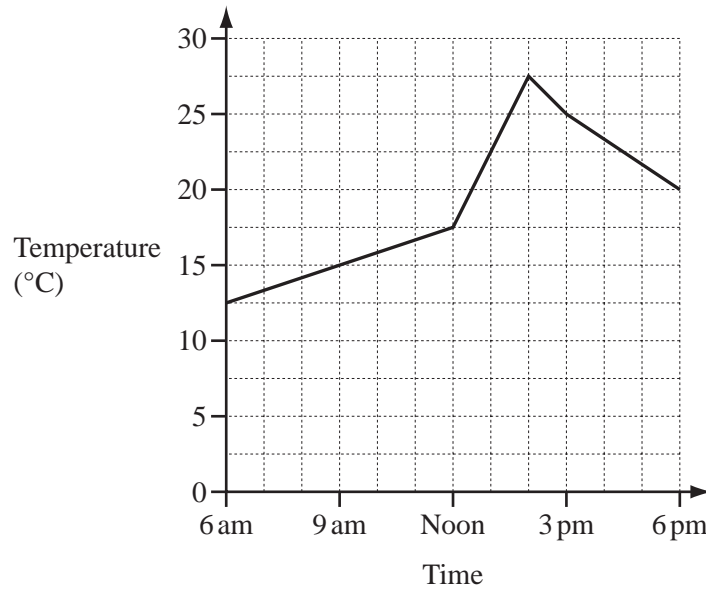


1



The graph shows the temperature in Paris from 6 am to 6 pm one day.

(a) What was the temperature at 9 am?

Answer(a) ..... °C [1]

(b) Between which two times was the temperature decreasing?

Answer(b) ..... and ..... [1]

(c) Work out the difference between the maximum and minimum temperatures shown.

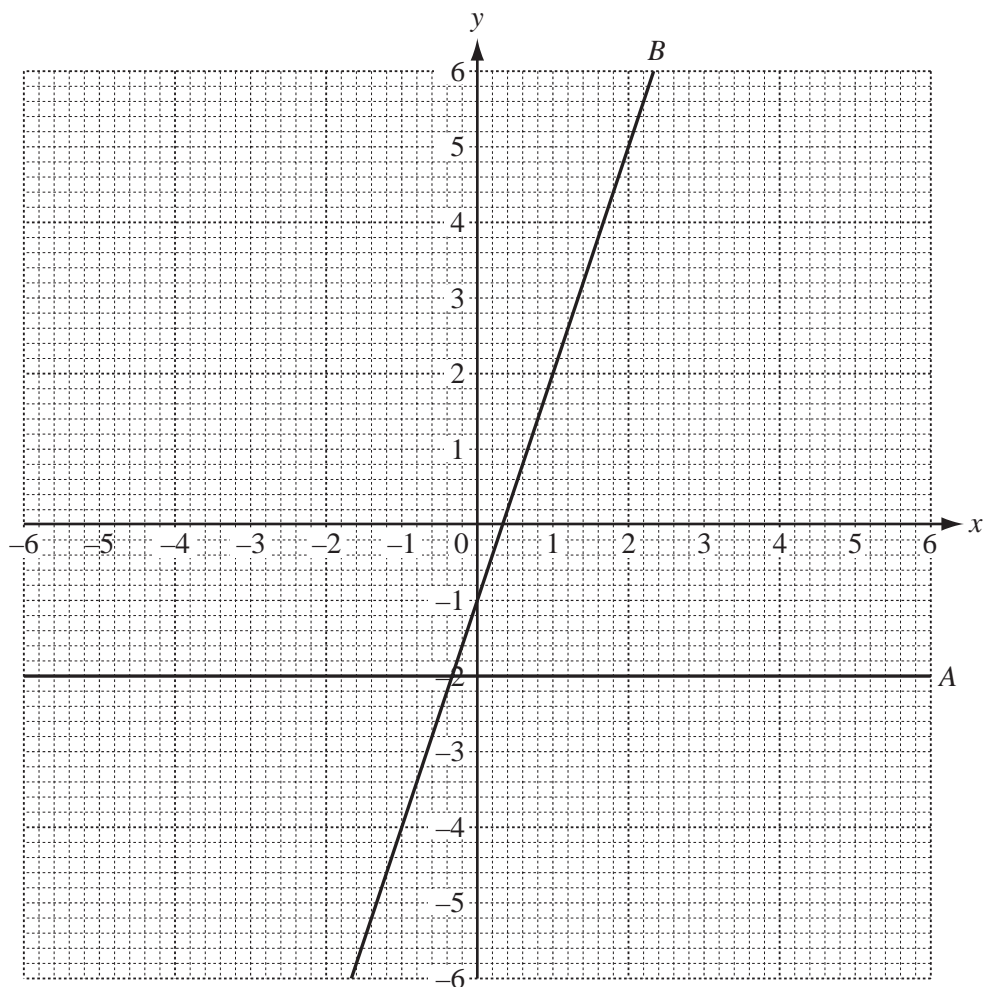
Answer(c) ..... °C [1]

2 Solve these simultaneous equations.

$$\begin{aligned} 5x - 2y &= 17 \\ 2x + y &= 5 \end{aligned}$$

Answer  $x =$  .....

$y =$  ..... [3]



The diagram shows two straight lines,  $A$  and  $B$ , drawn on a grid.

(a) Write down the equation of line  $A$ .

Answer(a) ..... [1]

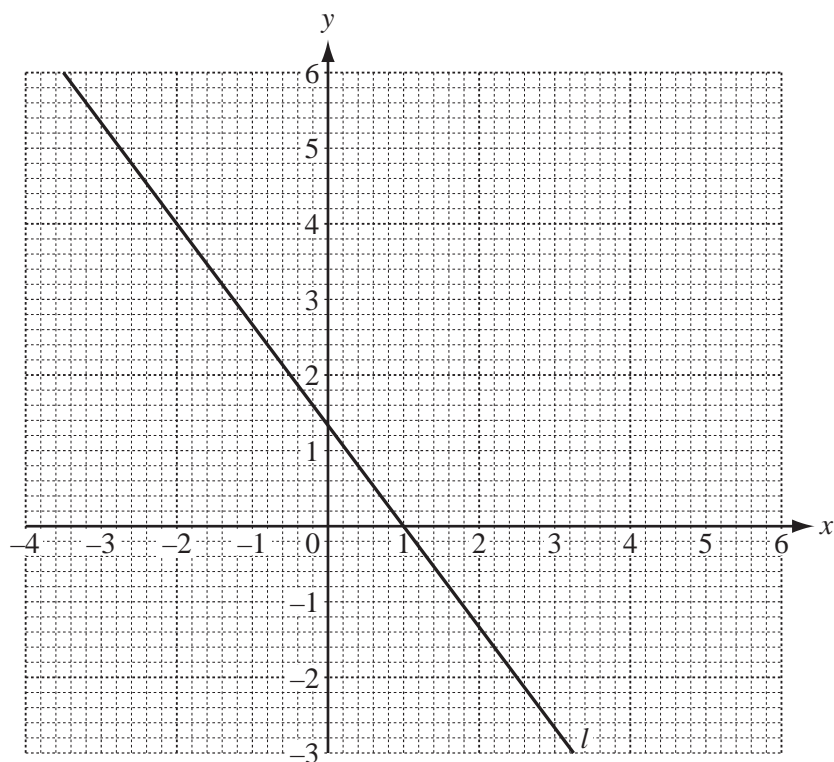
(b) The equation of line  $B$  is  $y = 3x - 1$ .

(i) Draw a line parallel to line  $B$  that passes through the point  $(0, 2)$ . [1]

(ii) Write down the equation of your line in the form  $y = mx + c$ .

Answer(b)(ii)  $y =$  ..... [2]

5



(a) Find the gradient of the line  $l$ .

Answer(a) ..... [2]

(b) (i) Complete the table below for  $x + 2y = 6$ .

$x$	0	2	
$y$			0

[3]

(ii) On the grid, draw the line  $x + 2y = 6$  for  $-4 \leq x \leq 6$ . [2]

(c) The equation of the line  $l$  is  $4x + 3y = 4$ .

Use your diagram to solve the simultaneous equations  $4x + 3y = 4$  and  $x + 2y = 6$ .

Answer(c)  $x =$  .....

$y =$  ..... [2]

- 7 (a) Solve the equation  $2(x + 4) = 3(x + 2) + 8$ .

*Answer(a)*  $x =$  ..... [3]

- (b) Make  $z$  the subject of  $za + b = 3$ .

*Answer(b)*  $z =$  ..... [2]

- (c) Find  $x$  when  $2x^3 = 54$ .

