not** win either game.

.....

(2)

(Total for Question 20 is 4 marks)

28 A paddling pool is in the shape of a cylinder.



The pool has radius 100 cm.
The pool has depth 30 cm.

The pool is empty.
It is then filled with water at a rate of 250 cm^3 per second.

Work out the number of minutes it takes to fill the pool completely.
Give your answer correct to the nearest minute.
You must show all your working.

..... minutes

(Total for Question 28 is 4 marks)

29 $w = 40 - t^2$

(a) Calculate the value of w when $t = -5$

$w =$ .....

(2)

$$p = \frac{h - 5}{3}$$

(b) Make h the subject of the formula.

.....

(2)

(Total for Question 29 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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19 The table shows the probabilities that a biased dice will land on 3, on 4, on 5 and on 6

Number on dice	1	2	3	4	5	6
Probability			0.10	0.30	0.05	0.25

Karim assumes that the probabilities that the dice will land on 1 and on 2 are the same.

Karim rolls the biased dice 500 times.

(a) Assuming Karim is right, work out an estimate for the number of times the dice will land on 2

.....

(3)

Karim is wrong.
The probability that the dice will land on 2 is greater than the probability that the dice will land on 1

(b) How does this information affect your answer to part (a)?

.....

.....

.....

(1)

(Total for Question 19 is 4 marks)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

20 (a) Work out $3\frac{1}{2} - 1\frac{1}{6}$

Give your answer as a mixed number.

.....

(2)

(b) Show that $5\frac{1}{4} \div 2\frac{1}{3} = 2\frac{1}{4}$

(3)

(Total for Question 20 is 5 marks)

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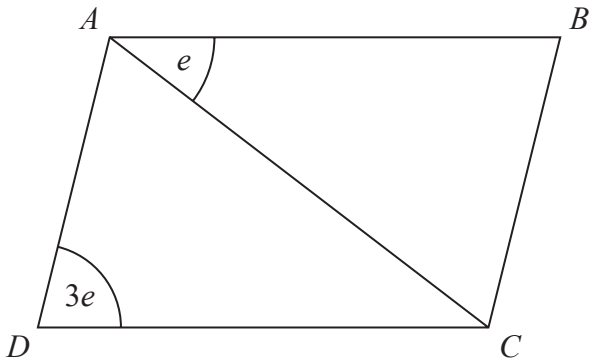
21 $ABCD$ is a parallelogram.



All angles are measured in degrees.

Find an expression, in terms of e, for the size of angle CAD.
Give a reason for each stage of your working.

.....

(Total for Question 21 is 3 marks)

22 A car travelled 4.96 miles at an average speed of 30.4 miles per hour.

(a) Work out an estimate for the time taken by the car.
Give your answer in minutes.

..... minutes
(3)

(b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

.....

.....

.....

(1)

(Total for Question 22 is 4 marks)

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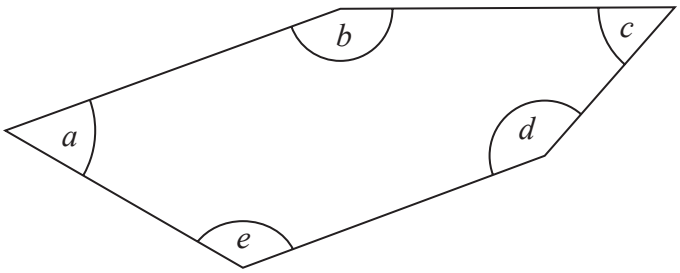
23 Here is a pentagon.



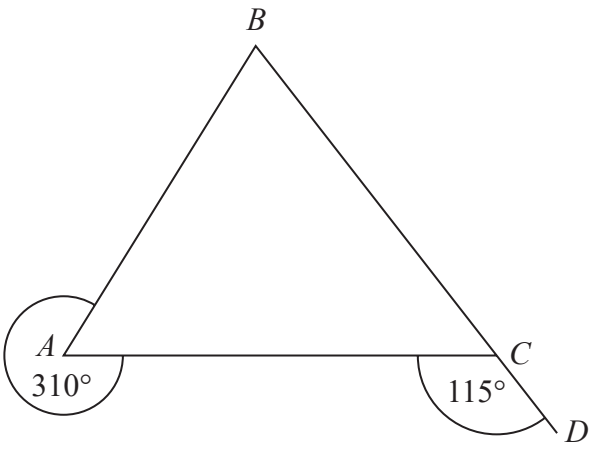
Angle a = angle c
Angle b = 155°
Angle d is three times the size of angle c
Angle e is two times the size of angle c

Work out the size of angle a

.....°

(Total for Question 23 is 4 marks)

13 *ABC* is a triangle.

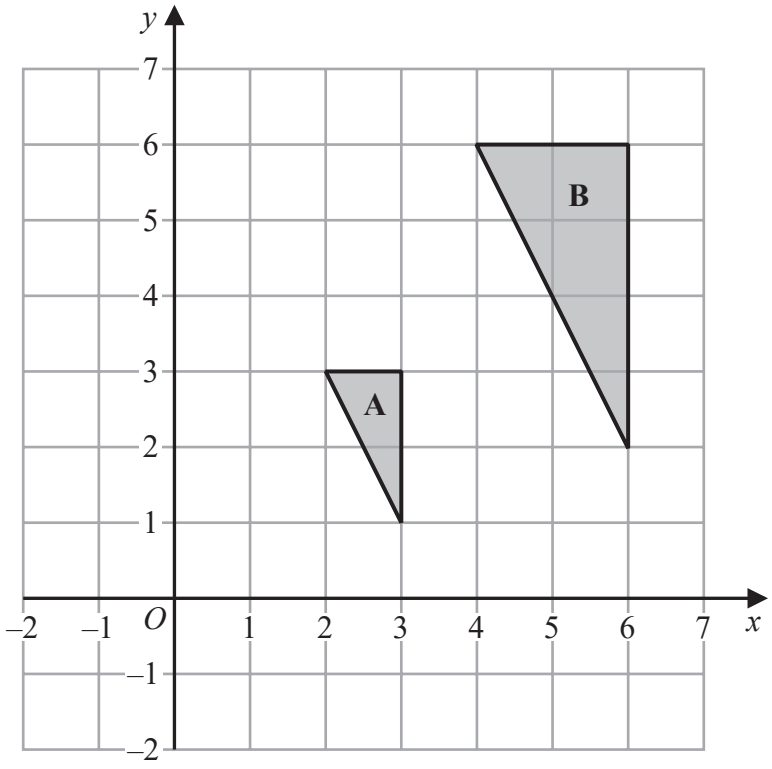


BCD is a straight line.

Show that triangle *ABC* is isosceles.
Give a reason for each stage of your working.

(Total for Question 13 is 4 marks)

18



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

.....

.....

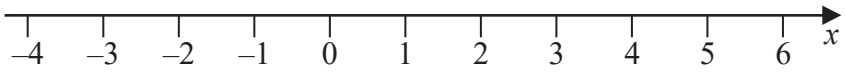
(Total for Question 18 is 2 marks)

19 (a) Factorise fully $15w^2 - 5w$

.....

(2)

(b) On the number line below, show the set of values of x for which $-2 < x \leqslant 4$



(2)

(Total for Question 19 is 4 marks)

20 Use your calculator to work out the value of

$$\sqrt{\frac{208.3 - 15.7}{5.694 + 1.8^2}}$$

Write down all the digits on your calculator display.

.....

(Total for Question 20 is 2 marks)

22

Choci bar
200 g
£3.50

London

Choci bar
360 g
7.20 Swiss francs

Zurich

In London, a 200 g Choci bar costs £3.50
In Zurich, a 360 g Choci bar costs 7.20 Swiss francs.

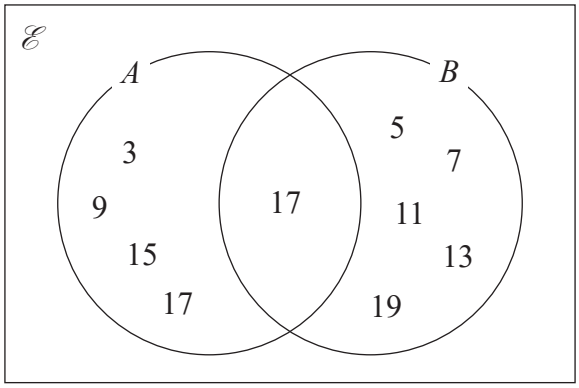
The exchange rate is £1 = 1.25 Swiss francs.

In which city is the Choci bar the better value for money, in London or in Zurich?
You must show how you get your answer.

(Total for Question 22 is 3 marks)

23 $\mathscr{E}$ = {odd numbers between 0 and 20}
A = {3, 9, 15, 17}
B = {5, 7, 11, 13, 17, 19}

Tom was asked to draw a Venn diagram for this information.
Here is his answer.



Write down two things Tom should do to make his answer fully correct.

1 .....

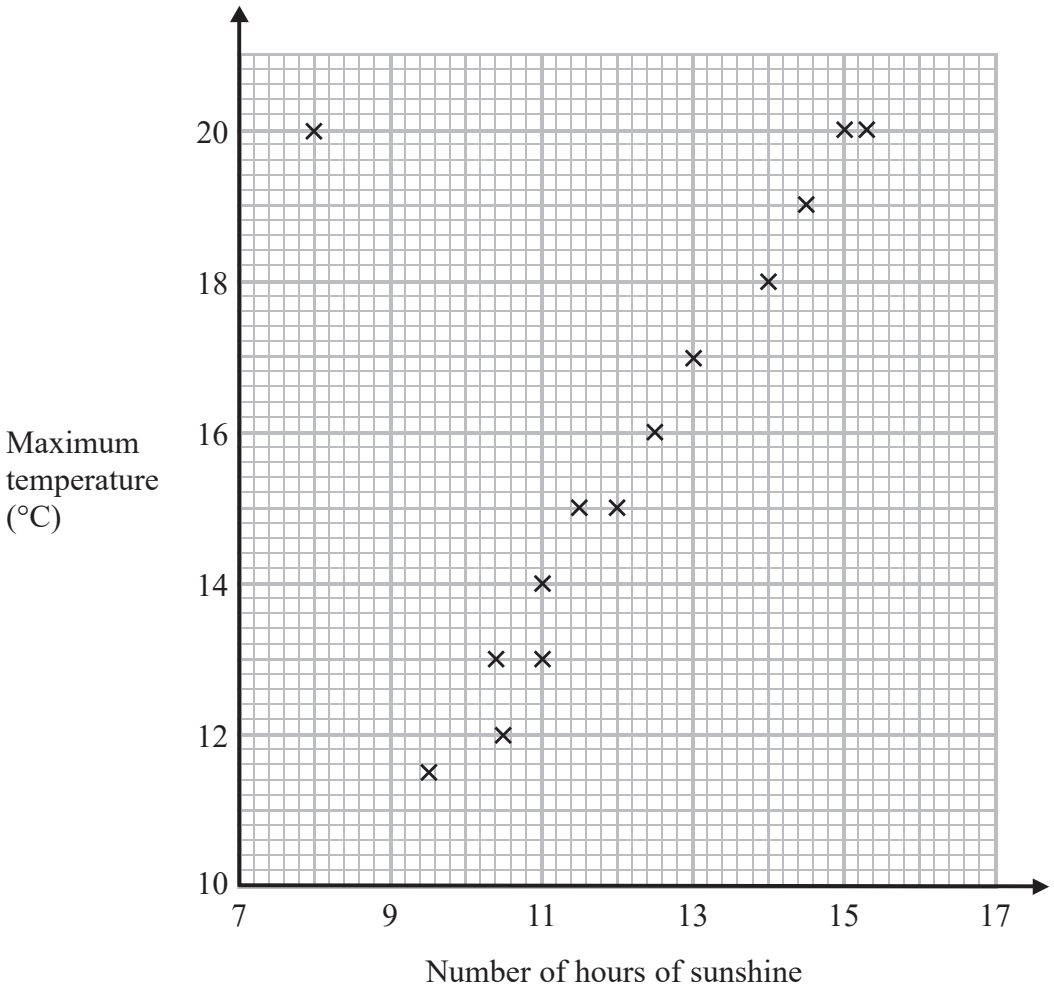
.....

2 .....

.....

(Total for Question 23 is 2 marks)

21 The scatter graph shows the maximum temperature and the number of hours of sunshine in fourteen British towns on one day.



One of the points is an outlier.

(a) Write down the coordinates of this point.

(..... , ...)

