

Write your name here

Surname

Other names

**Pearson**  
**Edexcel GCSE**

Centre Number

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Candidate Number

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**November 2016**  
**Predicted Paper 1**

**Higher Tier**

**Time: 1 hour 45 minutes**

Paper Reference

**1MA0/1H**

**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.*
- **Calculators must not be used.**

### Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed.

### Advice

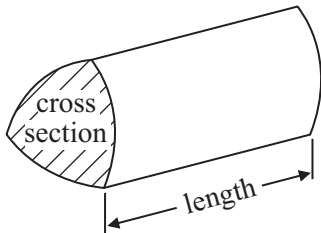
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

## GCSE Mathematics 1MA0

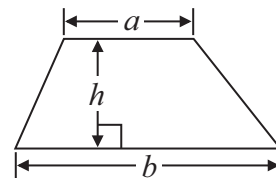
Formulae: Higher Tier

**You must not write on this formulae page.  
Anything you write on this formulae page will gain NO credit.**

**Volume of prism** = area of cross section  $\times$  length

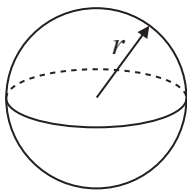


**Area of trapezium** =  $\frac{1}{2} (a + b)h$



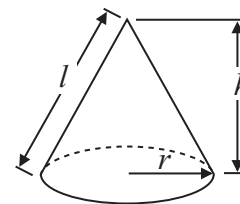
**Volume of sphere** =  $\frac{4}{3} \pi r^3$

**Surface area of sphere** =  $4\pi r^2$

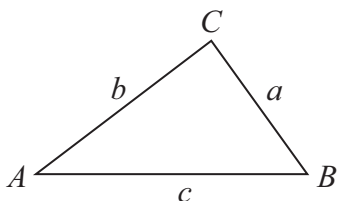


**Volume of cone** =  $\frac{1}{3} \pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



**In any triangle ABC**



**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$   
where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Sine Rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2} ab \sin C$

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

- 1** Here are the ingredients needed to make leek and potato soup for 4 people.

<p><b>Leek and potato soup</b></p> <p><b>Serves 4</b></p> <p>4 leeks</p> <p>350 g potatoes</p> <p>600 ml vegetable stock</p> <p>300 ml milk</p>
---

Jenny wants to make soup for 6 people.

Work out the amount of each ingredient she needs.