*Answer(c)*  $x =$  ..... [2]



- (d) A rectangular field has a length of  $x$  metres.  
The width of the field is  $(2x - 5)$  metres.

- (i) Show that the perimeter of the field is  $(6x - 10)$  metres.

*Answer (d)(i)*

[2]

- (ii) The perimeter of the field is 50 metres.

Find the length of the field.

*Answer(d)(ii)* length = ..... m [2]

---

- 9 (a) Factorise completely  $3x^2 + 12x$ .

*Answer(a)* ..... [2]

- (b) Find the value of  $a^3 + 3b^2$  when  $a = 2$  and  $b = -2$ .

*Answer(b)* ..... [2]

- (c) Simplify  $3x^4 \times 2x^3$ .

*Answer(c)* ..... [2]

---

- 4 (a) Expand and simplify  $3(2x + y) + 5(x - y)$ .

*Answer(a)* ..... [2]

- (b) Expand  $x^2(3x - 2y)$ .

*Answer(b)* ..... [2]

- (c) Factorise completely  $4y^2 - 10xy$ .

*Answer(c)* ..... [2]

(d)  $y = \frac{4x^2}{3}$

- (i) Find the value of  $y$  when  $x = -3$ .

*Answer(d)(i)*  $y =$  ..... [2]

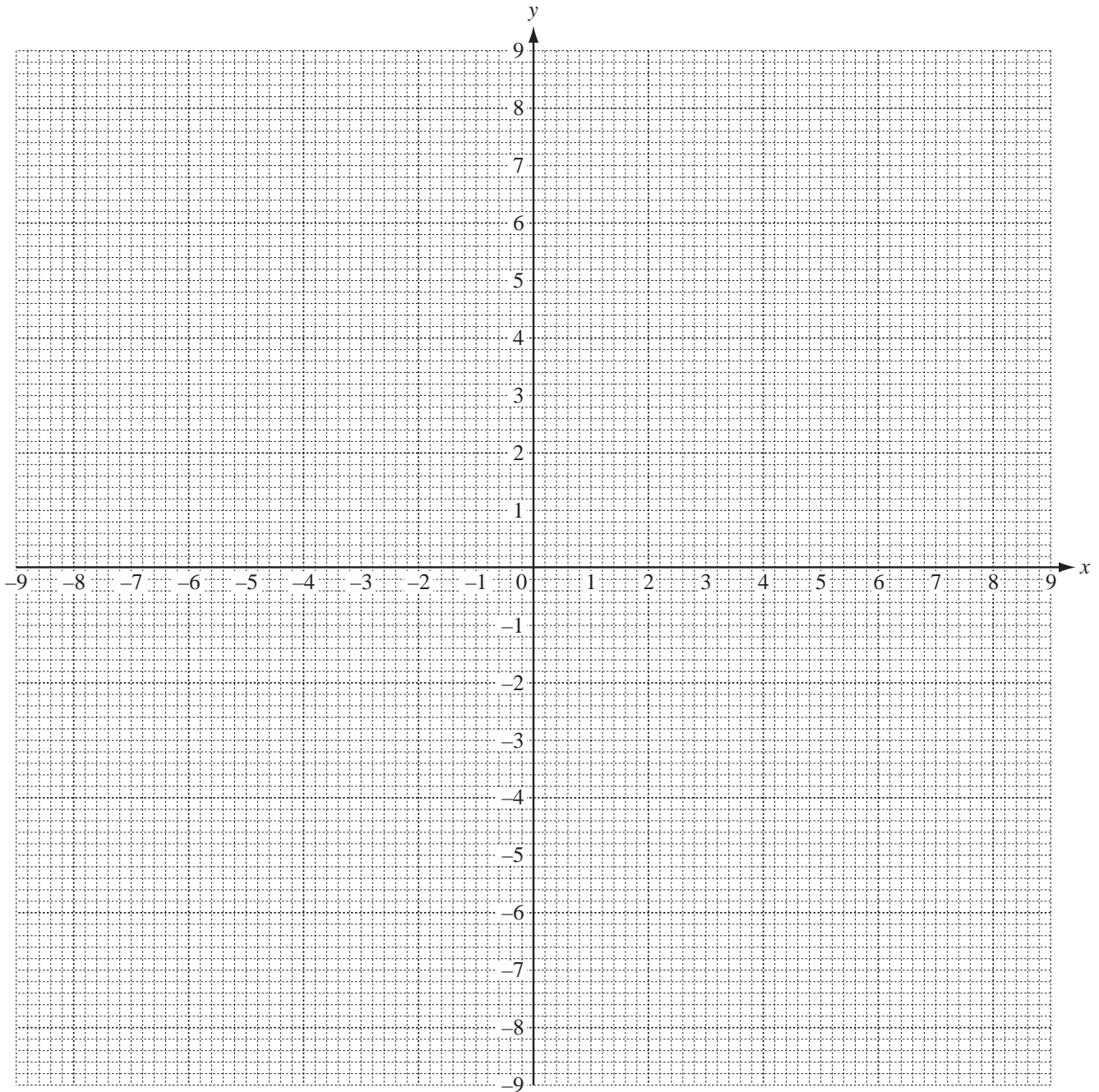
- (ii) Make  $x$  the subject of the formula.

*Answer(d)(ii)*  $x =$  ..... [3]

- 7 (a) The table shows some values for  $y = \frac{18}{x}$ .

$x$	-9	-6	-4	-3	-2		2	3	4	6	9
$y$	-2		-4.5		-9				4.5	3	

- (i) Complete the table. [2]
- (ii) On the grid, draw the graph of  $y = \frac{18}{x}$  for  $-9 \leq x \leq -2$  and  $2 \leq x \leq 9$ .



[4]

- (iii) Use your graph to solve the equation  $\frac{18}{x} = -5$ .

Answer(a)(iii)  $x =$  ..... [1]

- (b) (i) Complete the table of values for  $y = 2x + 3$ .

$x$	-4	-3	2	3
$y$	-5		7	

[2]

- (ii) On the grid, draw the graph of  $y = 2x + 3$  for  $-4 \leq x \leq 3$ .

[1]

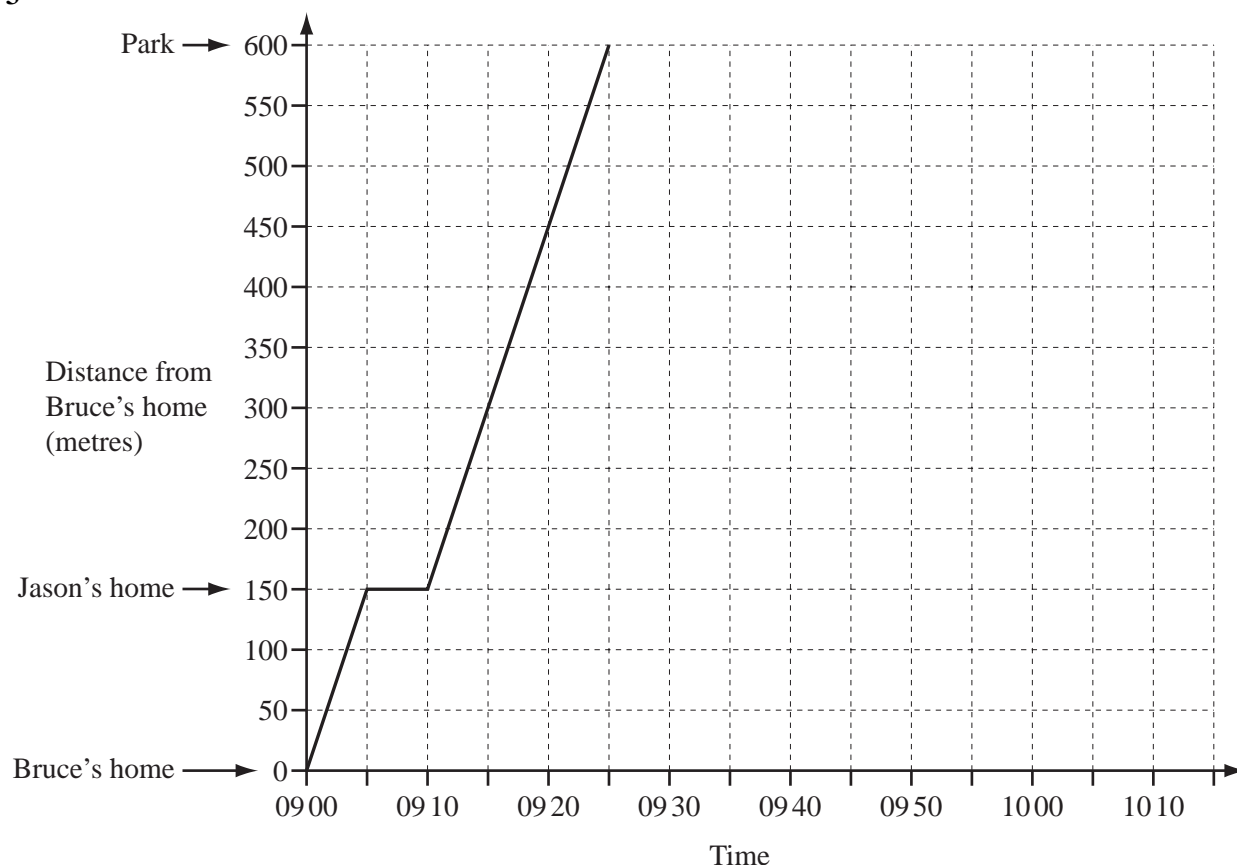
- (iii) Find the co-ordinates of the points of intersection of the graphs of

$$y = \frac{18}{x} \text{ and } y = 2x + 3.$$

*Answer(b)(iii)* ( ..... , ..... ) and ( ..... , ..... ) [2]

---

3



One morning, Bruce walked from his home to Jason's home and the two boys walked to the park. The distance-time graph shows Bruce's journey.