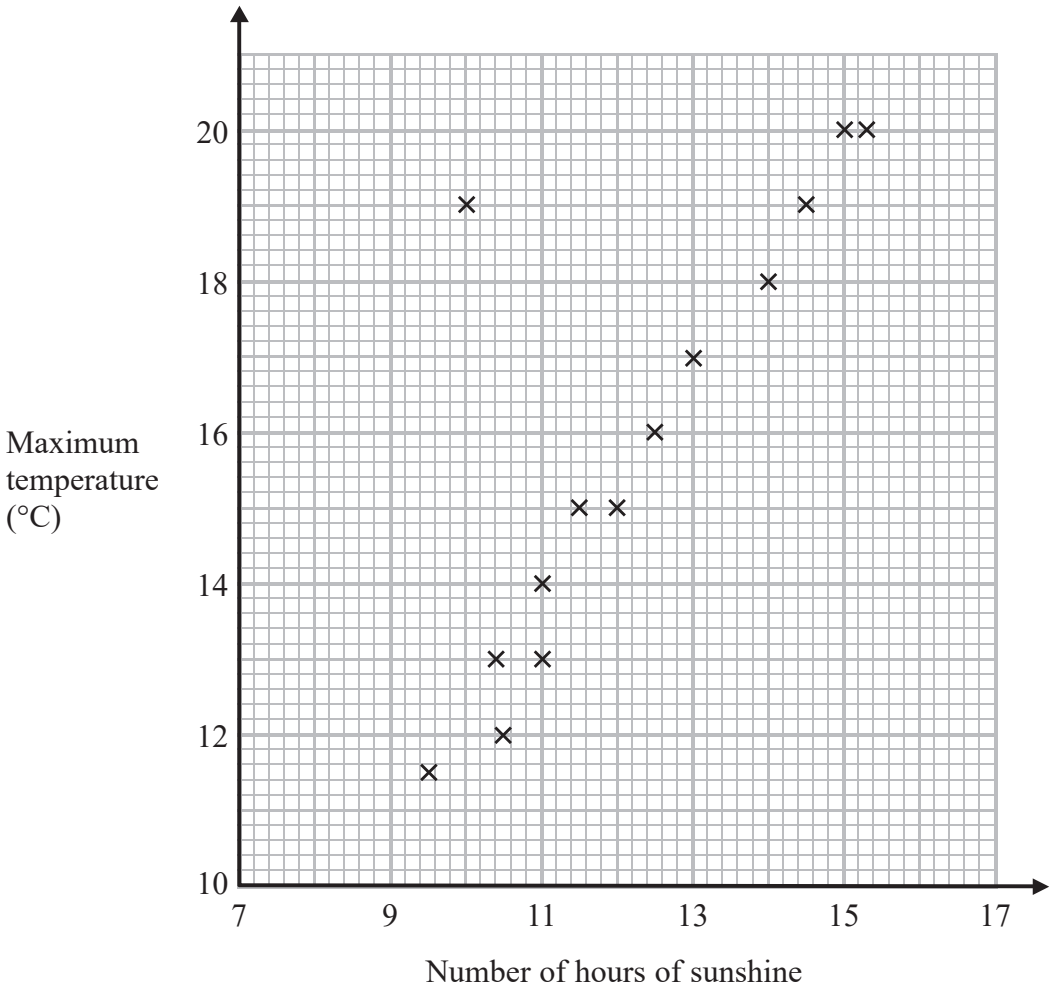
(1)

(b) For all the other points write down the type of correlation.

.....

(1)

21 The scatter graph shows the maximum temperature and the number of hours of sunshine in fourteen British towns on one day.



One of the points is an outlier.

(a) Write down the coordinates of this point.

(..... , ...)

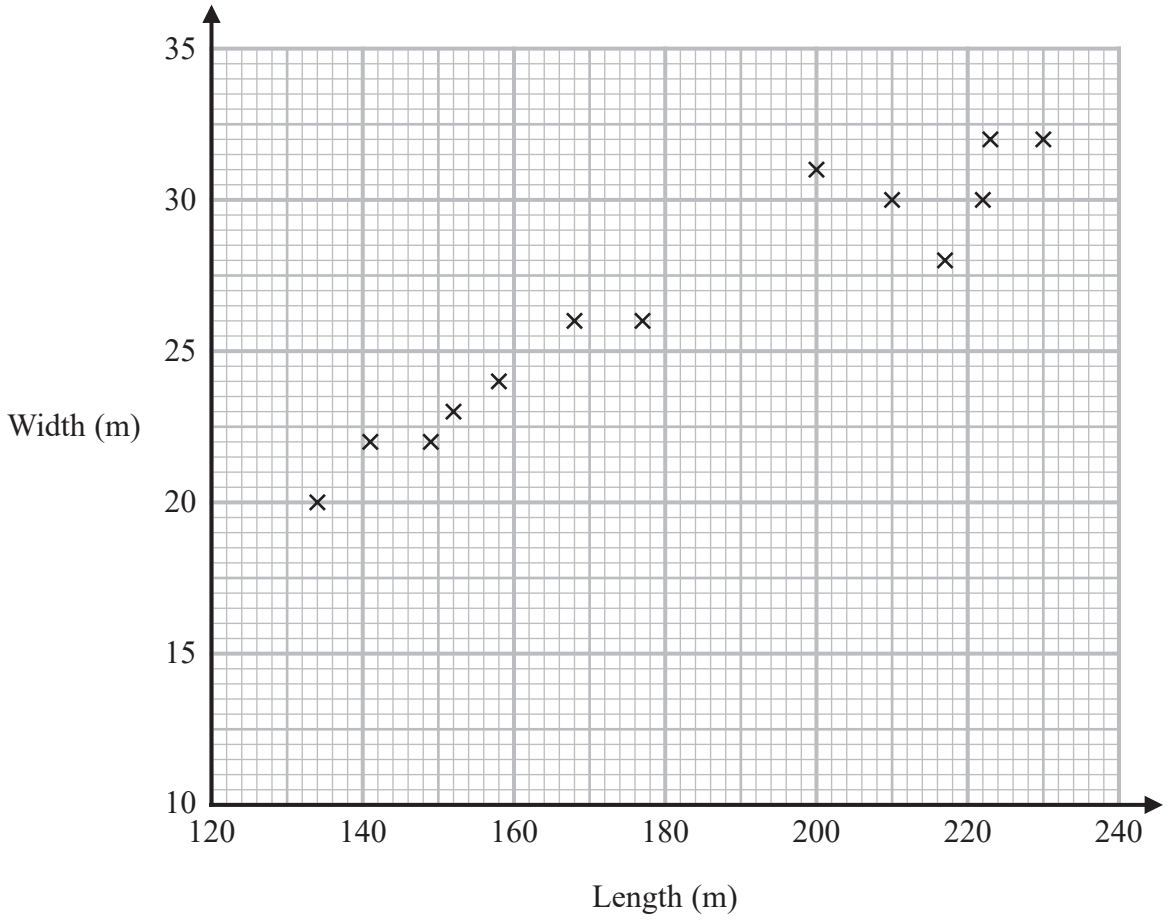
(1)

(b) For all the other points write down the type of correlation.

.....

(1)

21 The scatter graph shows information about some ships.
It shows the length and the width of each ship.



(a) What type of correlation does this scatter graph show?

.....

(1)

(b) Draw a line of best fit on the scatter graph.

(1)

A different ship has a length of 194 metres.

(c) Use your line of best fit to find an estimate for the width of this ship.

..... metres

(1)

(Total for Question 21 is 3 marks)

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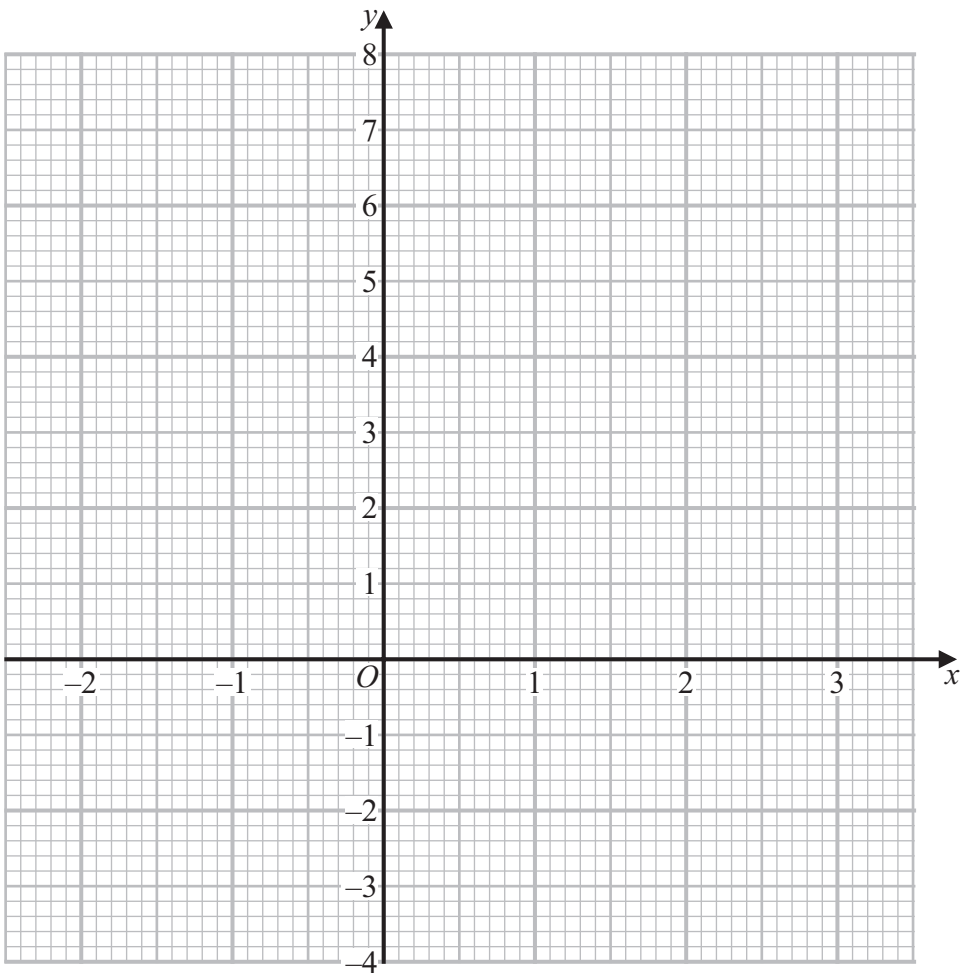
24 (a) Complete the table of values for $y = x^2 - x$

x	–2	–1	0	1	2	3
y	6		0		2	

(2)

(b) On the grid, draw the graph of $y = x^2 - x$ for values of x from –2 to 3



(2)

(c) Use your graph to find estimates for the solutions of the equation $x^2 - x = 4$

.....

(2)

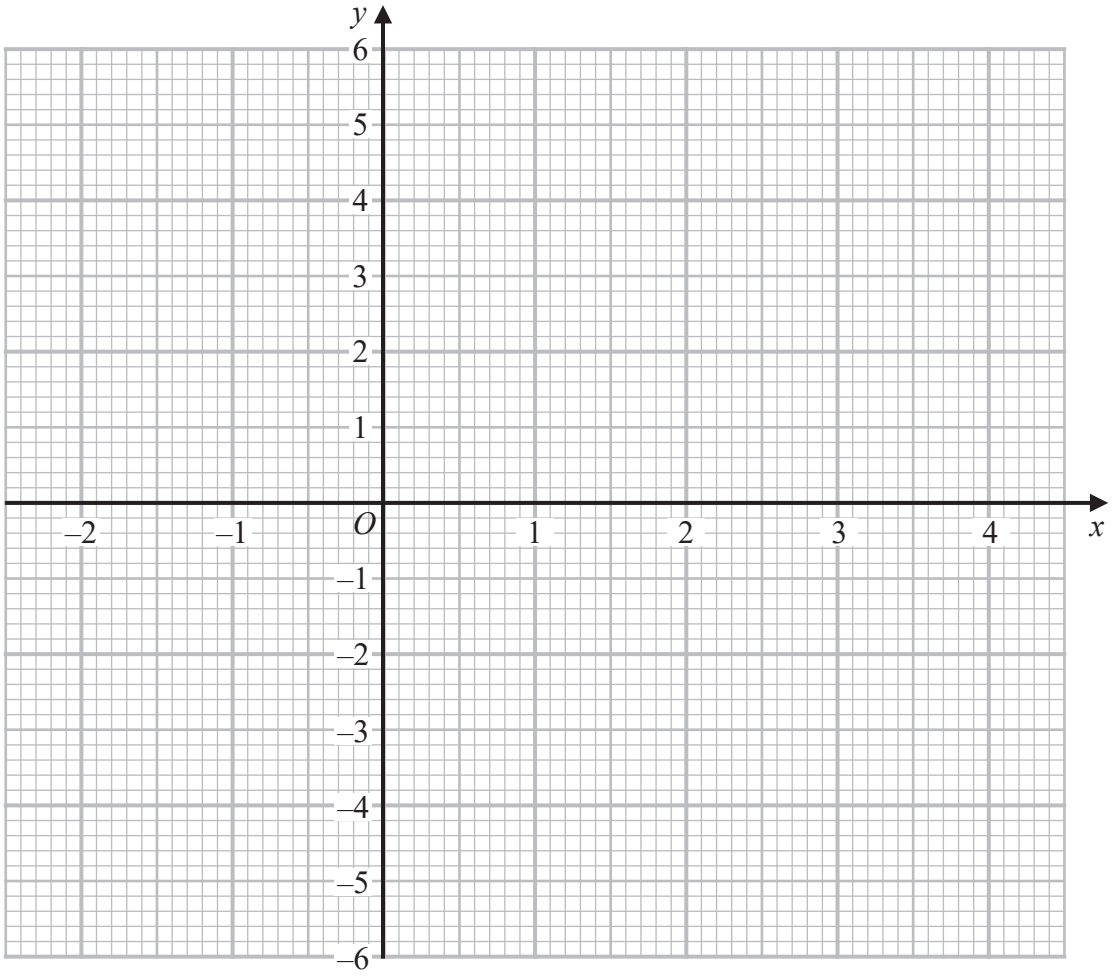
(Total for Question 24 is 6 marks)

24 (a) Complete the table of values for $y = x^2 - 2x - 3$

x	–2	–1	0	1	2	3	4
y		0			–3		

(2)

(b) On the grid, draw the graph of $y = x^2 - 2x - 3$ for values of x from –2 to 4

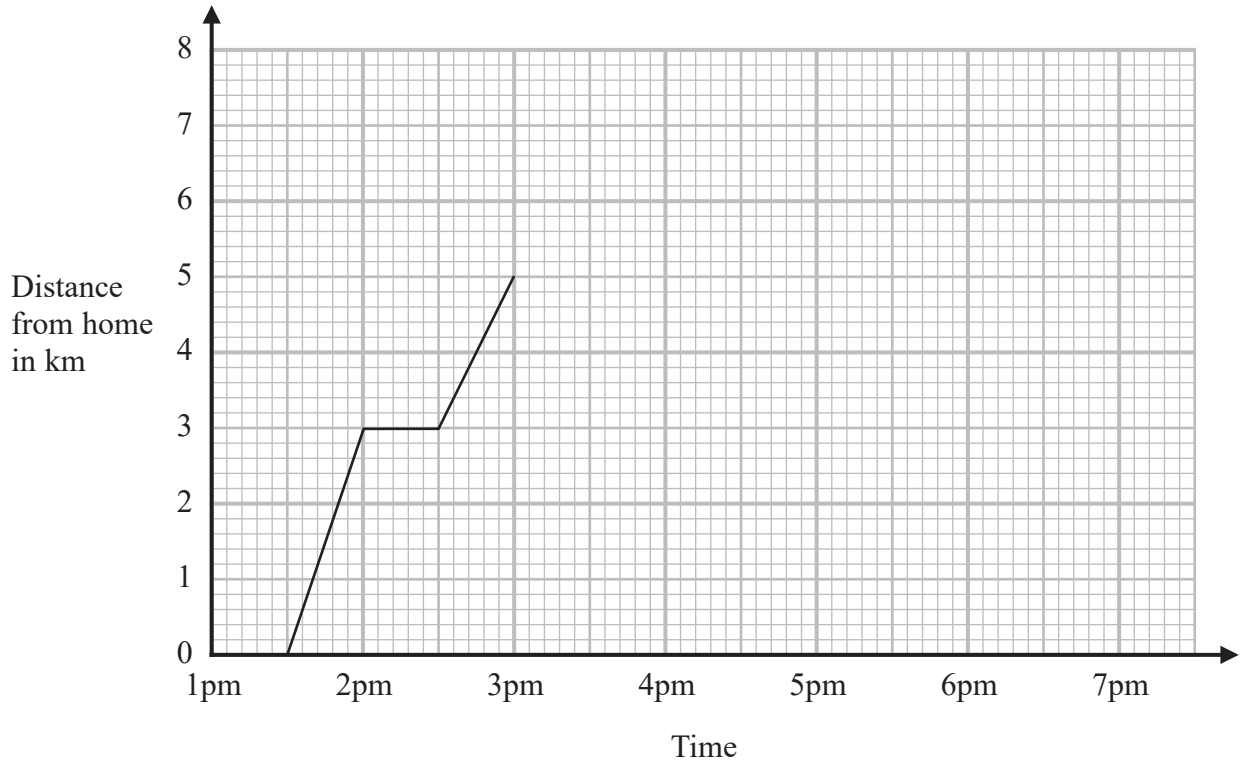


(2)

(Total for Question 24 is 4 marks)

14 Amy walked from her home to the skate park.

The travel graph of Amy's walk to the skate park is shown below.