..... leeks

..... g potatoes

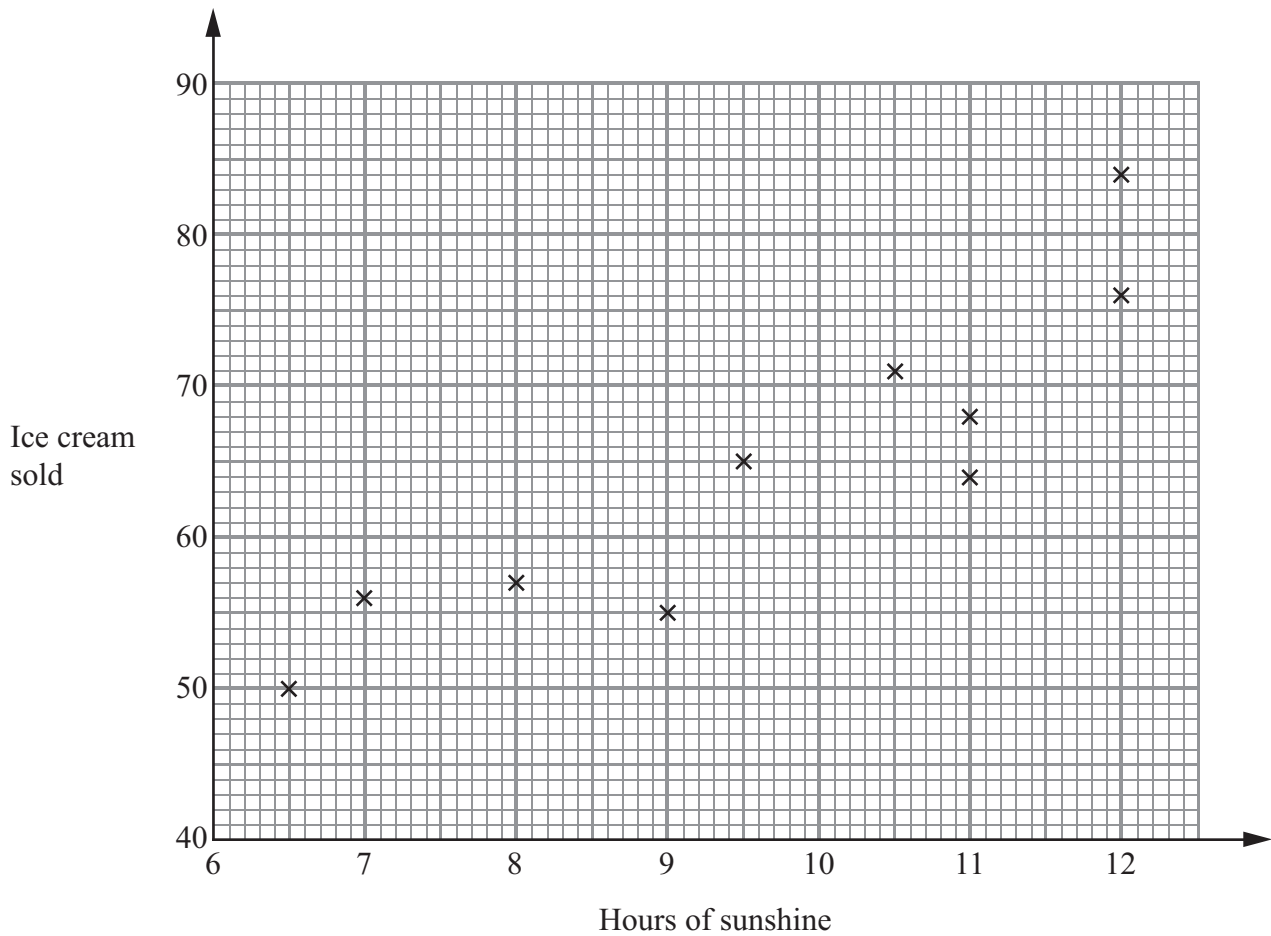
..... ml vegetable stock

..... ml milk

**(Total for Question 1 is 3 marks)**

- 2 A beach cafe sells ice creams.  
Each day the manager records the number of hours of sunshine and the number of ice creams sold.

The scatter graph shows this information.



On another day there were 11.5 hours of sunshine and 73 ice creams sold.

- (a) Show this information on the scatter graph.

(1)

- (b) Describe the relationship between the number of hours of sunshine and the number of ice creams sold.

(1)

One day had 10 hours of sunshine.

- (c) Estimate how many ice creams were sold.

(2)

(Total for Question 2 is 4 marks)

3 Richard's car uses 1 litre of petrol every 8 miles.  
Petrol costs £1.30 per litre.

Richard drives 240 miles.

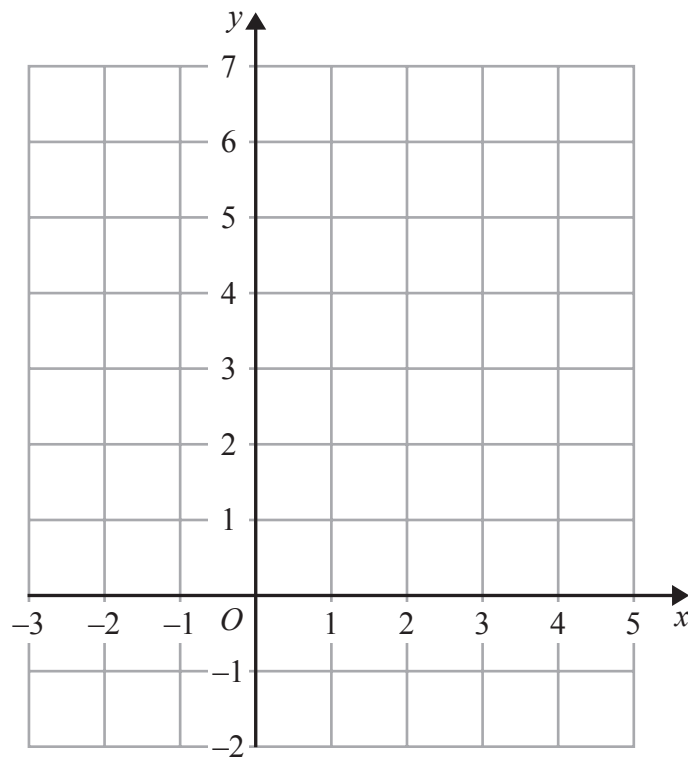
Work out the total cost of the petrol the car uses.

£ .....