- (a) How many minutes was Bruce at Jason's home?

Answer(a) ..... min [1]

- (b) How far **from the park** were Bruce and Jason at 0920?

Answer(b) ..... m [2]

- (c) Work out the speed at which Bruce and Jason walked to the park. Give your answer in km/h.

Answer(c) ..... km/h [3]

- (d) Bruce stayed at the park for 35 minutes. He then walked home at a speed of 60 metres per minute.

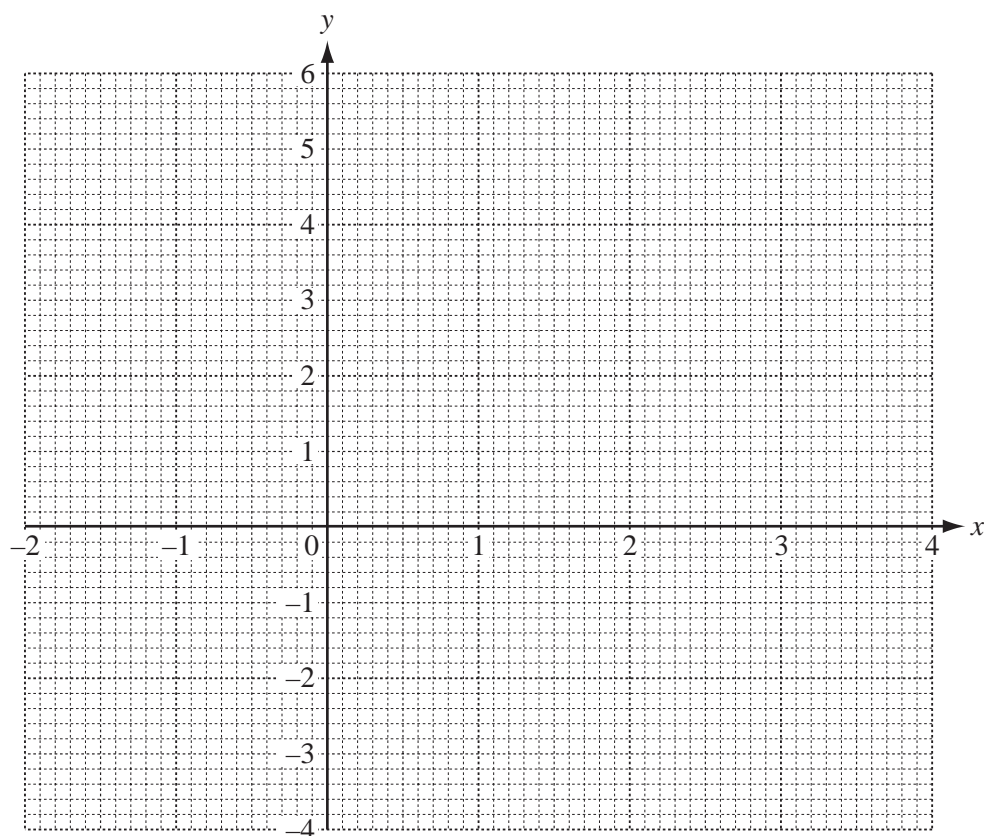
Complete the graph to show Bruce's time at the park and his journey home. [3]

- 6 (a) Complete the table for  $y = 4 + 2x - x^2$ .

$x$	-2	-1	0	1	2	3	4
$y$		1		5		1	

[2]

- (b) On the grid, draw the graph of  $y = 4 + 2x - x^2$  for  $-2 \leq x \leq 4$ .



[4]

- (c) (i) Draw the line of symmetry of the graph.

[1]

- (ii) Write down the equation of this line of symmetry.

Answer(c)(ii) ..... [1]

- (d) Use your graph to solve the equation  $4 + 2x - x^2 = 0$ .

Answer(d)  $x =$  ..... or  $x =$  ..... [2]

10 (a) Tatiana goes for a walk.

- (i) She walks for 15 minutes at a speed of 80 metres per minute.

Calculate the distance she walks.

*Answer(a)(i)* ..... m [1]

- (ii) She then walks for a further  $p$  minutes at  $w$  metres per minute.

Write down an expression, in terms of  $p$  and  $w$ , for the **total** distance Tatiana walks.

*Answer(a)(ii)* ..... m [1]

- (iii) Write down an expression, in terms of  $p$  and  $w$ , for Tatiana's average speed, in metres per minute.

*Answer(a)(iii)* ..... m/min [2]

16 Solve the simultaneous equations.

$$\begin{aligned}x + 2y &= 3 \\ 2x - 3y &= 13\end{aligned}$$

*Answer*  $x =$  .....

$y =$  ..... [3]



(b) The volume,  $V$ , of a solid is given by the following formula.

$$V = 3b\left(t + \frac{1}{2}m\right)$$

(i) Find  $V$  when  $b = 4$ ,  $t = 5$  and  $m = 6$ .

Answer(b)(i)  $V =$  ..... [2]

(ii) Find  $b$  when  $t = 3$ ,  $m = 2$  and  $V = 84$ .

Answer(b)(ii)  $b =$  ..... [3]

---

15 (a) Expand the brackets and simplify.

$$3(2x - 5y) - 4(x - y)$$

Answer(a) ..... [2]

(b) Factorise completely.

$$6x^2 - 9xy$$

Answer(b) ..... [2]

---

- 19** Piet, Rob and Sam collect model aeroplanes.  
 Piet has  $x$  aeroplanes.  
 Rob has 7 more aeroplanes than Piet.  
 Sam has three times as many aeroplanes as Piet.

**(a)** Write down an expression, in terms of  $x$ , for

**(i)** the number of aeroplanes Rob has,

*Answer(a)(i)* ..... [1]

**(ii)** the number of aeroplanes Sam has.

*Answer(a)(ii)* ..... [1]

**(b)** The total number of aeroplanes is 32.

**(i)** Use the information in **part (a)** to write down an equation in  $x$ .

*Answer(b)(i)* ..... [1]

**(ii)** Solve your equation.

*Answer(b)(ii)*  $x =$  ..... [2]

**(c)** Write down the number of aeroplanes Rob has.

*Answer(c)* ..... [1]

---

- 19 (a)** The travel graph on the opposite page shows Joel's journey to his school.  
He walks to the bus stop and waits for the bus, which takes him to the school.

**(i)** How long did Joel wait for the bus?

*Answer(a)(i)* ..... min [1]

**(ii)** Find the distance from the bus stop to the school.

*Answer(a)(ii)* ..... km [1]

- (b)** Joel's sister, Samantha, leaves home 14 minutes later than Joel to cycle to the same school.  
She cycles at a constant speed and arrives at the school at 08 16.