On the way to the skate park Amy stopped at her friend's house.

(a) How far is it from her friend's house to the skate park?

..... km

(1)

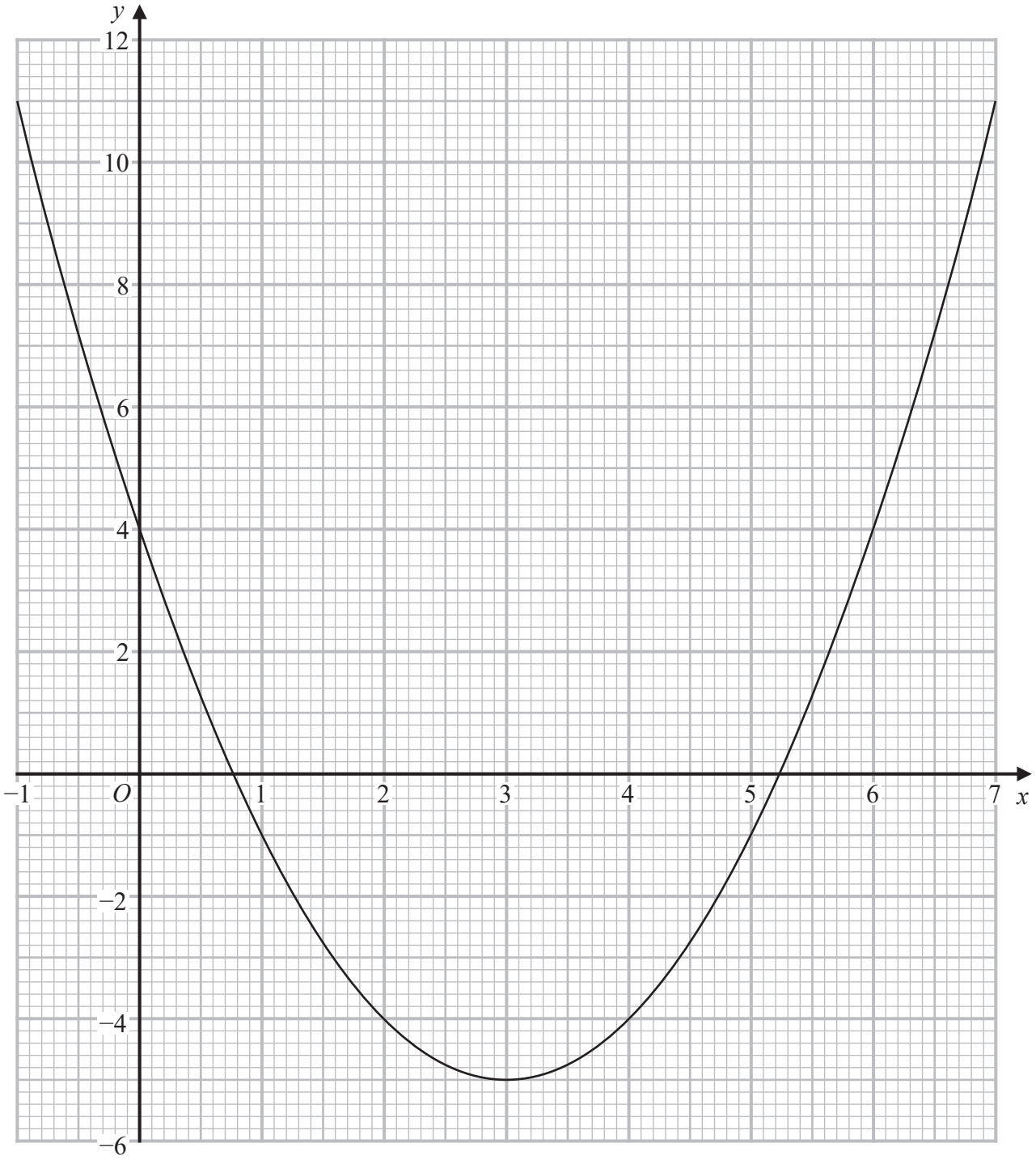
Amy stayed at the skate park for 2 hours.
Then she walked home at a steady speed.
She took 1 hour 30 minutes to walk home.

(b) Complete the travel graph.

(2)

(Total for Question 14 is 3 marks)

24 Here is the graph of $y = x^2 - 6x + 4$



(a) Write down the y intercept of the graph of $y = x^2 - 6x + 4$

.....

(1)

(b) Write down the coordinates of the turning point of the graph of $y = x^2 - 6x + 4$

(..... , ...)

(1)

(c) Use the graph to find estimates for the roots of $x^2 - 6x + 4 = 0$

.....

(2)

(Total for Question 24 is 4 marks)

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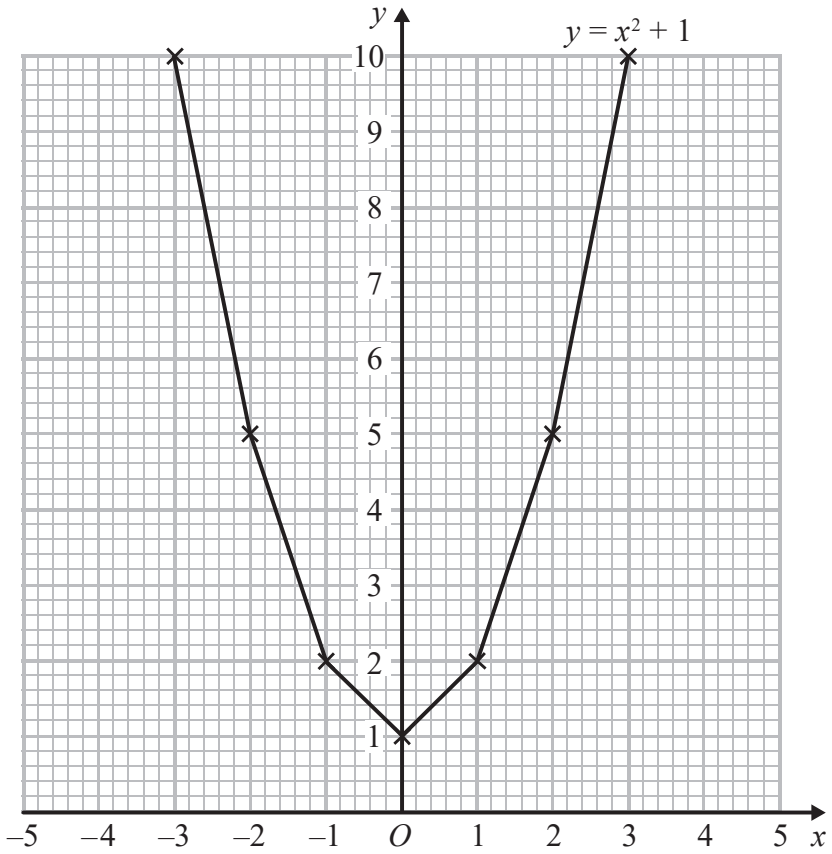
29 Brogan needs to draw the graph of $y = x^2 + 1$

Here is her graph.



Write down one thing that is wrong with Brogan's graph.

.....

.....

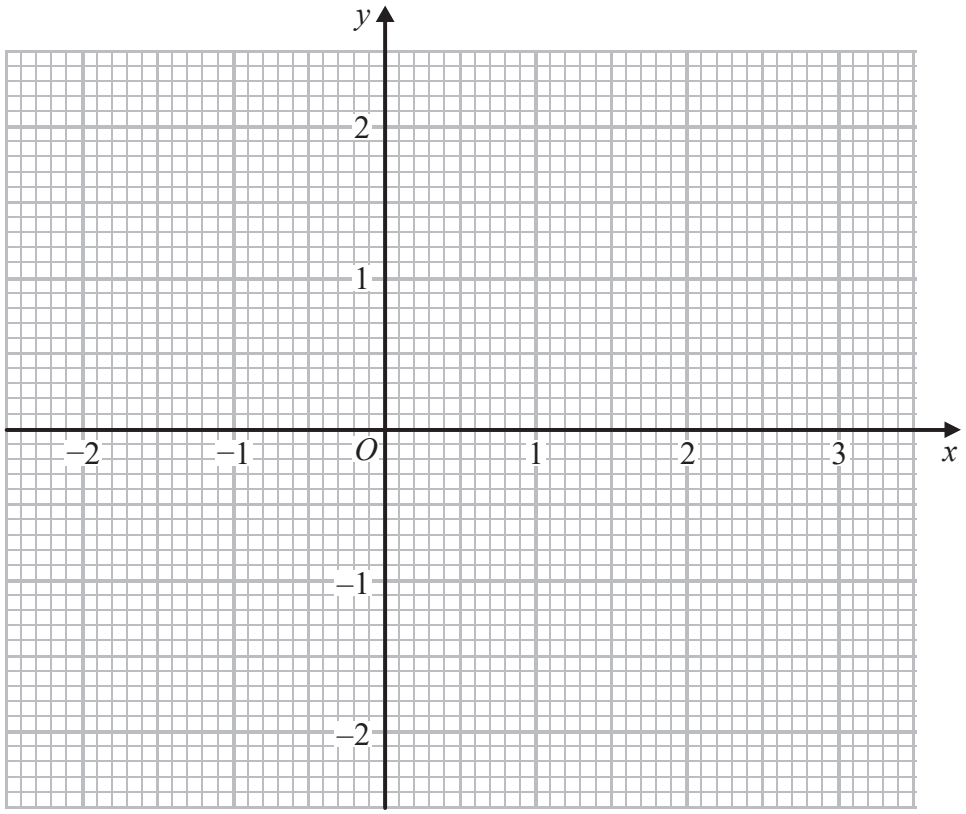
(Total for Question 29 is 1 mark)

13 (a) Complete the table of values for $y = \frac{1}{2}x - 1$

x	−2	−1	0	1	2	3
y	−2				0	

(2)

(b) On the grid, draw the graph of $y = \frac{1}{2}x - 1$ for values of x from −2 to 3



(2)

(c) Use your graph to find the value of x when $y = 0.3$

$x =$ .....