---

**(Total for Question 3 is 3 marks)**

4 On the grid, draw the graph of  $y = \frac{1}{2}x + 3$  for values of  $x$  from  $-2$  to  $4$



(Total for Question 4 is 3 marks)

5 The diagram shows the position of town  $A$ .



Scale: 1 cm represents 10 km

Town  $B$  is 64 km from town  $A$  on a bearing of  $070^\circ$ .

Mark the position of town  $B$ , with a cross ( $\times$ ).

Use a scale of 1 cm represents 10 km.

**(Total for Question 5 is 2 marks)**

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6 James wants to find out how long his friends spend using the internet.

He uses this question on his questionnaire.

How many hours do you spend using the internet?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1 – 5	5 – 10	10 – 20

(a) Write down two things wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Write a better question for James to use on his questionnaire to find out how long his friends spend using the internet.

(2)

**(Total for Question 6 is 4 marks)**



7 (a) Express 48 as a product of its prime factors.

.....  
(2)

Buses to Exeter leave a bus station every 20 minutes.

Buses to Plymouth leave the bus station every 16 minutes.

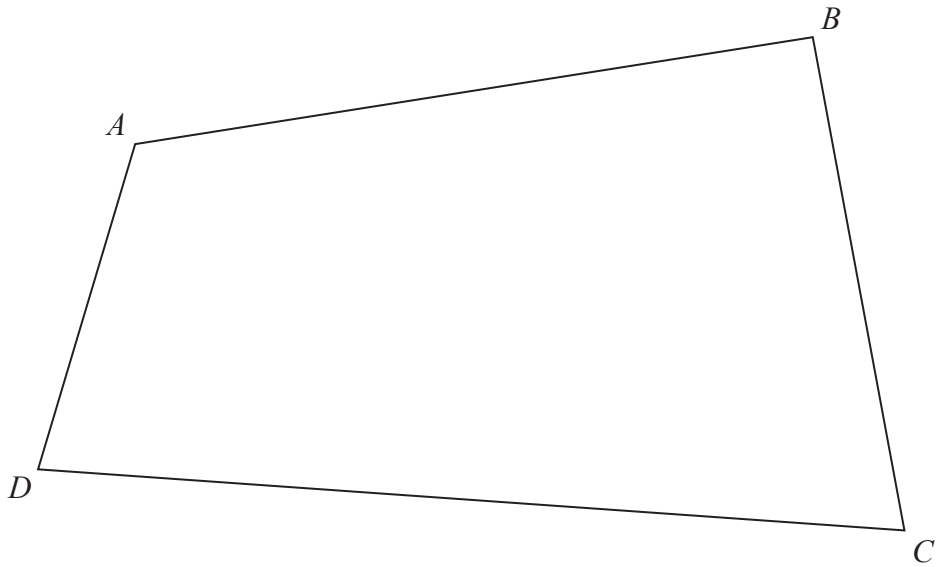
A bus to Exeter and a bus to Plymouth both leave the bus station at 8am.

(b) When will buses to Exeter and to Plymouth next leave the bus station at the same time?

.....  
(3)

.....  
**(Total for Question 7 is 5 marks)**

8 The diagram shows the plan of a park.



Scale: 1 cm represents 100 m

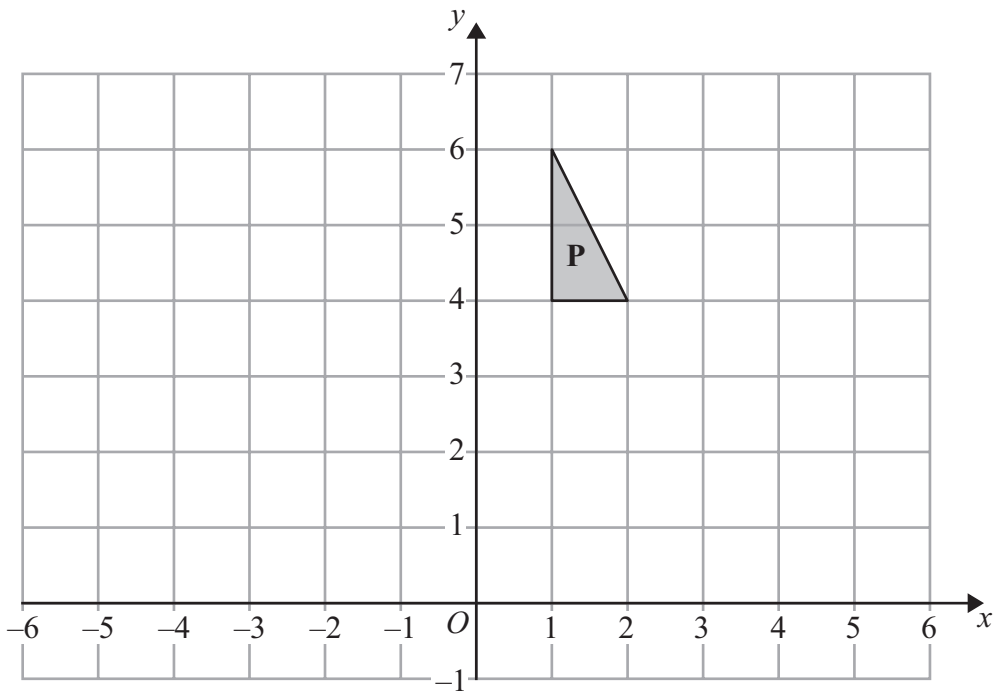
A fountain in the park is equidistant from *A* and from *C*.  
The fountain is exactly 700 m from *D*.