**(i)** On the grid, show her journey. [1]

**(ii)** At what time did the bus pass Samantha?

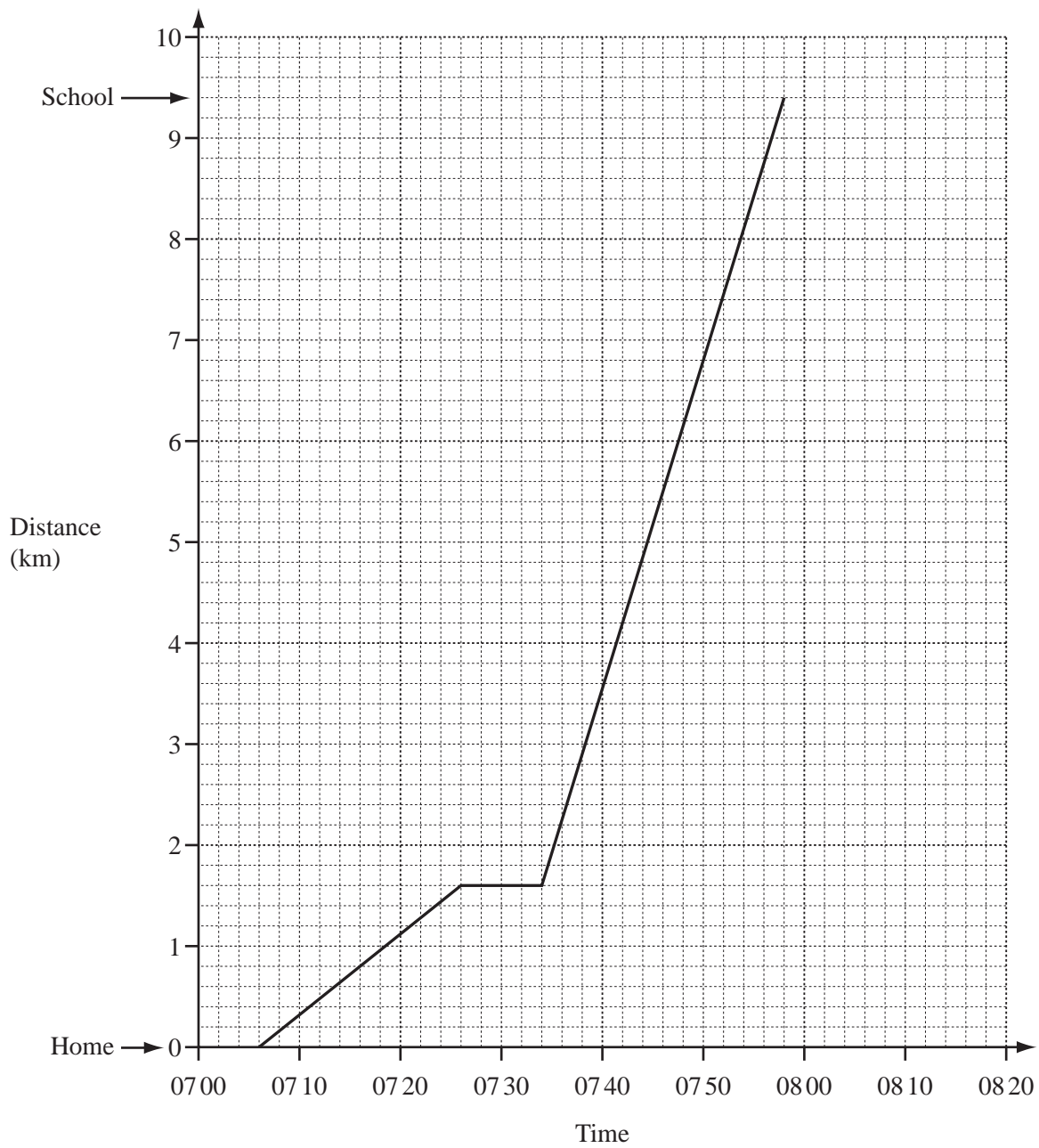
*Answer(b)(ii)* ..... [1]

**(iii)** How far from the school was she when the bus passed her?

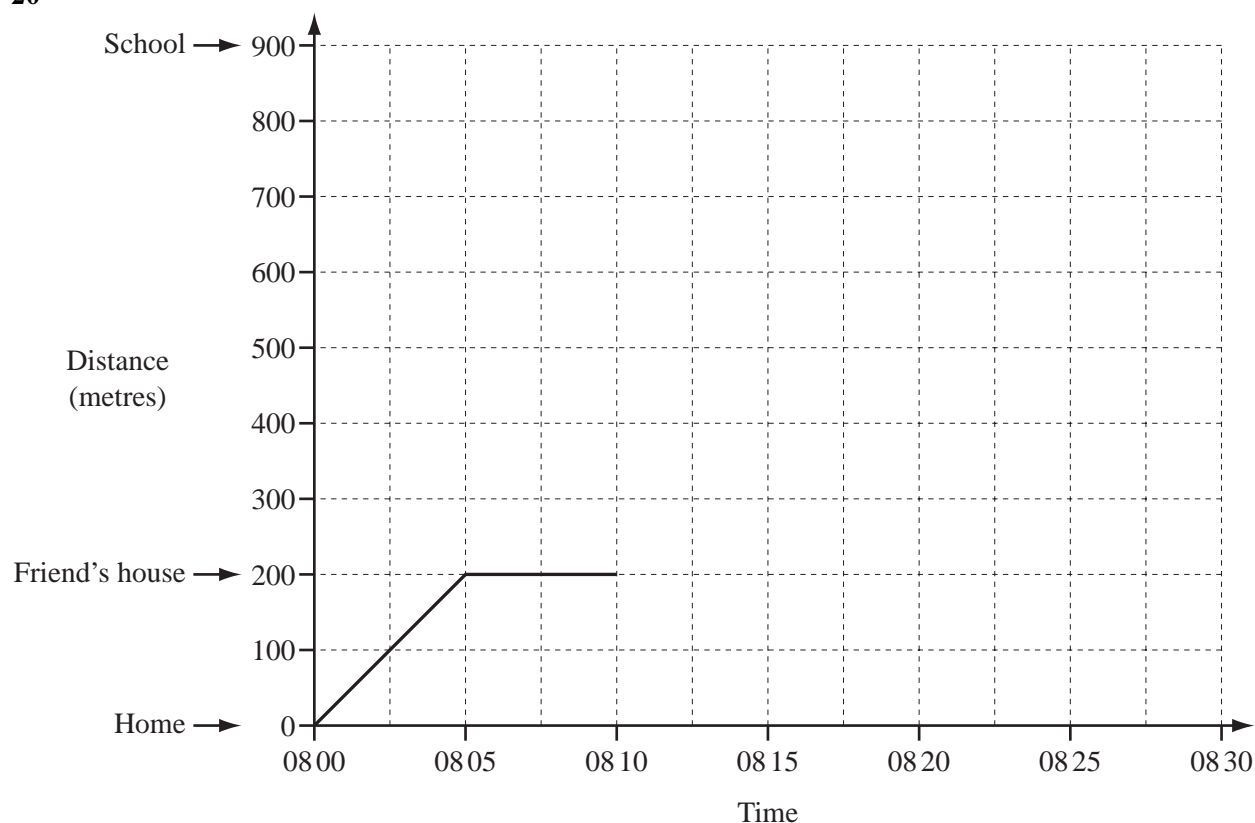
*Answer(b)(iii)* ..... km [1]

**(iv)** How many minutes after Joel did Samantha arrive at the school?

*Answer(b)(iv)* ..... min [1]



20



The graph shows part of Ali's journey from home to his school.

The school is 900 m from his home.

He walks 200 m to his friend's house and waits there.

He then takes 20 minutes to walk with his friend to their school.

(a) Complete the travel graph showing Ali's journey. [1]

(b) How long does he wait at his friend's house?

Answer(b) ..... min [1]

(c) Calculate the average speed for Ali's complete journey from home to his school.  
Give your answer in **kilometres per hour**.

Answer(c) ..... km/h [4]

3 (a)

$$x = 3m - k$$

Find the value of

(i)  $x$  when  $m = 2$  and  $k = -4$ ,

Answer(a)(i) ..... [2]

(ii)  $m$  when  $x = 19$  and  $k = 5$ .