(1)

(Total for Question 13 is 5 marks)

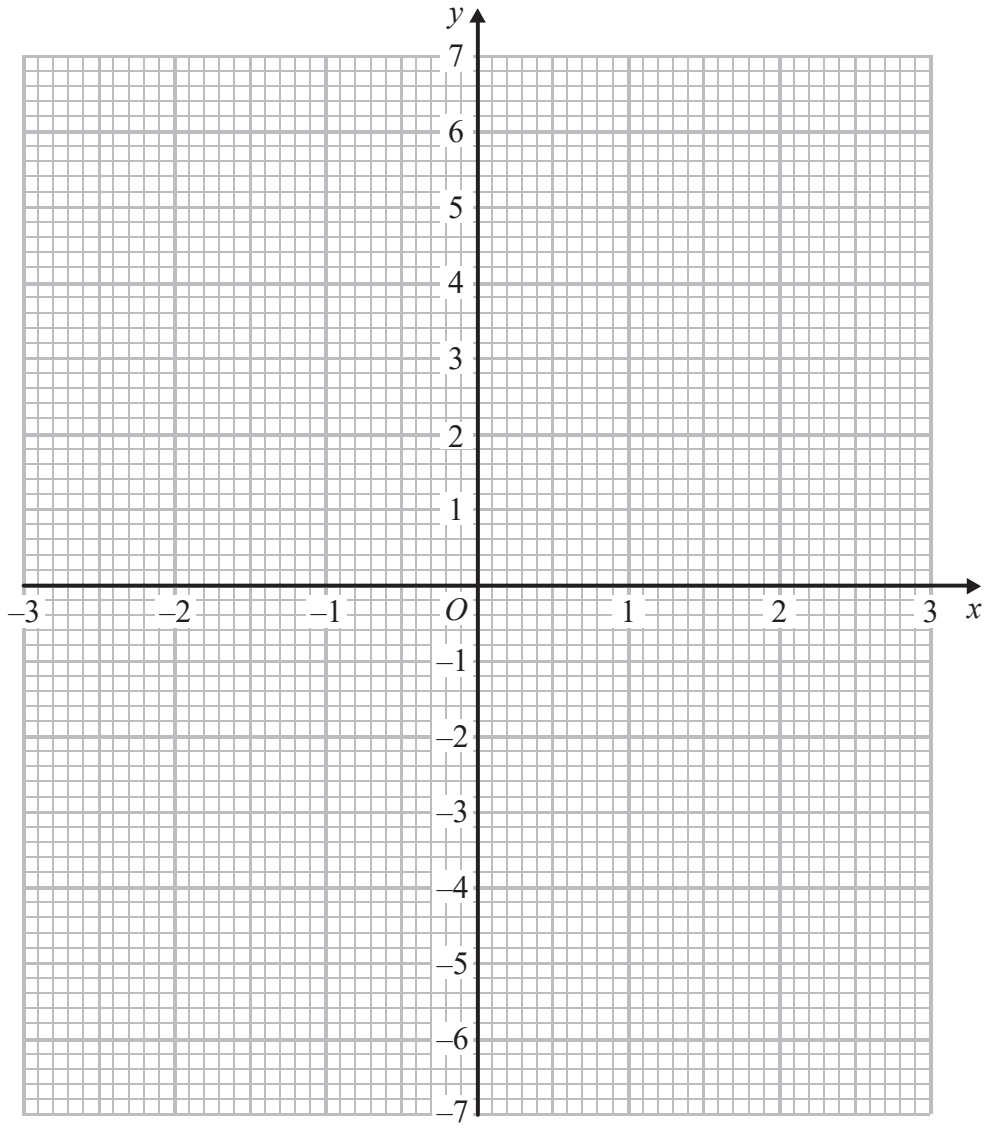
24 (a) Complete the table of values for $y = x^2 - x - 7$

x	–3	–2	–1	0	1	2	3
y	5			– 7			

(2)

(b) On the grid, draw the graph of $y = x^2 - x - 6$ for values of x from –3 to 3

(2)



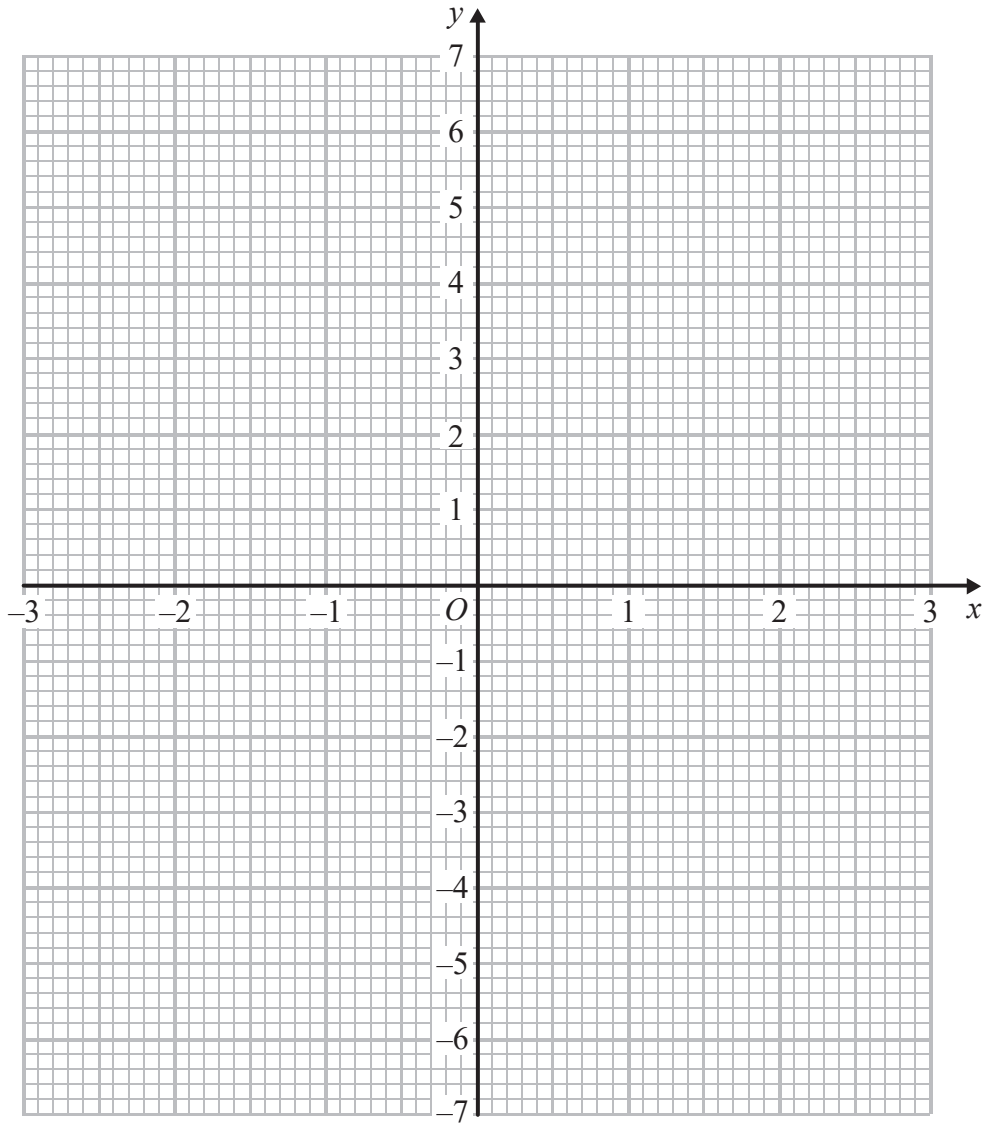
24 (a) Complete the table of values for $y = x^2 - x - 6$

x	–3	–2	–1	0	1	2	3
y	6			– 6			

(2)

(b) On the grid, draw the graph of $y = x^2 - x - 6$ for values of x from –3 to 3

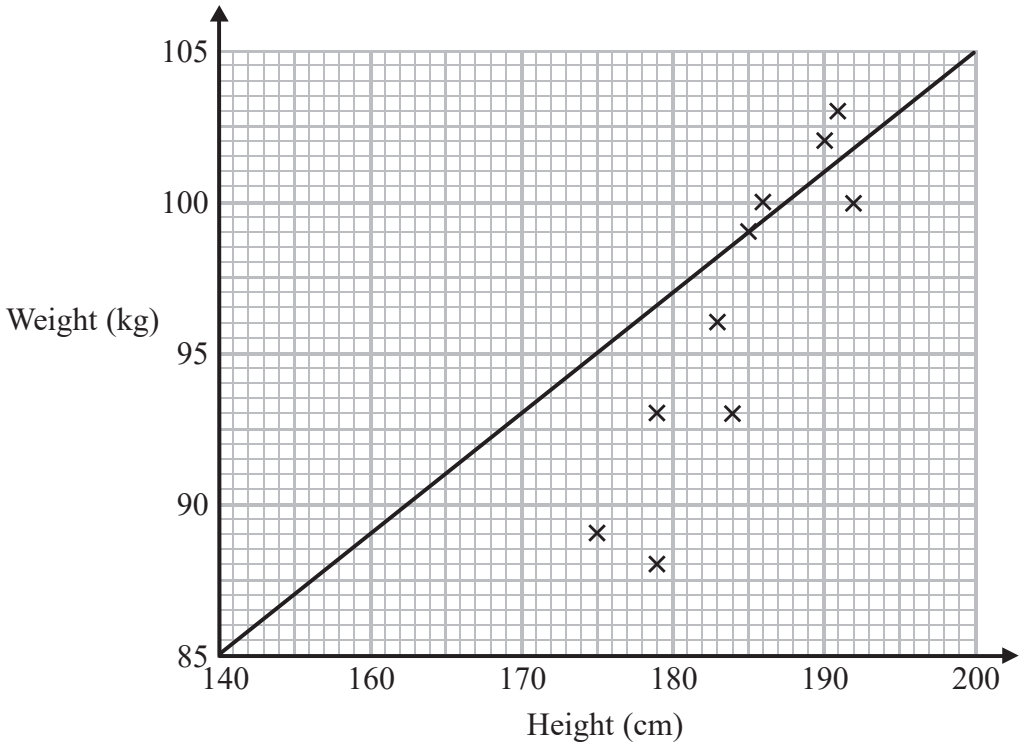
(2)



21 Sean has information about the height, in cm, and the weight, in kg, of each of ten rugby players.

He is asked to draw a scatter graph and a line of best fit for this information.

Here is his answer.



Sean has plotted the points accurately.

Write down two things that are wrong with his answer.

1 .....

.....

2 .....

.....

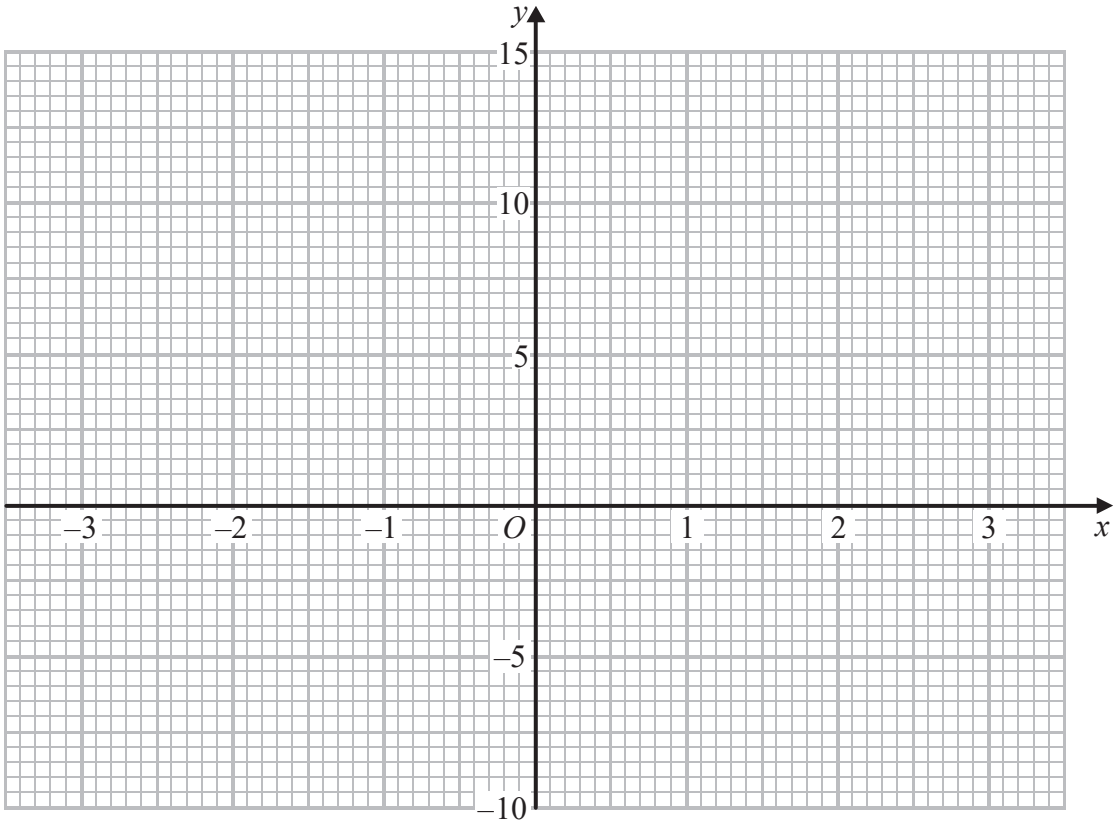
(Total for Question 21 is 2 marks)

22 (a) Complete this table of values for $y = x^2 + x - 4$

x	–3	–2	–1	0	1	2	3
y		–2	–4		–2		

(2)

(b) On the grid, draw the graph of $y = x^2 + x - 4$ for values of x from –3 to 3



(2)

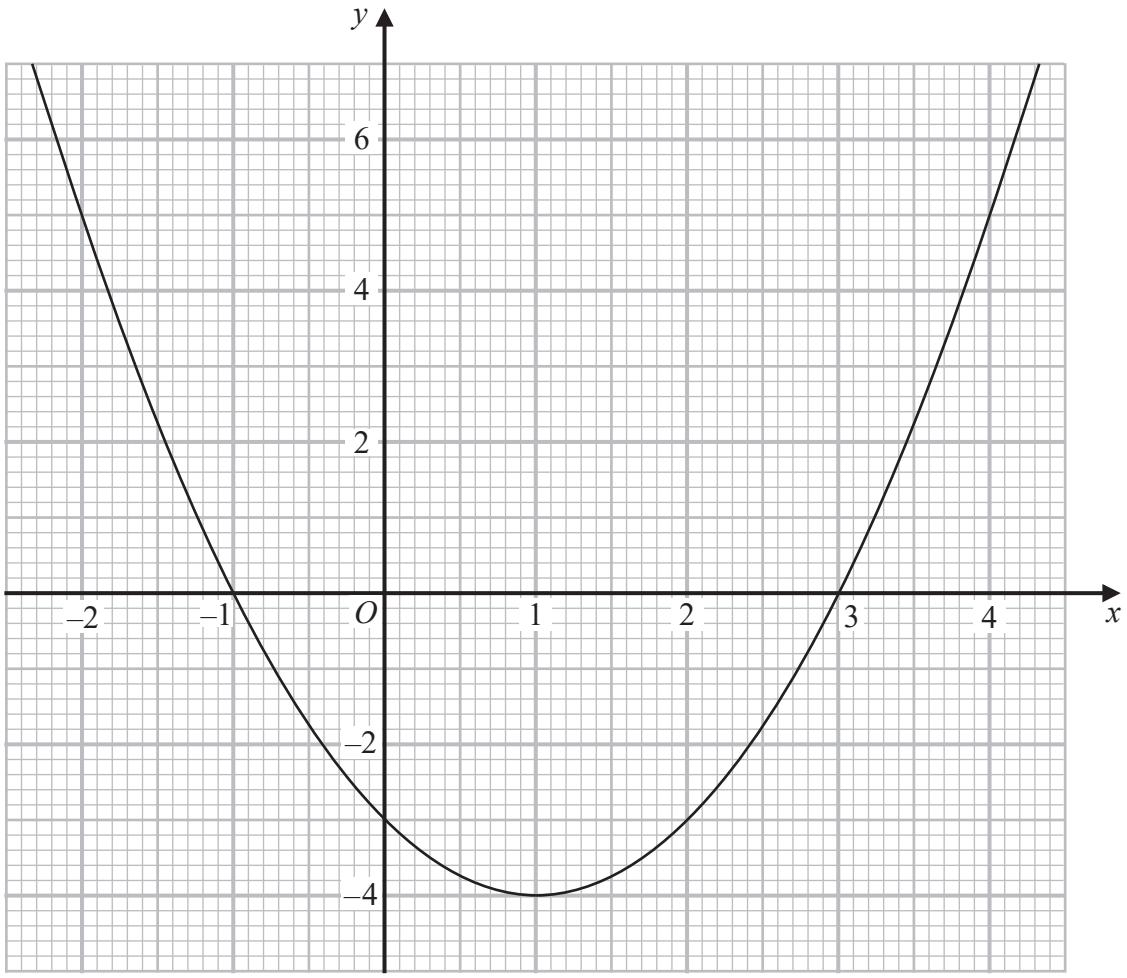
(c) Use the graph to estimate a solution to $x^2 + x - 4 = 0$

.....