On the diagram, mark the position of the fountain with a cross (X).

**(Total for Question 8 is 3 marks)**

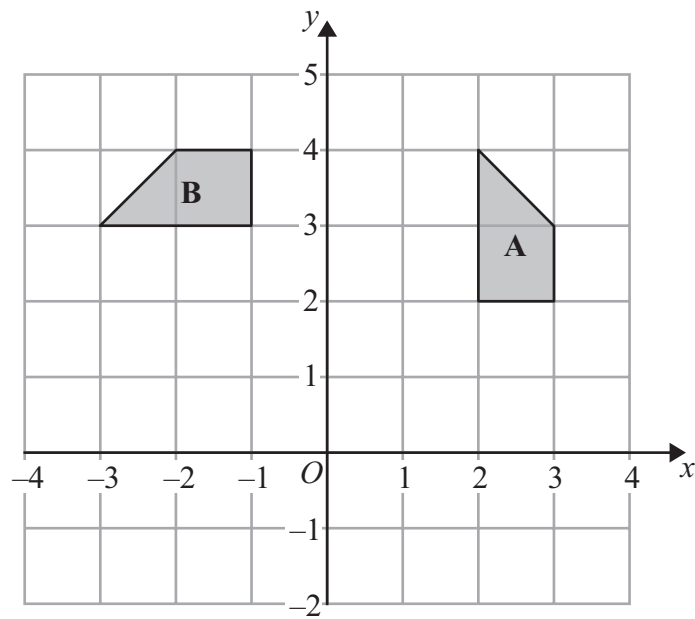
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9



(a) Reflect shape **P** in the line  $x = 3$

(2)



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

.....

.....

.....

(3)

(Total for Question 9 is 5 marks)

\*10 The diagram shows the plan of Mrs Phillips' living room.

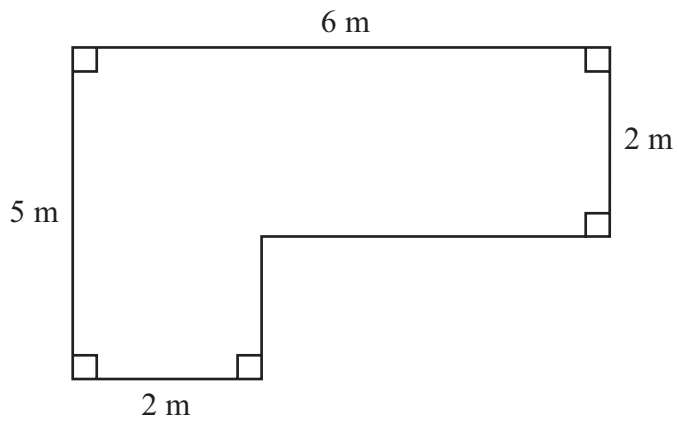


Diagram **NOT**  
accurately drawn

Mrs Phillips is going to cover the floor with floor boards.  
One pack of floor boards will cover  $2.5 \text{ m}^2$ .

How many packs of floor boards does she need?  
You must show your working.

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(Total for Question 10 is 4 marks)

11 Here is an equilateral triangle.

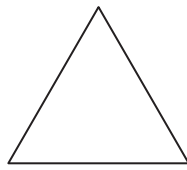
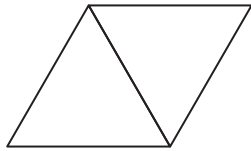


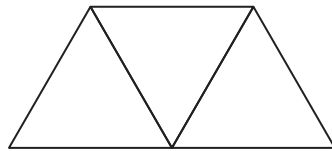
Diagram **NOT**  
accurately drawn

The equilateral triangle has a perimeter of 24 cm.