Answer(a)(ii) ..... [3]

(b) Expand the brackets.

$$g(7f - g^2)$$

Answer(b) ..... [2]

(c) Factorise completely.

$$18h^2 - 12hj$$

Answer(c) ..... [2]

(d) Make  $m$  the subject of the formula.

$$t = 8m + 15$$

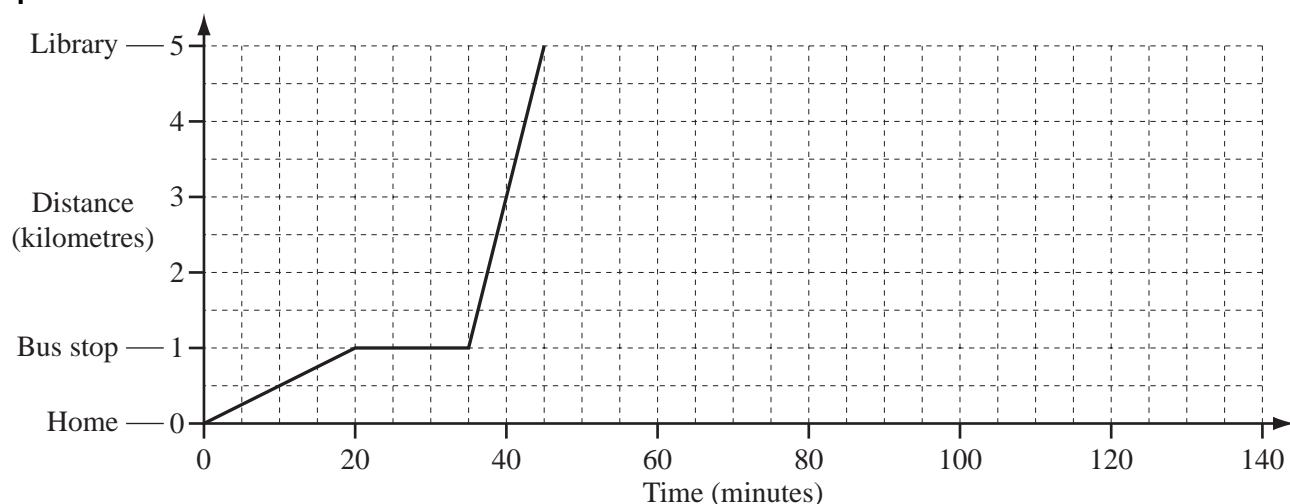
Answer(d)  $m =$  ..... [2]

(e) Solve the equation.

$$p + 3 = 3(p - 5)$$

Answer(e)  $p =$  ..... [3]

4



Sonia travels from home to the library.  
She walks to the bus stop and waits for a bus to take her to the library.

(a) Write down

(i) the distance to the bus stop,

Answer(a)(i) ..... km [1]

(ii) how many minutes Sonia waits for a bus,

Answer(a)(ii) ..... min [1]

(iii) how many minutes the bus journey takes to the library.

Answer(a)(iii) ..... min [1]

(b) Calculate, in **kilometres per hour**,

(i) Sonia's walking speed,

Answer(b)(i) ..... km/h [1]

(ii) the speed of the bus,

Answer(b)(ii) ..... km/h [2]

(iii) the **average** speed for Sonia's journey from home to the library.

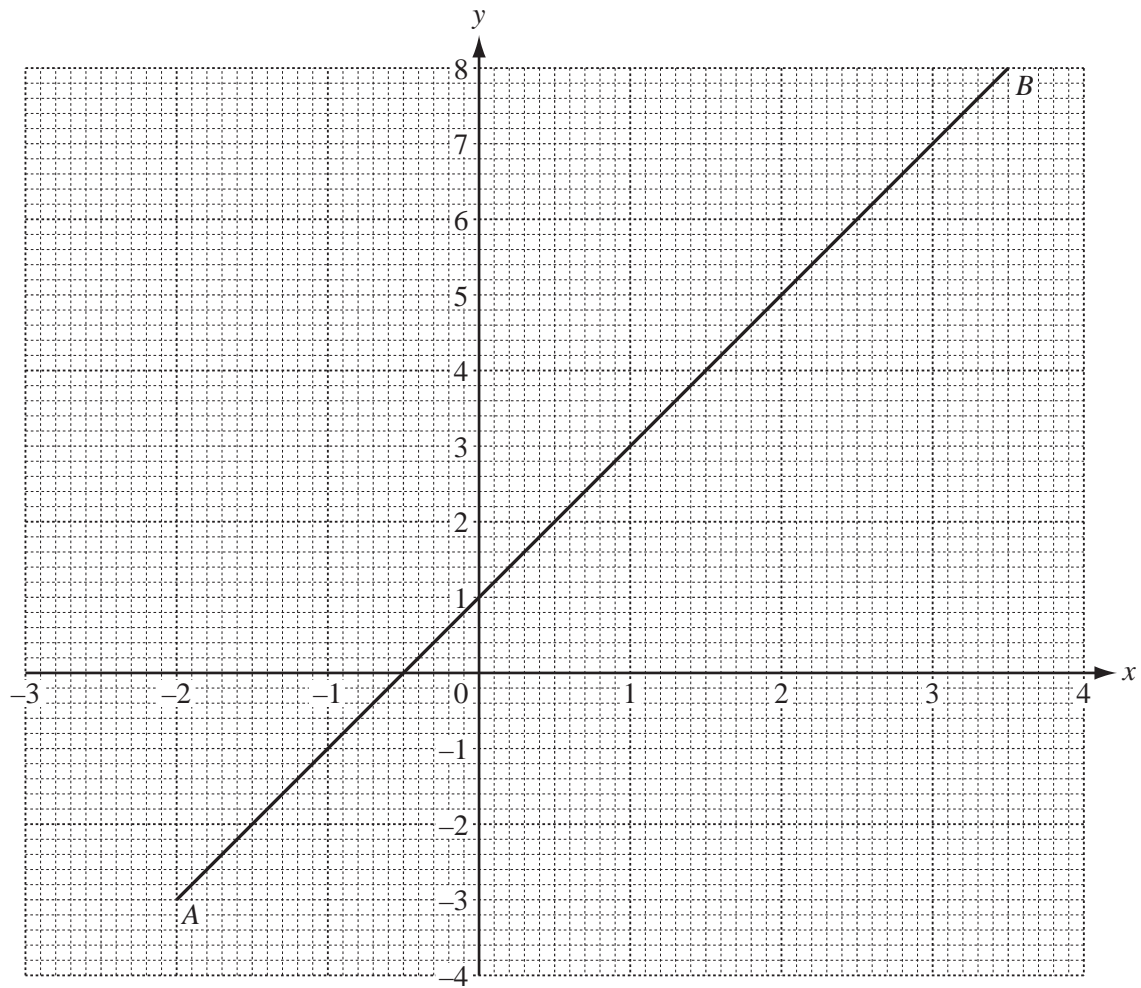
Answer(b)(iii) ..... km/h [3]

(c) Sonia works in the library for one hour.  
Then she travels home by car.  
The average speed of the car is 30 km/h.

Complete the travel graph.

[2]

5



- (a) (i) Find the gradient of the line  $AB$ .

Answer(a)(i) ..... [2]

- (ii) Write down the equation of the line  $AB$  in the form  $y = mx + c$ .

Answer(a)(ii)  $y =$  ..... [2]



(b) The table shows some values of the function  $y = x^2 - 2$ .

$x$	-3	-2	-1	0	1	2	3
$y$	7		-1		-1		7

- (i) Complete the table. [2]
- (ii) On the grid, draw the graph of  $y = x^2 - 2$  for  $-3 \leq x \leq 3$ . [4]
- (iii) Use your graph to solve the equation  $x^2 - 2 = 0$ .

Answer(b)(iii)  $x =$  ..... or  $x =$  ..... [2]

(c) Write down the co-ordinates of the points where your graph meets the line  $AB$ .

Answer(c) ( ..... , ..... ) and ( ..... , ..... ) [2]

---

- 4 (a) An electrician is paid a fixed amount of \$12 and then \$6.50 for each hour she works.

- (i) The electrician works for 7 hours.

Calculate how much she is paid for this work.

Answer(a)(i) \$ ..... [2]

- (ii) The electrician works for  $n$  hours.

Write down an expression, in terms of  $n$ , for how much she is paid.

Answer(a)(ii) ..... [1]

- (iii) The electrician is paid \$44.50 for her work.

Calculate the number of hours she worked.

Answer(a)(iii) ..... [2]

- (b) Solve the simultaneous equations.

$$\begin{aligned} 3x - y &= 22 \\ 5x + 3y &= 4 \end{aligned}$$

Answer(b)  $x =$  .....