(1)

(Total for Question 22 is 5 marks)

29 Here is the graph of $y = x^2 - 2x - 3$



(a) Write down the coordinates of the turning point on the graph of $y = x^2 - 2x - 3$

(..... , ...)

(1)

(b) Use the graph to find the roots of the equation $x^2 - 2x - 3 = 0$

.....

(2)

(Total for Question 29 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

26 The table shows information about the heights of 80 plants.

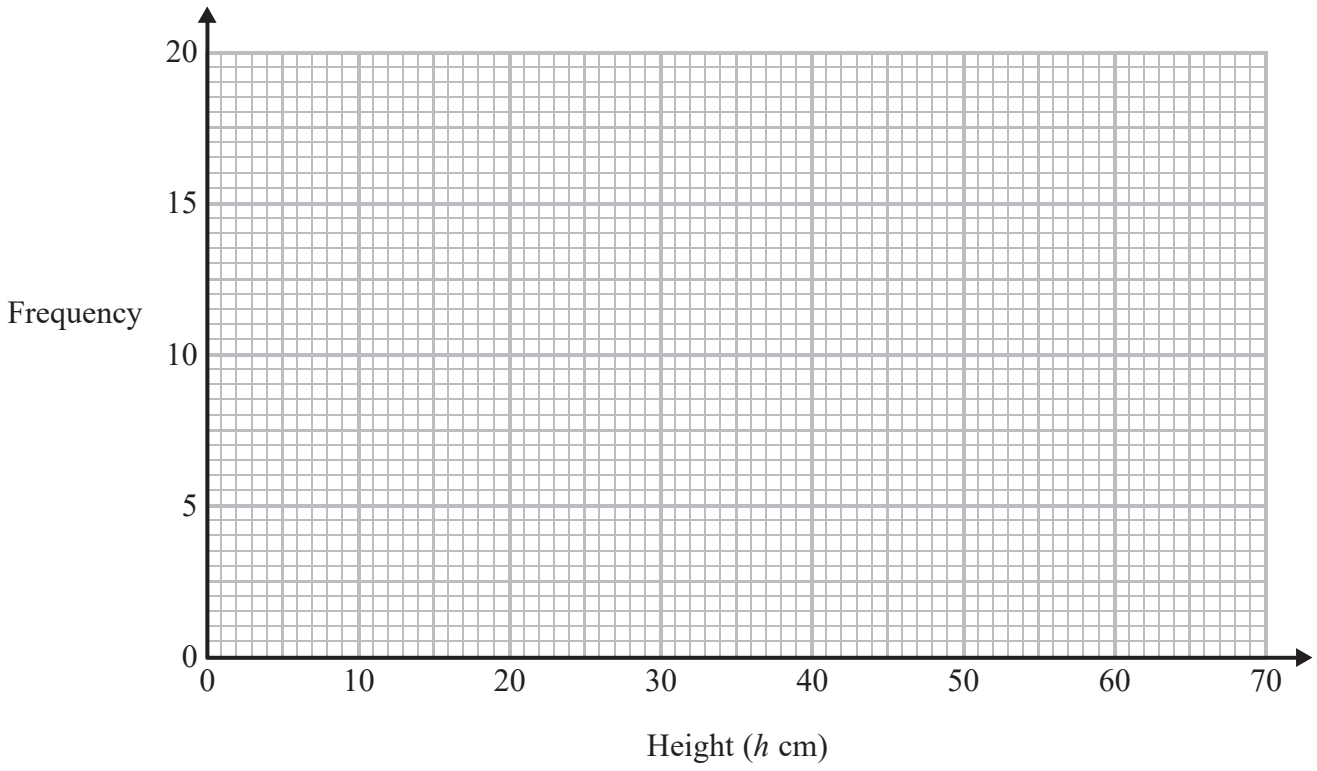
Height (h cm)	Frequency
$10 < h \leqslant 20$	7
$20 < h \leqslant 30$	13
$30 < h \leqslant 40$	14
$40 < h \leqslant 50$	12
$50 < h \leqslant 60$	16
$60 < h \leqslant 70$	18

(a) Find the class interval that contains the median.

.....

(1)

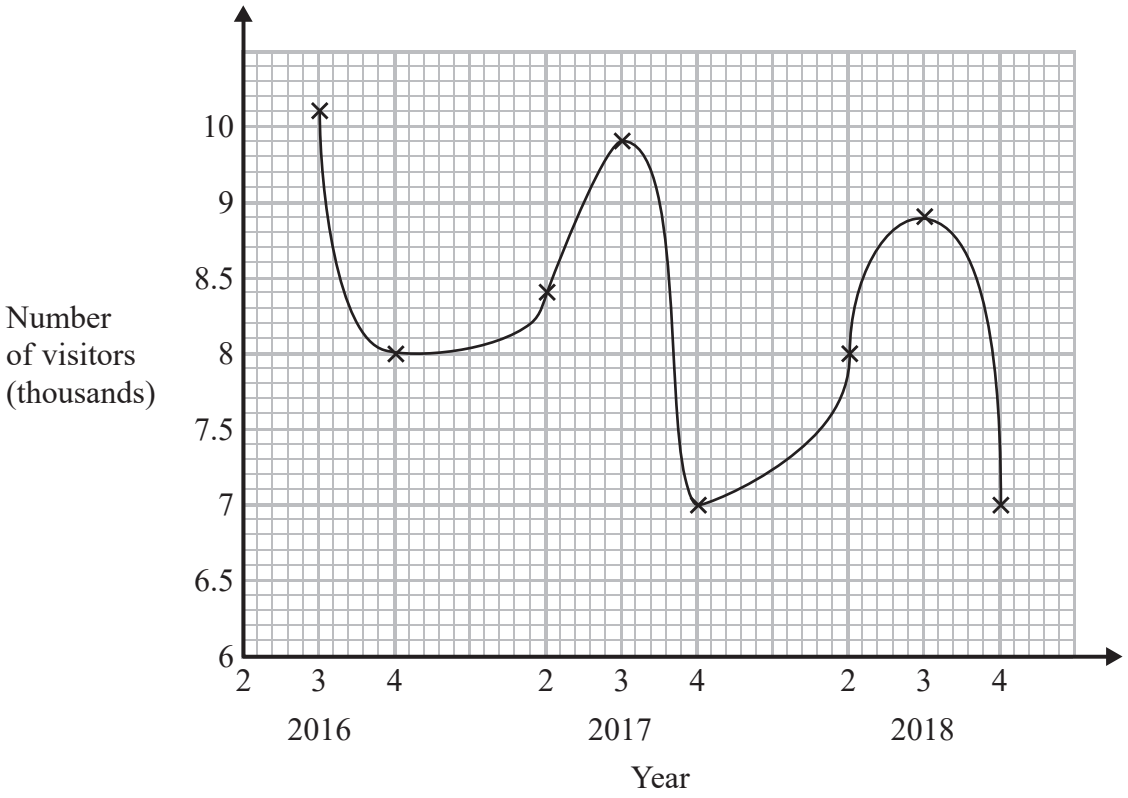
(b) On the grid, draw a frequency polygon for the information in the table.



(2)

(Total for Question 26 is 3 marks)

27 Sean has drawn a time series graph to show the numbers, in thousands, of visitors to a fun park.



Write down two things that are wrong or could be misleading with this graph.

1 .....

.....

.....

2 .....

.....

.....

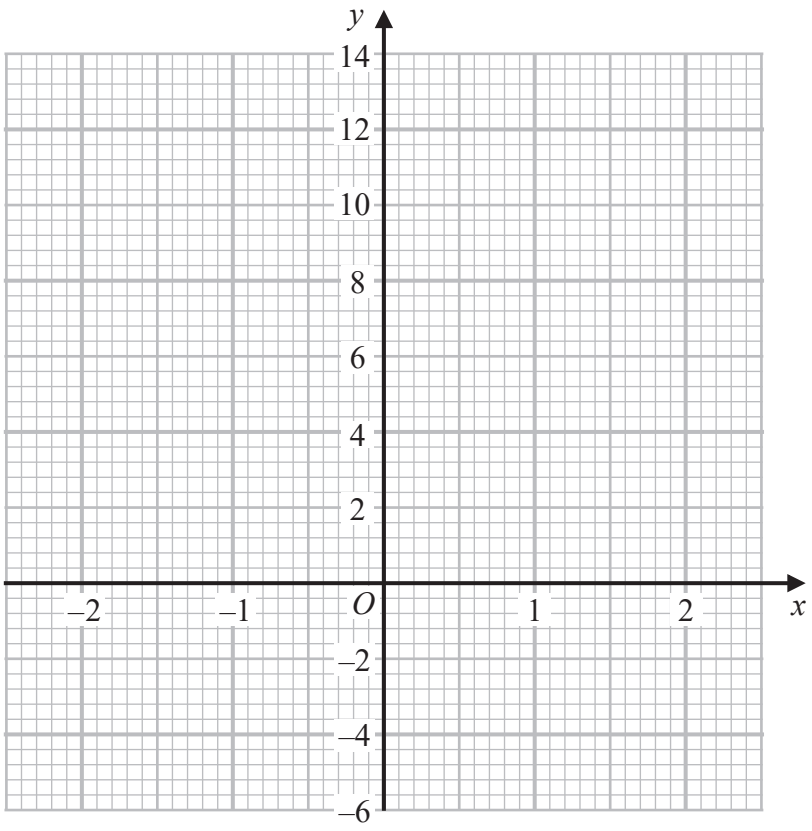
(Total for Question 27 is 2 marks)

24 (a) Complete the table of values for $y = 5 - x^3$

x	–2	–1	0	1	2
y		6			

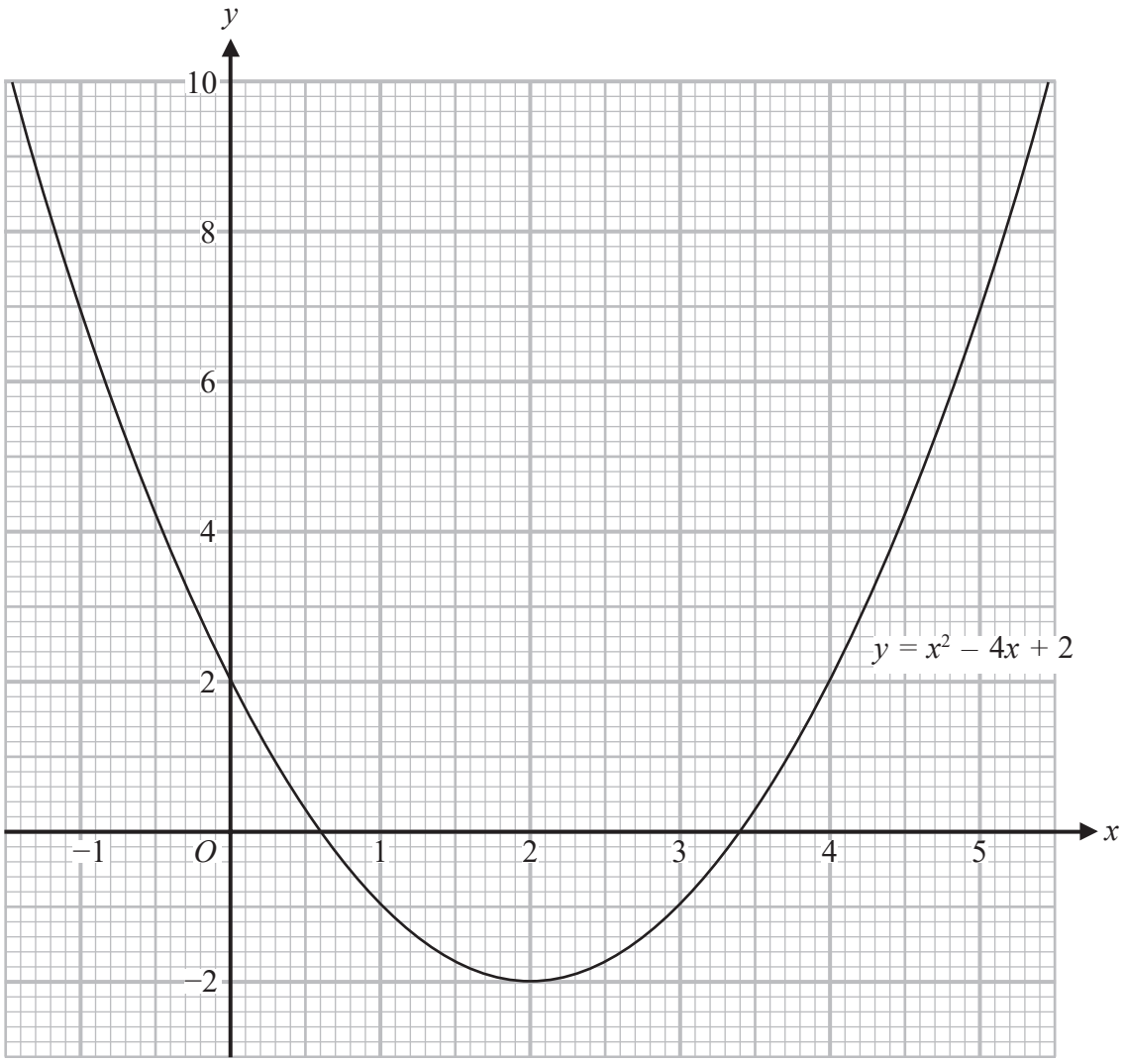
(2)