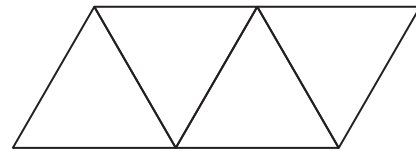
Some of these equilateral triangles are used to make this sequence of quadrilaterals.



quadrilateral 1



quadrilateral 2



quadrilateral 3

Find an expression for the perimeter, in centimetres, of quadrilateral  $n$ .

.....  
**(Total for Question 11 is 3 marks)**

**12** Kevin wants to get the ferry to Ireland.

A ferry crossing costs

£125 on Saturdays

£109 on Mondays

Kevin has a voucher for 15% off the cost of a ferry crossing on Mondays.

Kevin can go on Saturday without using the voucher or on Monday using the voucher.

What is the difference in the cost of the ferry crossing if Kevin goes on Monday rather than on Saturday?

£.....

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**(Total for Question 12 is 3 marks)**

13 The diagram shows a prism.

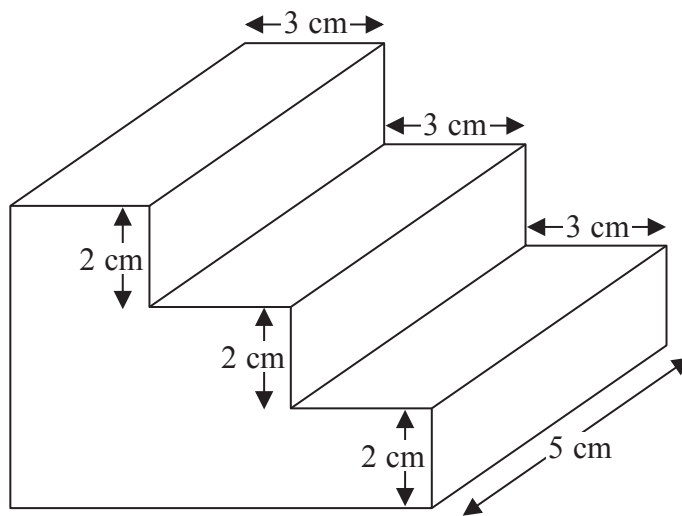


Diagram **NOT**  
accurately drawn

All the corners are right angles.

Work out the volume of the prism.

.....cm<sup>3</sup>

(Total for Question 13 is 3 marks)

14 Lyndsey records the number of miles ( $m$ ) she drives each day for 120 days.

Some information about the results is given in the table.

Distance ( $m$ miles)	Frequency
$0 < m \leq 10$	4
$10 < m \leq 20$	18
$20 < m \leq 30$	24
$30 < m \leq 40$	40
$40 < m \leq 50$	24
$50 < m \leq 60$	10