$y =$  ..... [3]

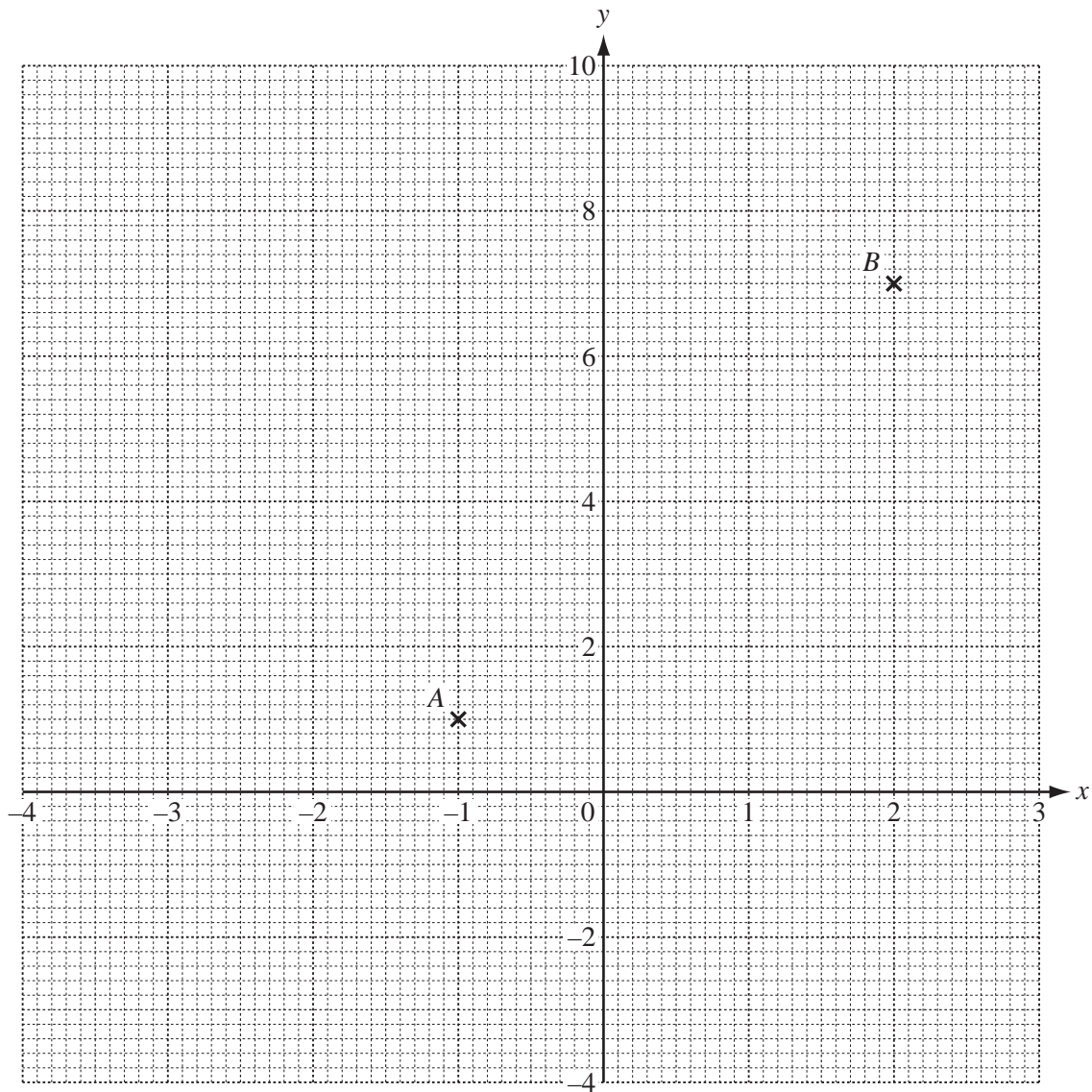
- 7 (a) The table shows some values of the function  $y = x^2 + x - 3$ .

$x$	-4	-3	-2	-1	0	1	2	3
$y$	9	3		-3		-1		9

(i) Complete the table.

[2]

(ii) On the grid, draw the graph of  $y = x^2 + x - 3$  for  $-4 \leq x \leq 3$ .



[4]

(iii) Use your graph to solve the equation  $x^2 + x - 3 = 0$ .

Answer(a)(iii)  $x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

**(b) (i)** Draw the line of symmetry of the graph. [1]

**(ii)** Write down the equation of the line of symmetry.

*Answer(b)(ii)* ..... [1]

**(c)** Two points,  $A$  and  $B$ , are marked on the grid.

**(i)** Draw the straight line through the points  $A$  and  $B$  extending it to the edges of the grid. [1]

**(ii)** Write down the co-ordinates of the points of intersection of this line with  $y = x^2 + x - 3$ .

*Answer(c)(ii)* ( ..... , ..... ) and ( ..... , ..... ) [2]

**(iii)** Work out the gradient of the straight line through points  $A$  and  $B$ .

*Answer(c)(iii)* ..... [2]

**(iv)** Write down the equation of the straight line through points  $A$  and  $B$ , in the form  $y = mx + c$ .

*Answer(c)(iv)*  $y =$  ..... [2]

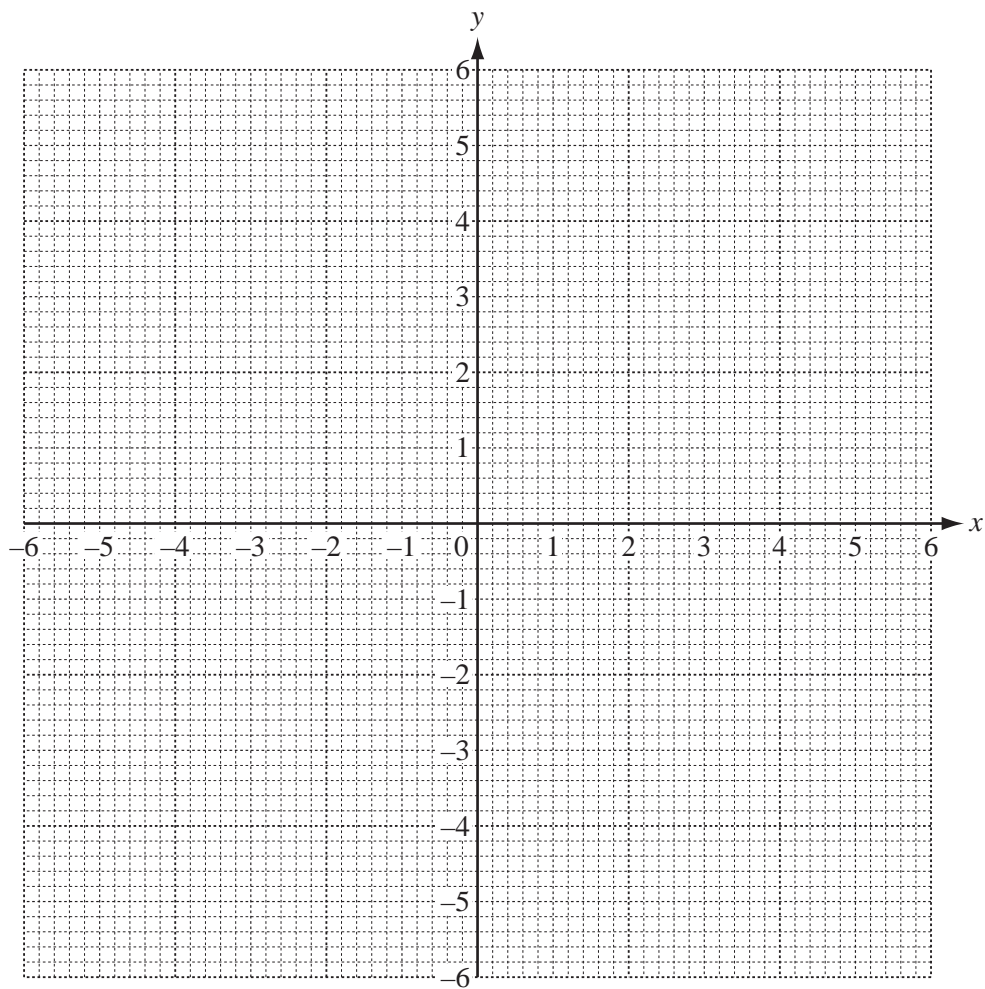
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- 5 (a) (i) Complete the table for the function  $y = \frac{6}{x}$ ,  $x \neq 0$ .

$x$	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6
$y$	-1	-1.2		-2	-3	-6	6	3			1.2	1

[2]

- (ii) On the grid, draw the graph of  $y = \frac{6}{x}$  for  $-6 \leq x \leq -1$  and  $1 \leq x \leq 6$ .



[4]

- (b) (i) Complete the table for the function  $y = \frac{x^2}{2} - 2$ .

$x$	-4	-3	-2	-1	0	1	2	3	4
$y$	6	2.5			-2			2.5	6

[2]

- (ii) On the grid opposite, draw the graph of  $y = \frac{x^2}{2} - 2$  for  $-4 \leq x \leq 4$ . [4]

- (c) Write down the co-ordinates of the point of intersection of the two graphs.

Answer(c)( ..... , ..... ) [2]

---

7 (a) Solve the equations.

(i)  $2x + 3 = 15 - x$

*Answer(a)(i)*  $x =$  ..... [2]

(ii)  $\frac{2y-1}{3} = 7$

*Answer(a)(ii)*  $y =$  ..... [2]

(iii)  $2 = \frac{1}{u-1}$

*Answer(a)(iii)*  $u =$  ..... [3]

(b) Write down equations to show the following.