(b) On the grid below, draw the graph of $y = 5 - x^3$ for values of x from –2 to 2



(2)

(Total for Question 24 is 4 marks)



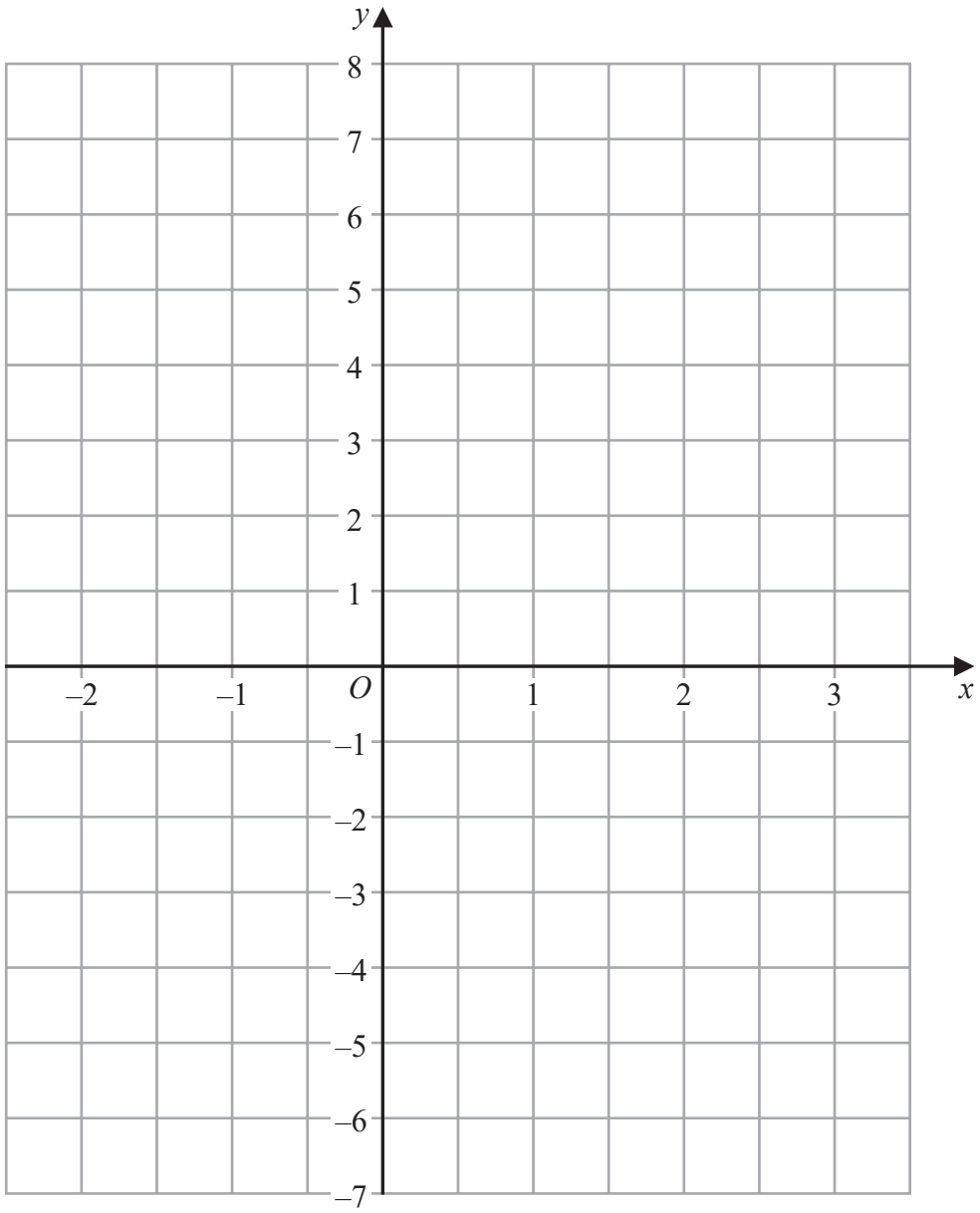
(b) Use this graph to find estimates for the solutions of the quadratic equation $x^2 - 4x + 2 = 0$

.....

(2)

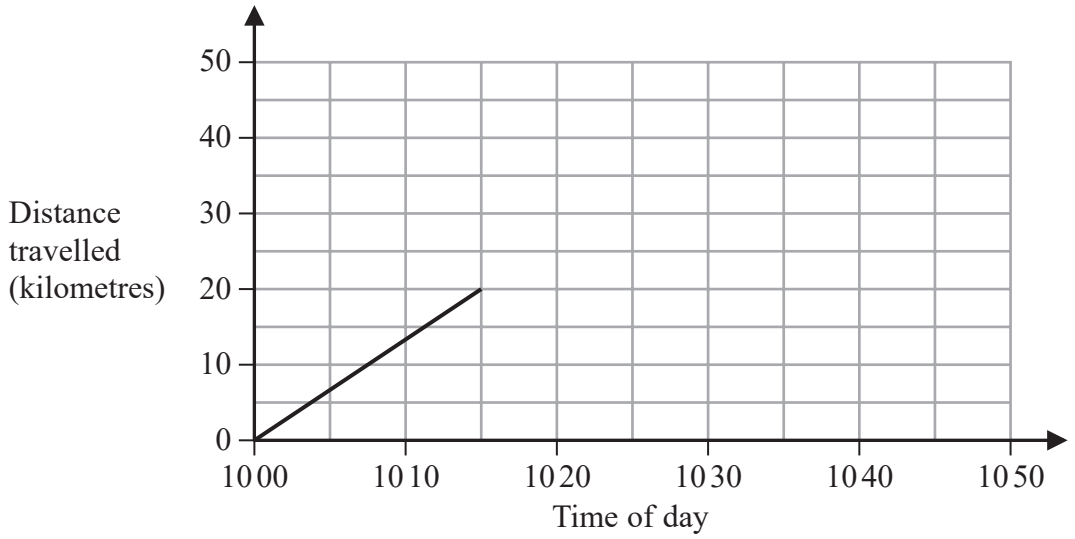
(Total for Question 28 is 3 marks)

18 On the grid below, draw the graph of $y = 2x - 2$ for values of x from –2 to 3



(Total for Question 18 is 3 marks)

23 Sam drives his car on a journey.
Here is the travel graph for the first 15 minutes of his journey.



(a) Work out Sam's speed, in km/h, for the first 15 minutes of his journey.

..... km/h

(2)

At 10 15 Sam stops for 10 minutes and then drives for 20 minutes at a speed of 75 km/h.

(b) On the grid, complete the travel graph for Sam's journey.

(3)

(Total for Question 23 is 5 marks)

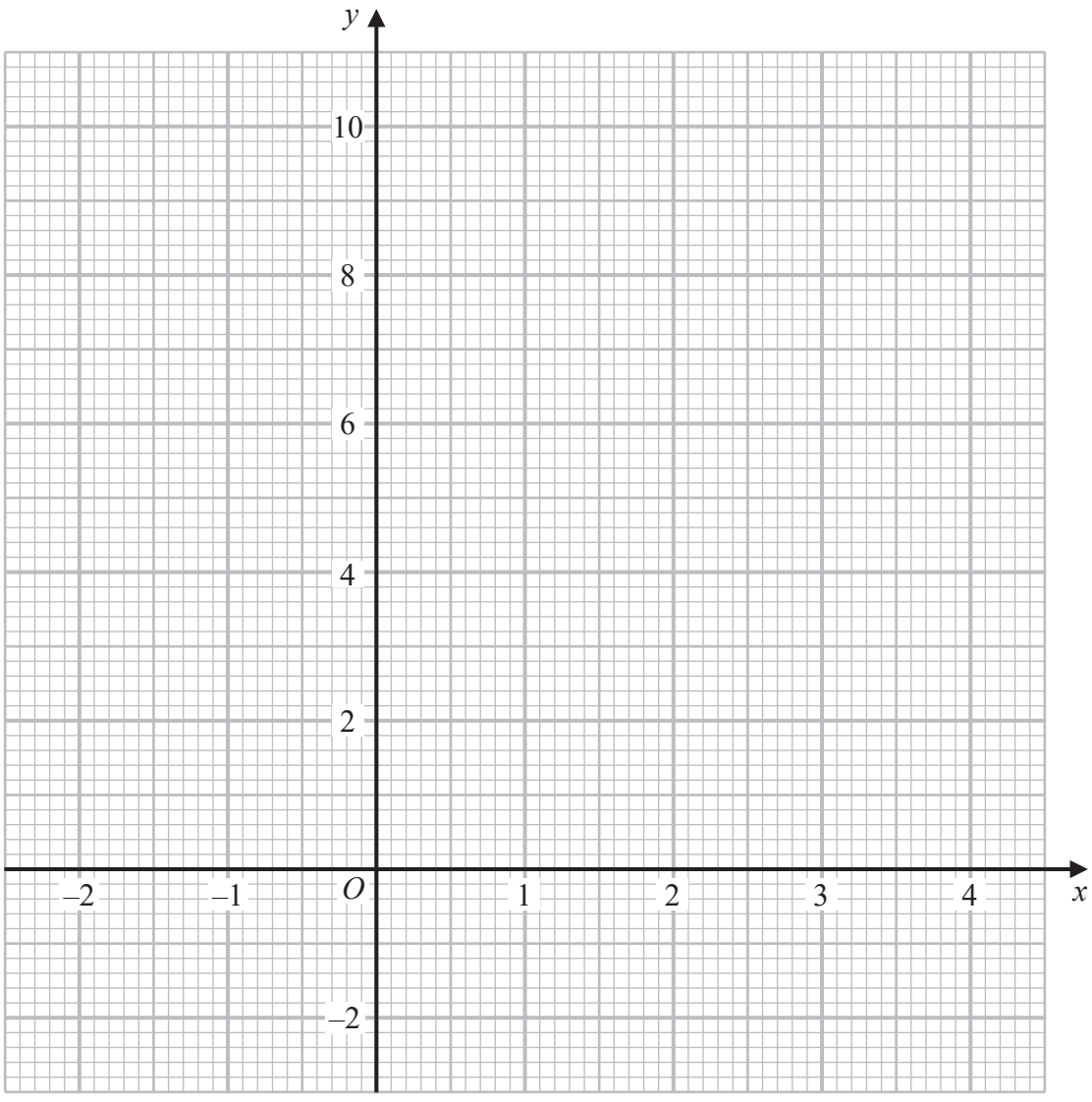
24 (a) Complete the table of values for $y = x^2 - 2x + 2$

x	–2	–1	0	1	2	3	4
y	10		2			5	

(2)

(b) On the grid, draw the graph of $y = x^2 - 2x + 2$ for values of x from –2 to 4

(2)



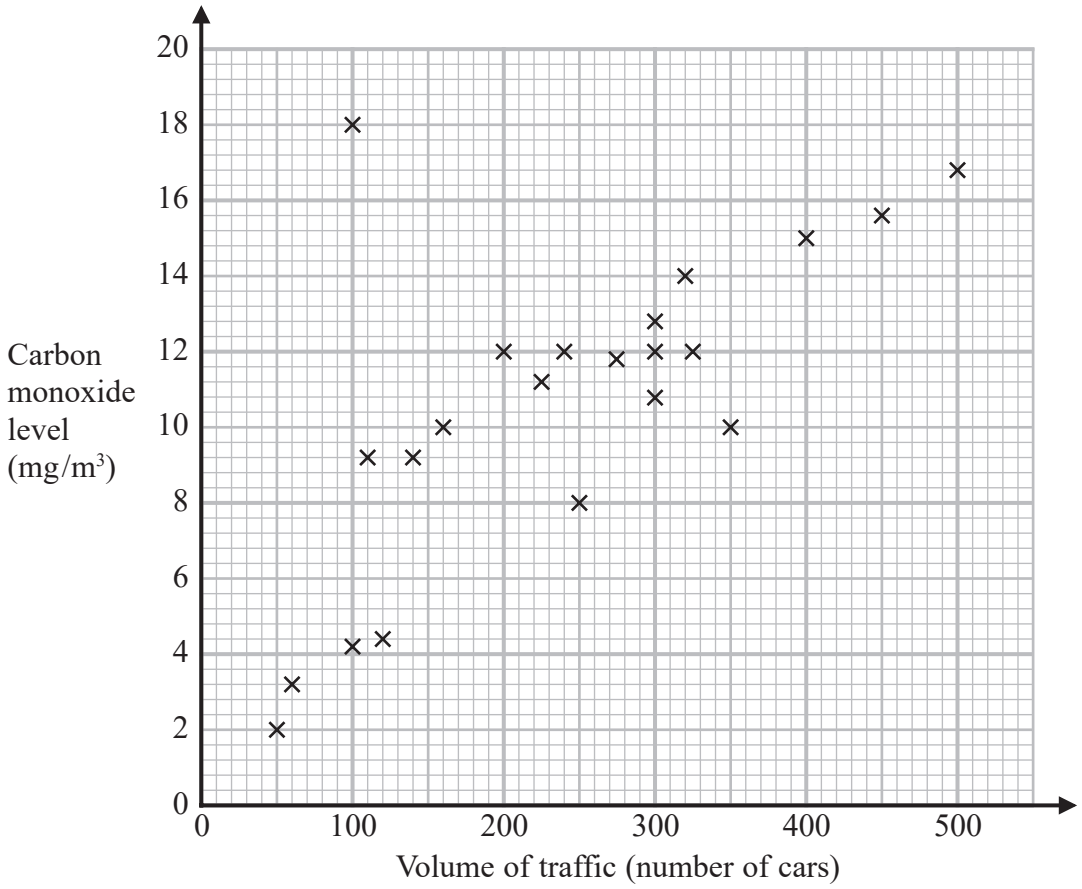
(c) Use your graph to find estimates of the solutions of the equation $x^2 - 2x + 2 = 4$

.....