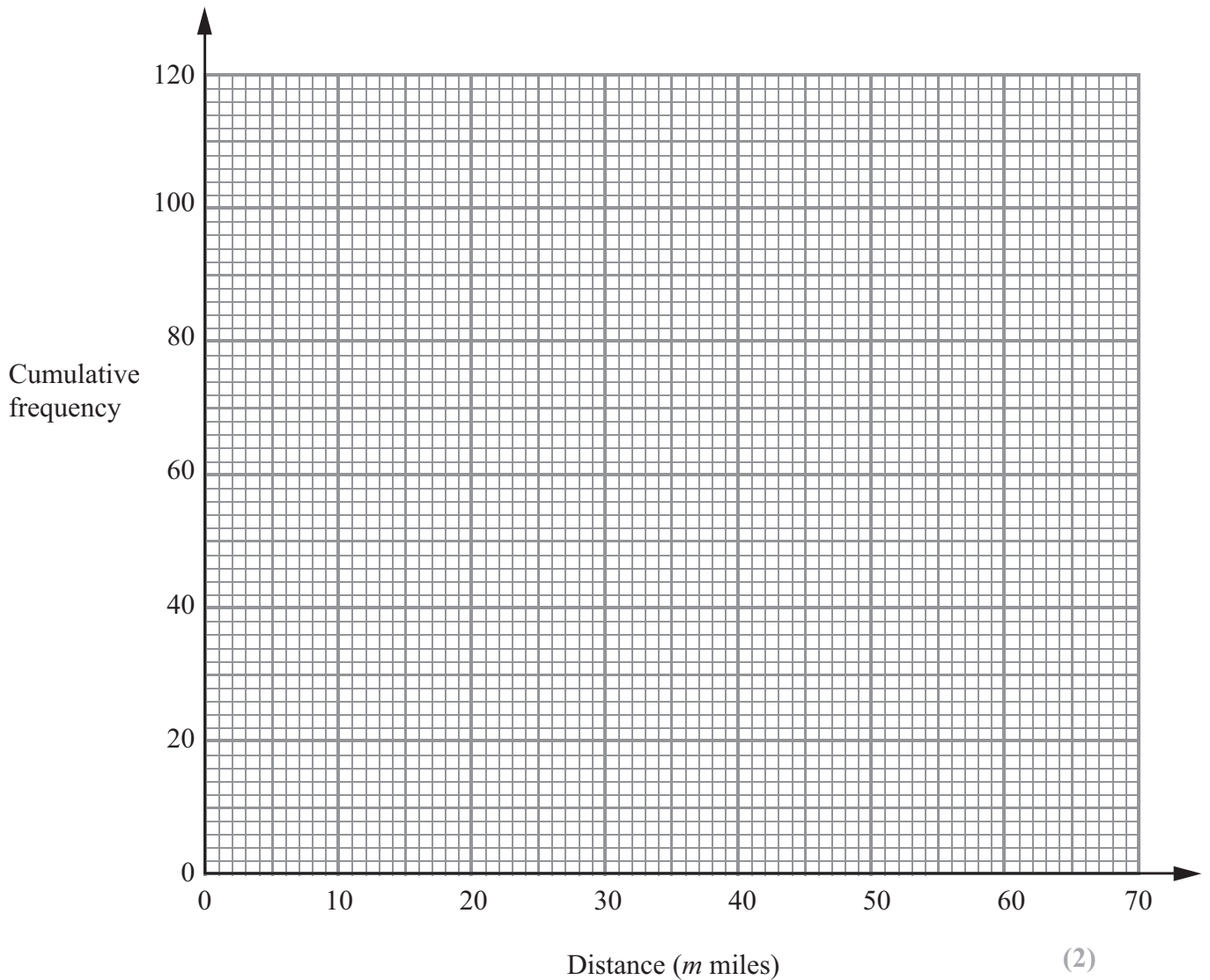
(a) Complete the cumulative frequency table.

Distance ( $m$ miles)	Cumulative frequency
$0 < m \leq 10$	
$0 < m \leq 20$	
$0 < m \leq 30$	
$0 < m \leq 40$	
$0 < m \leq 50$	
$0 < m \leq 60$	

(1)



(b) On the grid, draw a cumulative frequency graph.



(c) Work out an estimate for the number of days on which Lyndsey drives more than 36 miles.

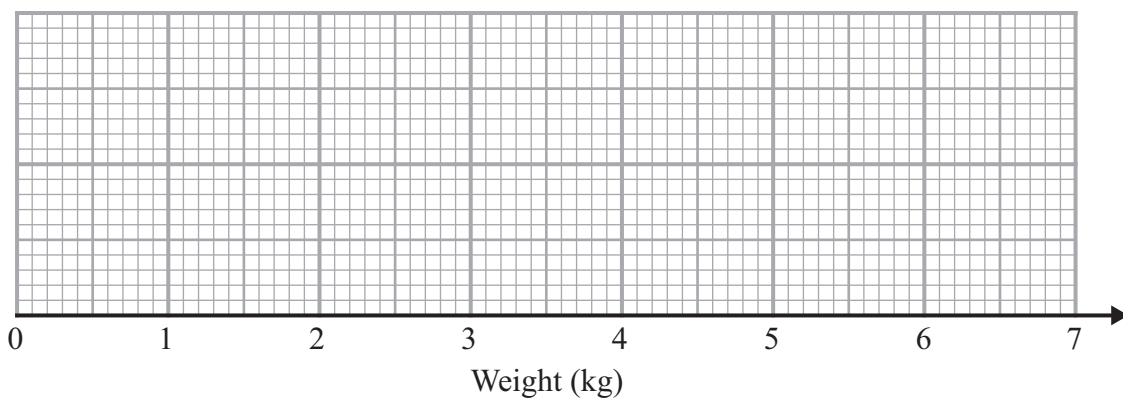
..... days  
(2)

**(Total for Question 14 is 5 marks)**

15 The table gives some information about the weights of 60 babies.

Lowest	2.0 kg
Highest	6.5 kg
Lower quartile	2.8 kg
Upper quartile	4.2 kg
Median	3.0 kg

(a) Draw a box plot to show this information.