(i)  $p$  is equal to  $r$  plus two times  $q$ .

*Answer(b)(i)* ..... [1]

(ii)  $k$  is equal to the square of the sum of  $l$  and  $m$ .

*Answer(b)(ii)* ..... [2]

(c) Pierre walks for 2 hours at  $w$  km/h and then for another 3 hours at  $(w - 1)$  km/h.

The total distance of Pierre's journey is 11.5 km.

Find the value of  $w$ .

*Answer(c)*  $w =$  ..... [4]

12 Solve the simultaneous equations.

$$\begin{aligned} 3x + y &= 18 \\ 4x - 2y &= 34 \end{aligned}$$

*Answer*  $x =$  .....

$y =$  ..... [3]



14 Simplify the following.

(a)  $8^0$

Answer(a) ..... [1]

(b)  $(x^5)^2$

Answer(b) ..... [1]

(c)  $p^{-3} \div p^4$

Answer(c) ..... [1]

---

13 Solve the simultaneous equations.

$$\begin{aligned} 3x + y &= 5 \\ 5x + y &= 9 \end{aligned}$$

Answer  $x =$  .....  
 $y =$  ..... [2]

---

- 8 (a) Factorise completely.

$$8pq + 12pr$$

Answer(a) ..... [2]

- (b) Use your answer to **part (a)** to make  $p$  the subject of the formula below.

$$s = 8pq + 12pr$$

Answer(b)  $p =$  ..... [1]

- 12 (a) Write down the value of  $x$  when

(i)  $5^x \div 5^2 = 5^4$ ,

Answer(a)(i)  $x =$  ..... [1]

(ii)  $\frac{1}{49} = 7^x$ .

Answer(a)(ii)  $x =$  ..... [1]

- (b) Write down the value of  $3p^0$ .

Answer(b) ..... [1]

- 5 Multiply out the brackets.

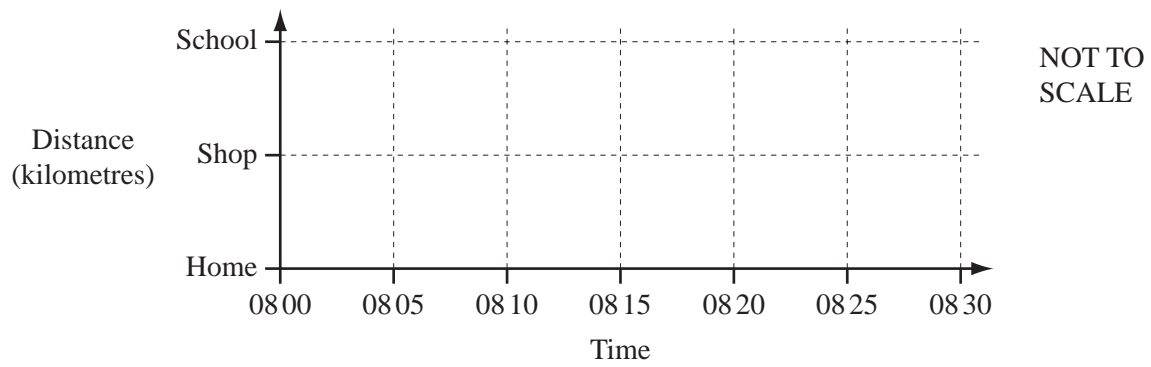
$$x(2x + y)$$

Answer ..... [2]

- 6 Solve the equation.

$$\frac{2x+1}{3} = 4$$

Answer  $x =$  ..... [2]



Rob walks to school each morning.  
 One day, he leaves home at 08 00.  
 He stops at a shop at 08 10 and stays there for 5 minutes.  
 He then continues to school and arrives at 08 30.

(a) Draw the travel graph for Rob's journey from home to school. [3]

(b) Rob's average speed for the whole journey from home to school is 3.3 km/h.

Calculate the distance from Rob's home to school.

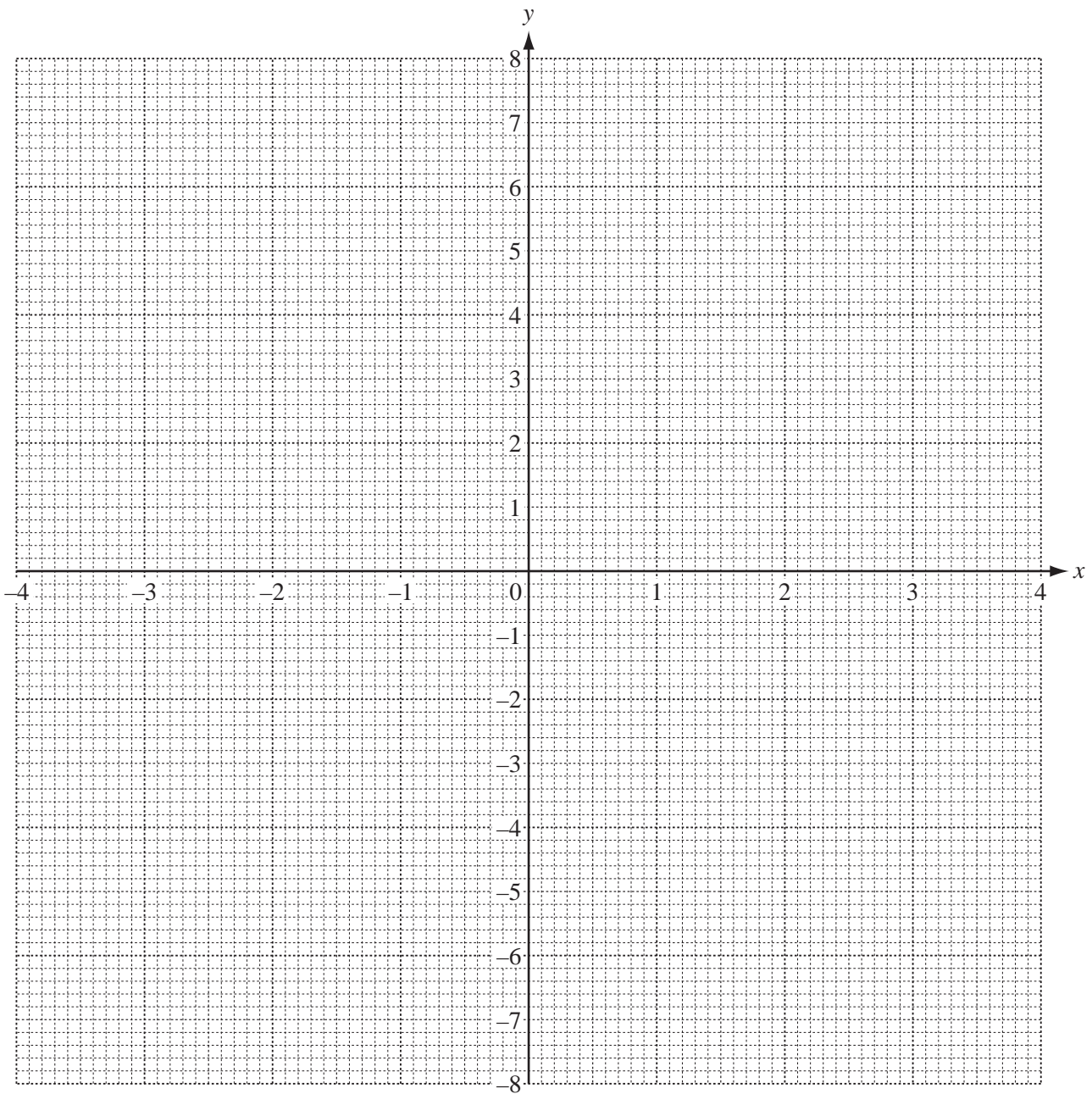
Answer(b) ..... km [2]

- 6 (a) Complete the table of values for  $y = \frac{4}{x}$ ,  $x \neq 0$ .

$x$	-4	-3	-2	-1	-0.5		0.5	1	2	3	4
$y$		-1.3	-2		-8		8	4	2		

[2]

- (b) On the grid below, draw the graph of  $y = \frac{4}{x}$ , for  $-4 \leq x \leq -0.5$  and  $0.5 \leq x \leq 4$ .



[4]

(c) Complete the following statement.

The point  $(-2.5, \dots\dots\dots)$  lies on the graph of  $y = \frac{4}{x}$ . [1]

(d) (i) On the grid, draw the line  $y = 5$ . [1]

(ii) Use your graphs to solve the equation  $\frac{4}{x} = 5$ .

*Answer(d)(ii)*  $x = \dots\dots\dots$  [1]

(e) (i) On the grid, draw the straight line joining the points  $(-0.5, -8)$  and  $(2, 2)$ . [2]

(ii) Find the gradient of this line.