(2)

(Total for Question 24 is 6 marks)

21 The scatter graph shows information about the volume of traffic and the carbon monoxide level at a point on a road each day for 22 days.



One point is an outlier.

(a) Write down the coordinates of this point.

(..... , ...)

(1)

For another day, 370 cars pass the point on the road.

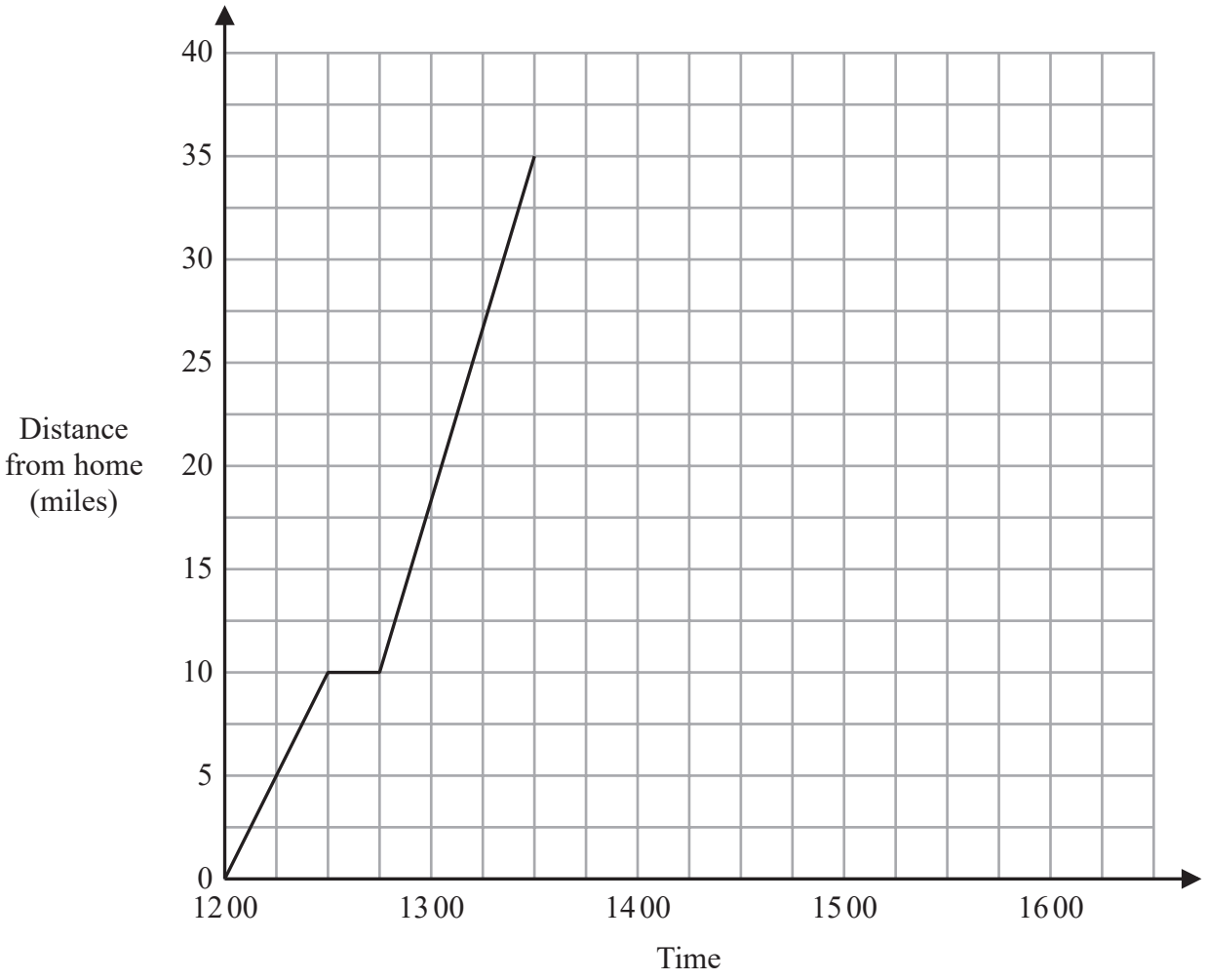
(b) Estimate the carbon monoxide level for this day.

..... mg/m³

(2)

13 Rowena drove from her home to a beach.

Here is a travel graph for her journey.



Rowena stopped at a cafe on her way to the beach.

(a) (i) How many minutes did Rowena take to drive to the cafe?

..... minutes

(1)

(ii) Write down the distance from Rowena's home to the cafe.

..... miles

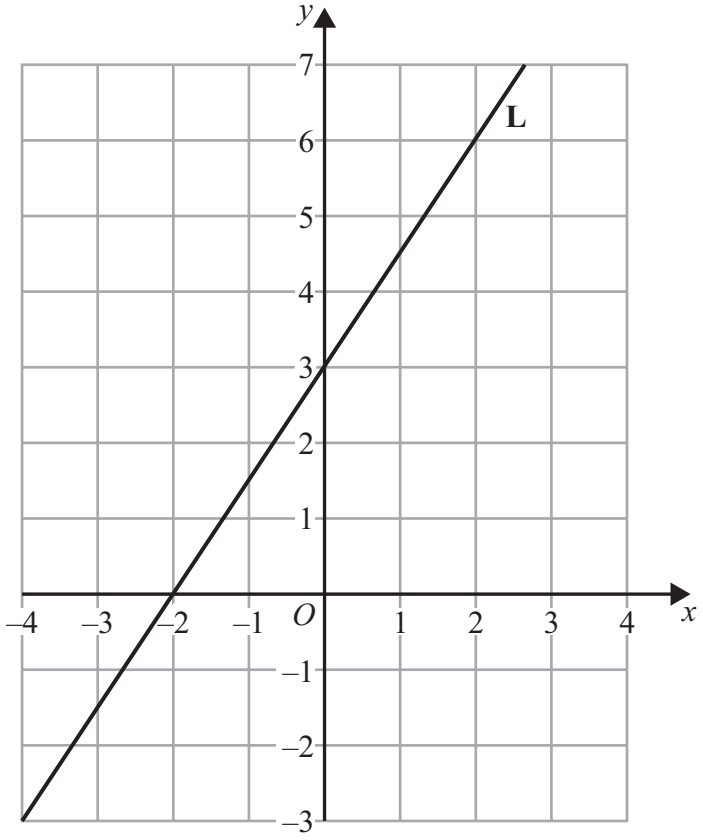
(1)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

25 Here is a straight line **L** drawn on a grid.



(a) Find an equation for **L**.

.....

(3)

M is a different straight line with equation $y = 5x$

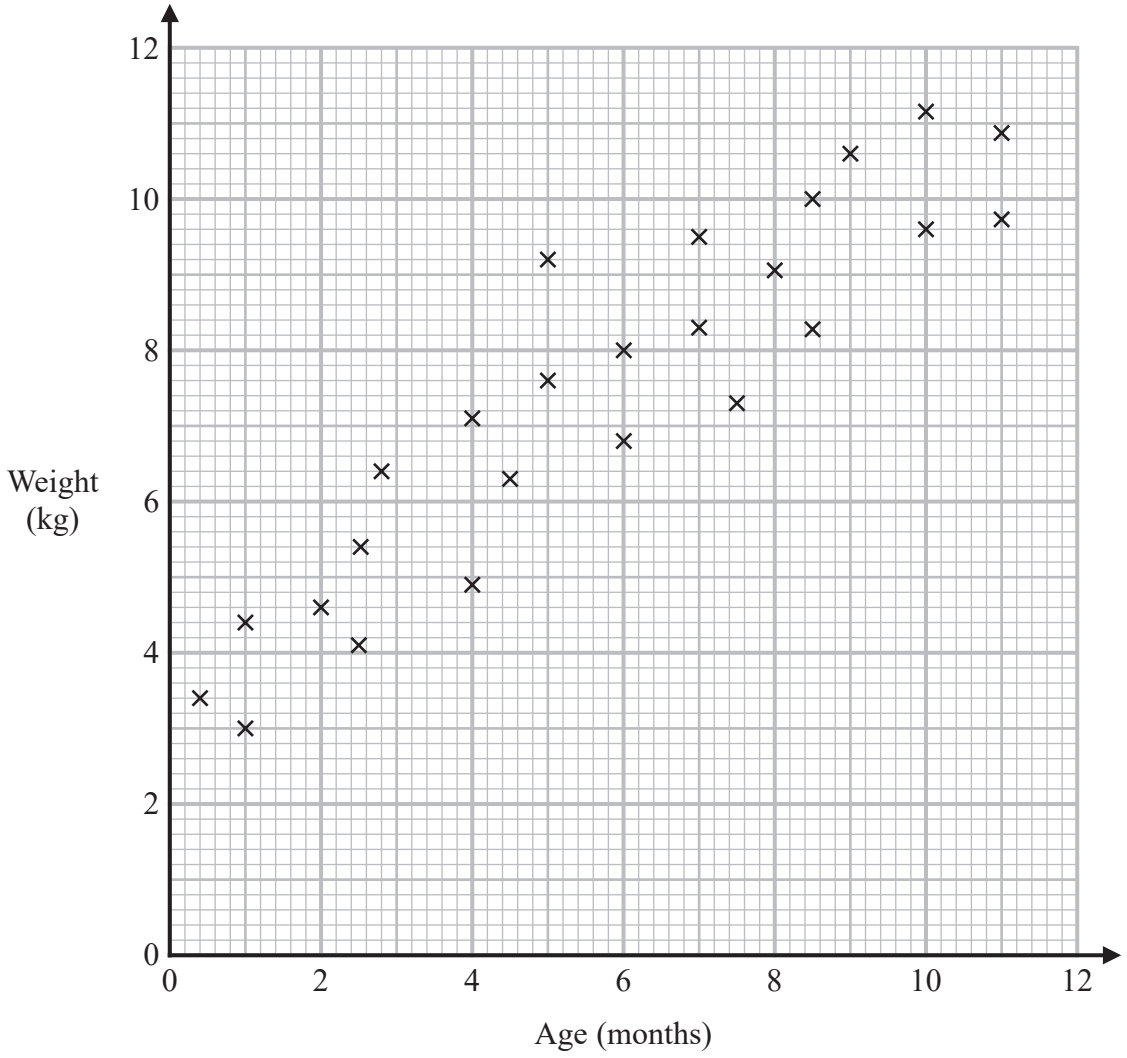
(b) Write down the equation of a straight line parallel to **M**.

.....

(1)

(Total for Question 25 is 4 marks)

25 The scatter graph shows information about the ages and weights of some babies.



(a) Describe the relationship between the age and the weight of the babies.

.....

.....

.....

(1)

Another baby has a weight of 5.8 kg

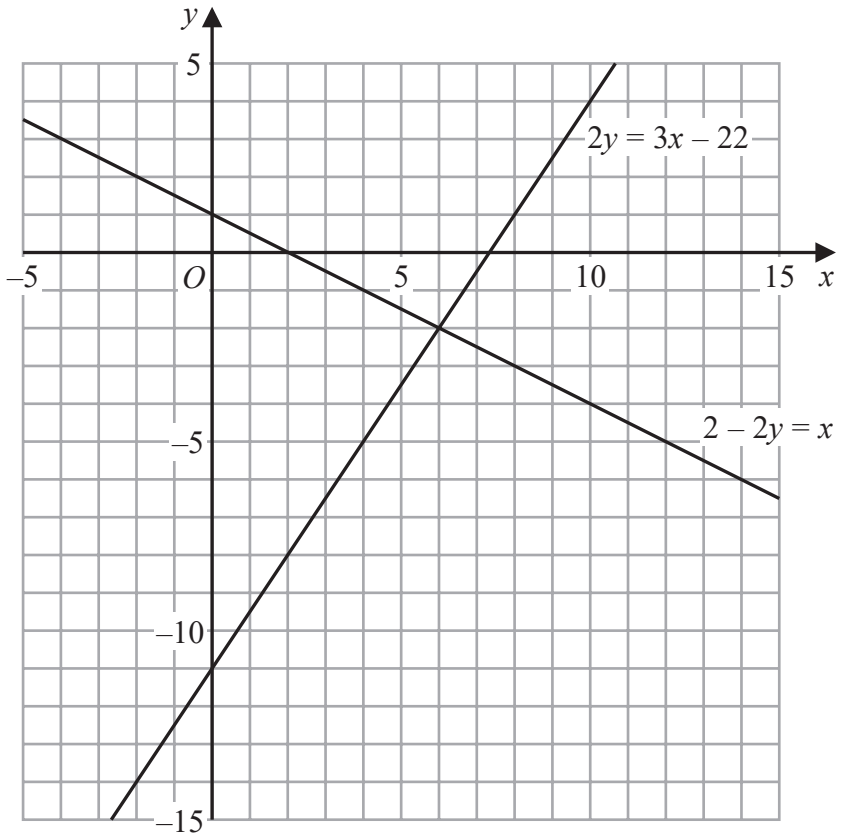
(b) Using the scatter graph, find an estimate for the age of this baby.