(2)

There are 60 babies.

(b) Work out an estimate for the number of these babies with a weight greater than 2.8 kg.

.....  
(2)

**(Total for Question 15 is 4 marks)**

16 (a) Factorise  $3t + 12$

.....  
(1)

(b) (i) Expand and simplify  $7(2x + 1) + 6(x + 3)$

.....  
(ii) Show that when  $x$  is a whole number

$$7(2x + 1) + 6(x + 3)$$

is always a multiple of 5

(3)

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**(Total for Question 16 is 4 marks)**

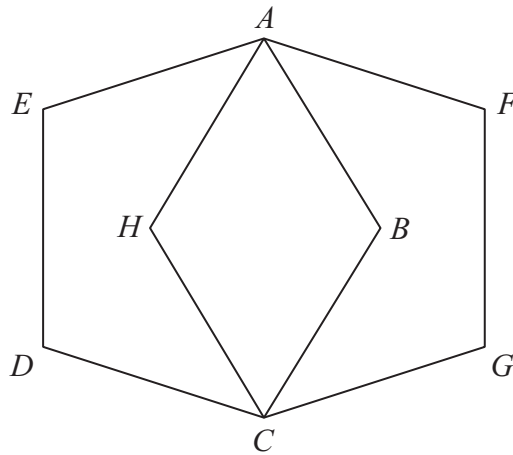


Diagram **NOT**  
accurately drawn

$ABCDE$  and  $AFGCH$  are regular pentagons.  
The two pentagons are the same size.

Work out the size of angle  $EAH$ .  
You must show how you got your answer.

o

(Total for Question 17 is 4 marks)

\*18

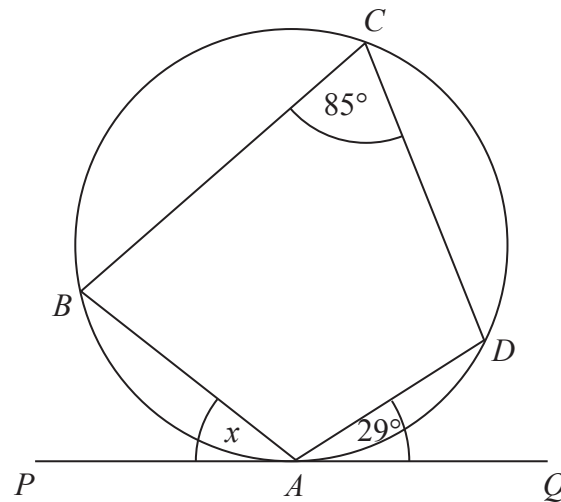


Diagram **NOT**  
accurately drawn

In the diagram,

- the points  $A$ ,  $B$ ,  $C$  and  $D$  are on the circumference of a circle
- the line  $PAQ$  is a tangent to the circle
- angle  $DAQ = 29^\circ$
- angle  $BCD = 85^\circ$

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

(Total for Question 18 is 3 marks)

19 Here is a shape.

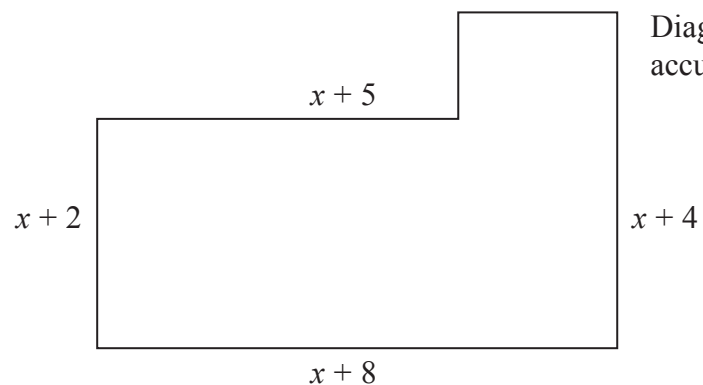


Diagram **NOT**  
accurately drawn

All the measurements are in centimetres.  
All the corners are right angles.

The area of the shape is  $A$  cm<sup>2</sup>.

Find a formula for  $A$  in terms of  $x$ .  
Give your answer in its simplest form.

$A =$  .....

**(Total for Question 19 is 4 marks)**

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**20** Solve the simultaneous equations

$$3x - 2y = 7$$

$$7x + 2y = 13$$

---

**(Total for Question 20 is 3 marks)**

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**22** The straight line **L** has equation  $y = 3x - 4$

(a) Write down an equation of the line parallel to **L** which passes through the origin.

.....  
(2)

(b) Find an equation of the straight line that passes through (0, 5) and is perpendicular to **L**.

.....  
(2)

---

**(Total for Question 22 is 4 marks)**

23 (a) Express  $5\sqrt{27}$  in the form  $n\sqrt{3}$ , where  $n$  is a positive integer.

.....  
(2)

(b) Rationalise the denominator of  $\frac{21}{\sqrt{3}}$

.....  
(2)

**(Total for Question 23 is 4 marks)**

---

24 (a) Write down the value of  $27^{\frac{1}{3}}$

.....  
(1)

(b) Find the value of  $25^{-\frac{1}{2}}$

.....  
(2)

**(Total for Question 24 is 3 marks)**

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25 (a) Simplify  $\frac{2y-12}{y^2-8y+12}$

.....  
(3)

(b) Write as a single fraction  $\frac{3}{x-4} - \frac{1}{x+5}$

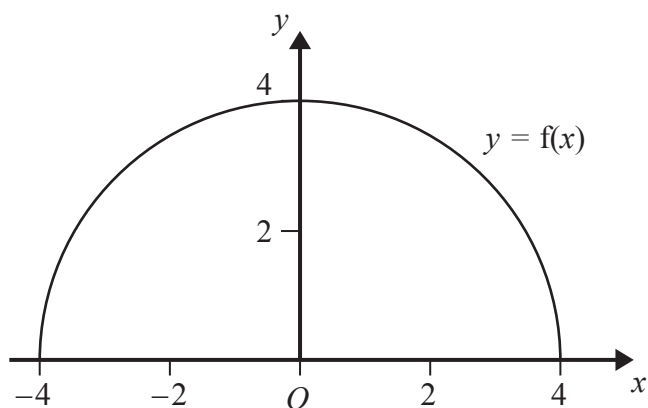
.....  
(2)

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**(Total for Question 25 is 5 marks)**

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26 Here is the graph of  $y = f(x)$ .



(a) Write down the coordinates of the point where the graph of  $y = f(x) - 3$  meets the  $y$ -axis.

(....., .....)  
(1)

The graph of  $y = f(4x)$  meets the  $x$ -axis at the points  $P$  and  $Q$ .

(b) Work out the length of the line segment  $PQ$ .

.....  
(2)

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(Total for Question 26 is 3 marks)

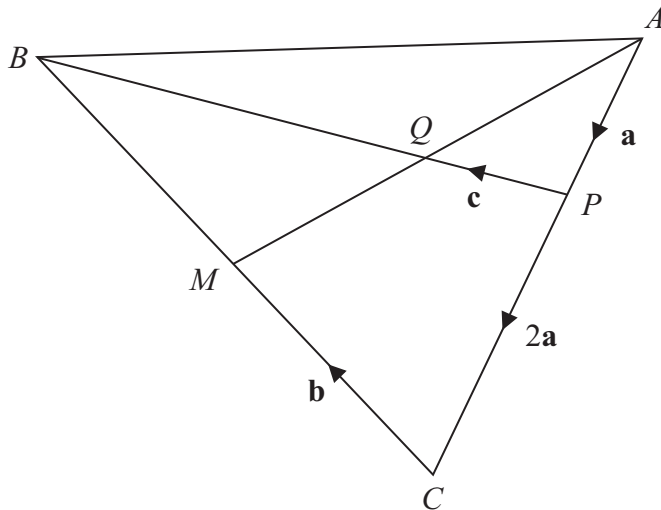


Diagram **NOT**  
accurately drawn

$M$  is the midpoint of  $BC$ .  
 $Q$  is the midpoint of  $AM$ .

$$\vec{AP} = \mathbf{a} \quad \vec{PC} = 2\mathbf{a} \quad \vec{CM} = \mathbf{b} \quad \vec{PQ} = \mathbf{c}$$

(a) Find  $\vec{AM}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ .

$$\vec{AM} = \dots\dots\dots (1)$$

(b) Find  $\vec{QB}$  in terms of  $\mathbf{c}$ .

$$\vec{QB} = \dots\dots\dots (4)$$

(Total for Question 27 is 5 marks)