..... months

(2)

(Total for Question 25 is 3 marks)

28



Use these graphs to solve the simultaneous equations

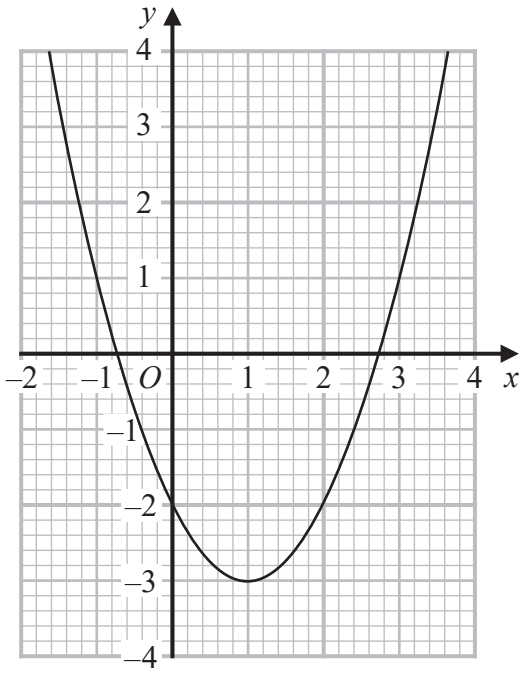
$$2 - 2y = x$$
$$2y = 3x - 22$$

$x =$ .....

$y =$ .....

(Total for Question 28 is 1 mark)

26 Here is the graph of $y = x^2 - 2x - 2$



(a) Write down the coordinates of the turning point on the graph of $y = x^2 - 2x - 2$

(..... , ...)

(1)

(b) Write down an estimate for one of the roots of $x^2 - 2x - 2 = 0$

.....

(1)

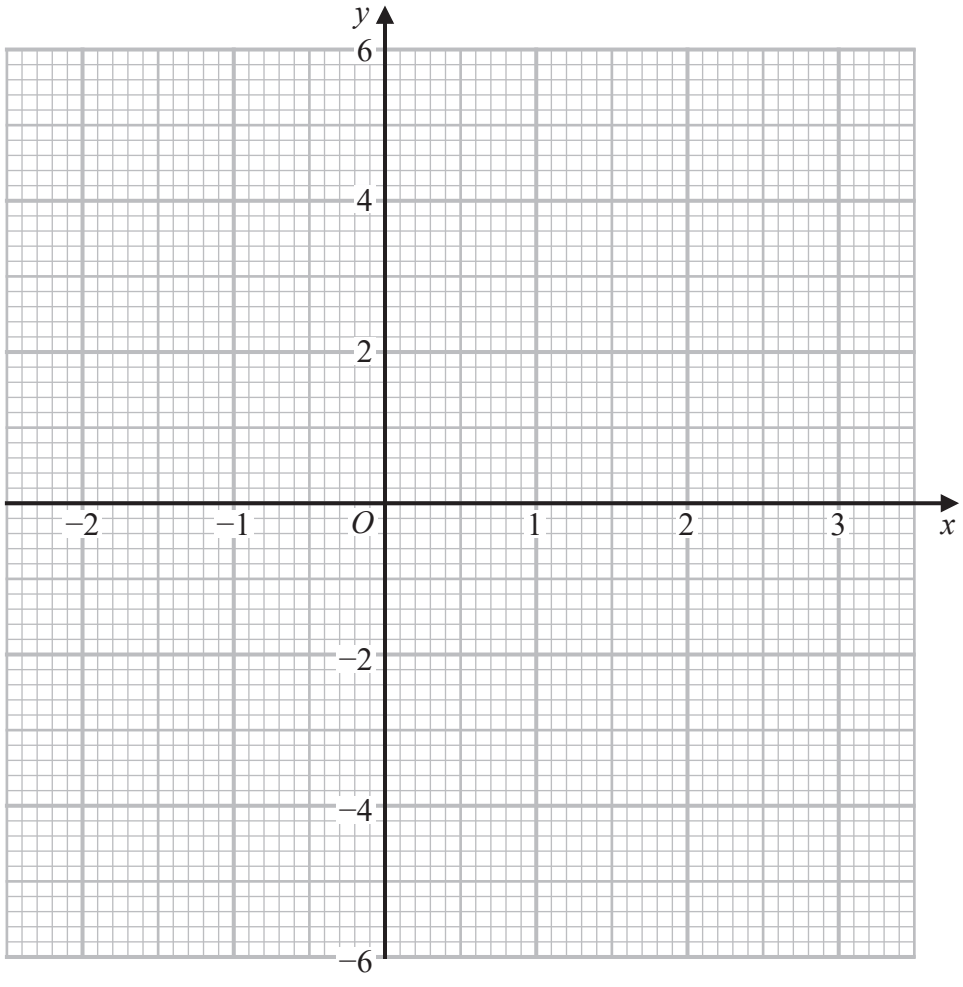
(Total for Question 26 is 2 marks)

20 (a) Complete the table of values for $y = x^2 - x - 2$

x	−2	−1	0	1	2	3
y	4			−2		

(2)

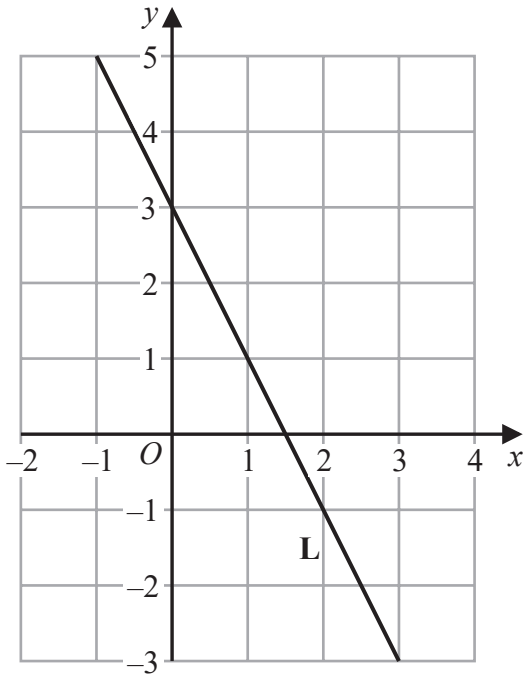
(b) On the grid, draw the graph of $y = x^2 - x - 2$ for values of x from −2 to 3



(2)

(Total for Question 20 is 4 marks)

28 The line **L** is shown on the grid.

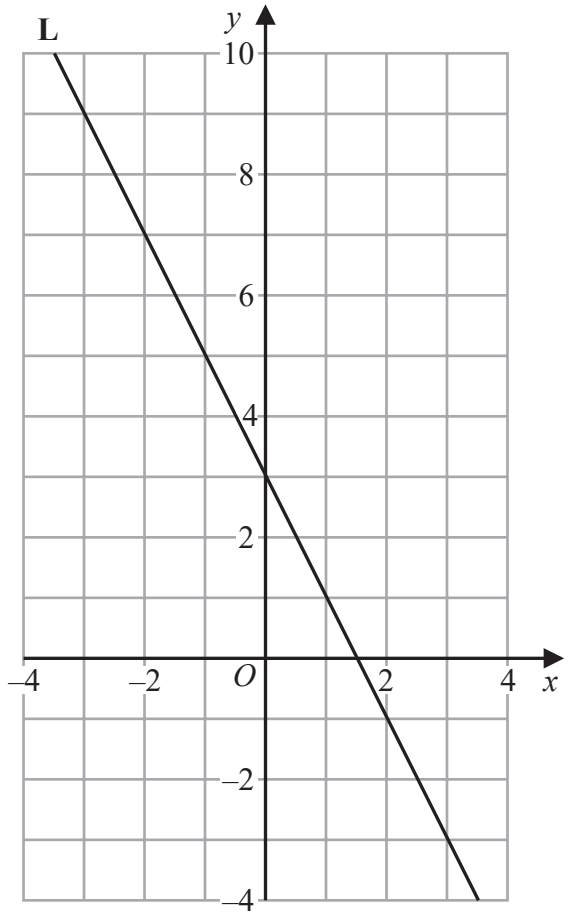


Find an equation for **L**.

.....

(Total for Question 28 is 3 marks)

27 Line **L** is drawn on the grid.



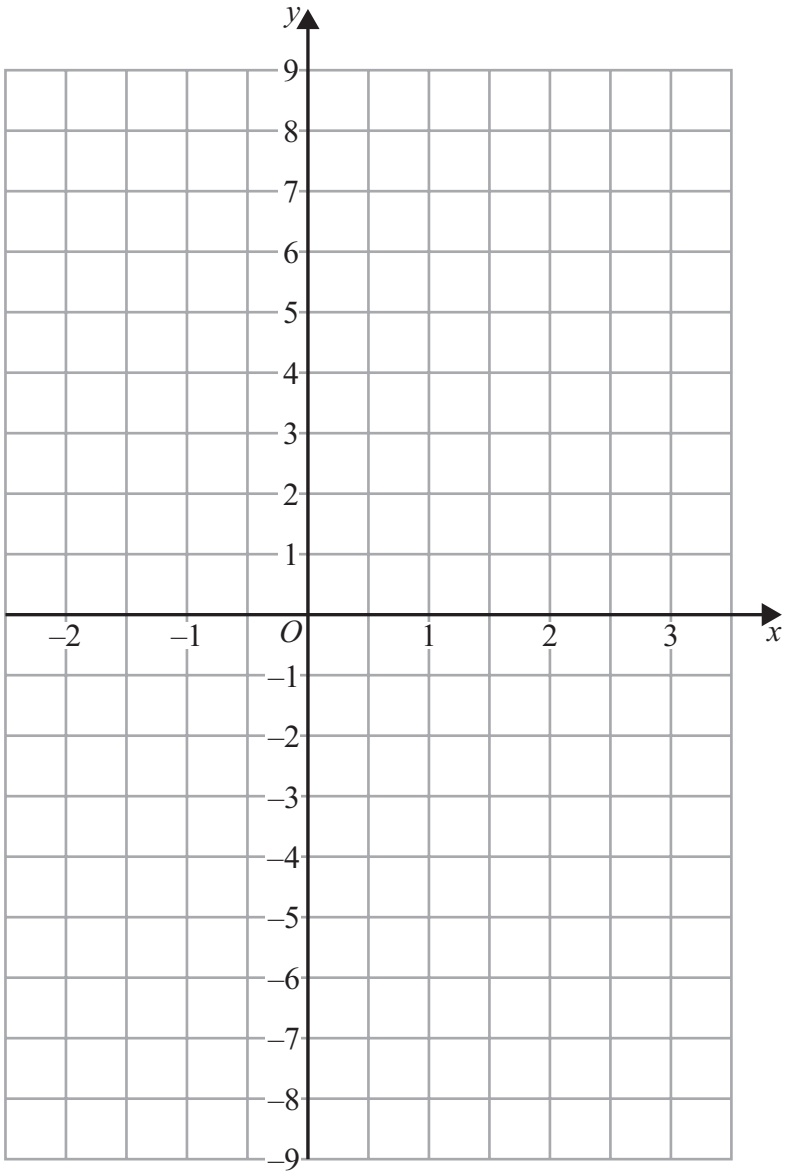
Find an equation for line **L**.

.....

(Total for Question 27 is 3 marks)

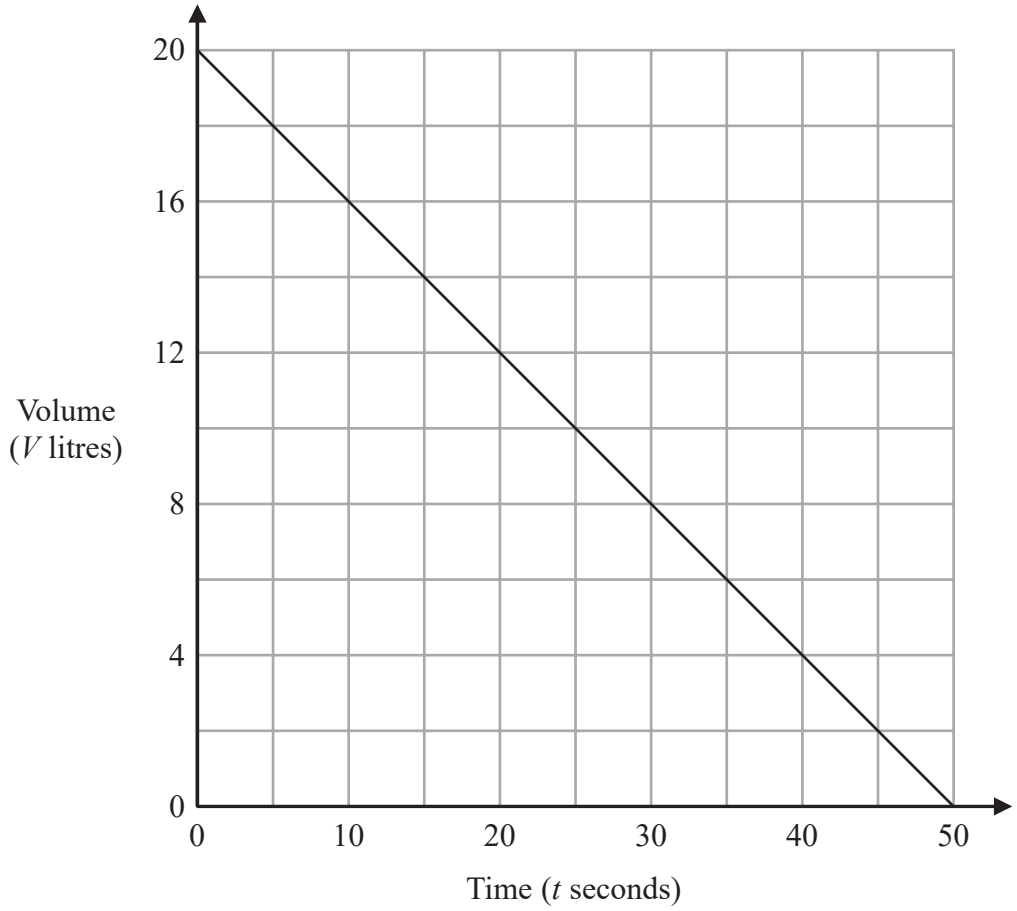
TOTAL FOR PAPER IS 80 MARKS

19 On the grid below, draw the graph of $y = 3x - 2$ for values of x from –2 to 3



(Total for Question 19 is 3 marks)

24 The graph shows the volume of water, V litres, in a tank at time t seconds.



What does the gradient of this graph represent?

.....

.....

.....

(Total for Question 24 is 1 mark)