*Answer(e)(ii)*  $\dots\dots\dots$  [1]

(iii) Write down the equation of this line in the form  $y = mx + c$ .

*Answer(e)(iii)*  $y = \dots\dots\dots$  [2]

---

- 7 (a) Solve the equation.

$$4x + 3 = 2 + 6x$$

Answer(a)  $x =$  ..... [2]

- (b) Simplify.

$$7(3x - 4y) - 3(5x + 2y)$$

Answer(b) ..... [2]

- (c) Factorise completely.

$$6g^2 - 3g^3$$

Answer(c) ..... [2]

---

- 10 (a) Expand and simplify

$$5(3c - 4d) - 8c.$$

Answer(a) ..... [2]

- (b) Factorise  $pq - q^2$ .

Answer(b) ..... [1]

---

- 11** Roberto earns a total of  $\$p$  per week.  
 He works for  $t$  hours each week and is paid a fixed amount per hour.  
 He also receives a bonus of  $\$k$  every week.

The formula for  $p$  is

$$p = 8t + k.$$

- (a)** Write down how much Roberto is paid per hour.

*Answer(a)* \$ ..... [1]

- (b) (i)** Find how much Roberto earns in a week when he works for 40 hours and his bonus is \$35.

*Answer(b)(i)* \$ ..... [2]

- (ii)** Find how many hours Roberto works in a week when he earns \$288 and his bonus is \$24.

*Answer(b)(ii)* ..... h [3]

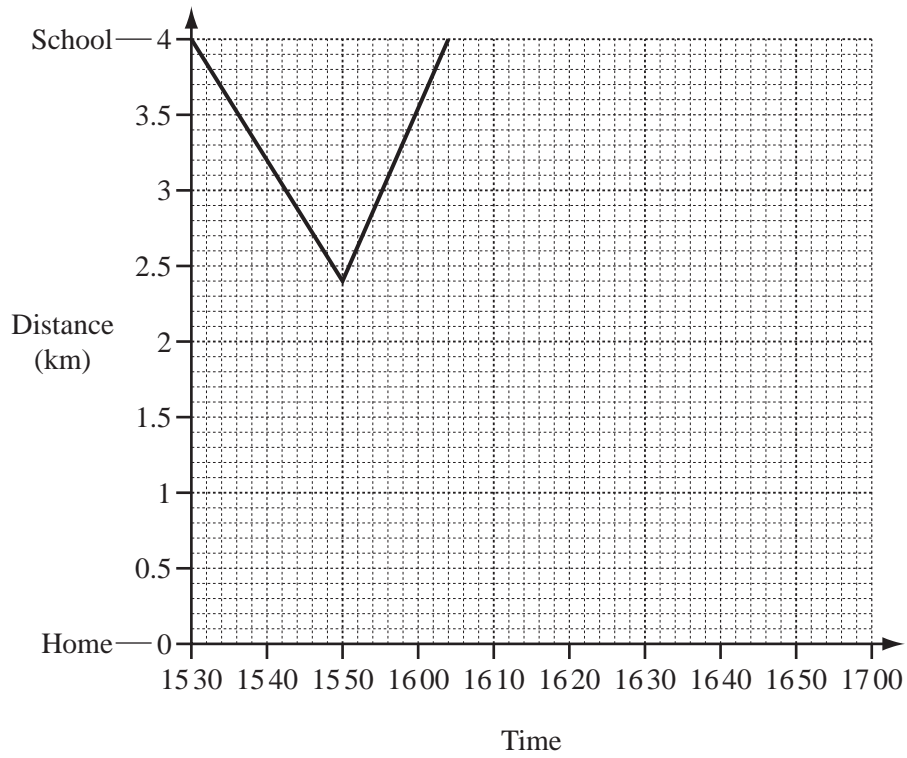
- (c)** Make  $t$  the subject of the formula.

*Answer(c)*  $t =$  ..... [2]

---

- 3 Kim left school at 15 30 to walk home.  
On the way home he remembered he had left a book at school.  
He ran back to school and arrived at 16 04.

The travel graph shows his journey.



- (a) Use the graph to answer the following questions.

- (i) At what time did Kim start to run back to school?

Answer(a)(i) ..... [1]

- (ii) How far was he from school at this time?

Answer(a)(ii) ..... km [1]

- (iii) How many minutes did he take to run back to school?

Answer(a)(iii) ..... min [1]

- (iv) What was his speed, in kilometres per hour, on his journey back to school?

Answer(a)(iv) ..... km/h [3]



- (b) Kim spent 6 minutes at school collecting his book.  
He then walked home at a speed of 6 km/h.

(i) Complete the travel graph. [3]

(ii) At what time did Kim arrive home?

*Answer(b)(ii)* ..... [1]

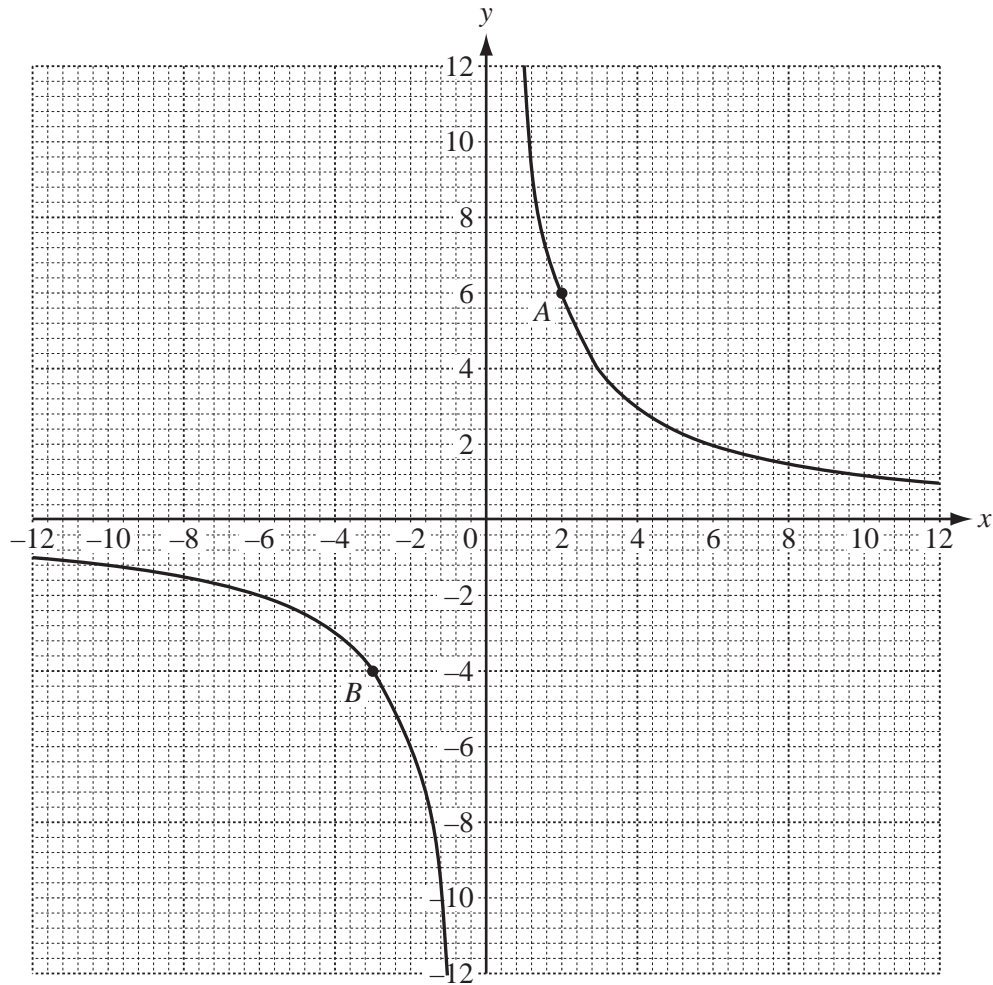
- (c) Kim's sister, Julie, left the school at 15 48.  
She walked at a steady speed, without stopping, and arrived home 46 minutes later.

(i) On the grid, draw the travel graph of Julie's journey home from school. [2]

(ii) Complete the sentence.

..... arrived home first by ..... minutes. [1]

---



A graph is drawn on the grid.  
Points  $A$  and  $B$  are marked on the curves.

- (a) (i) Write down the co-ordinates of the points  $A$  and  $B$ .

Answer(a)(i)  $A( \dots\dots\dots , \dots\dots\dots )$  and  $B( \dots\dots\dots , \dots\dots\dots )$  [2]

- (ii) The equation of the graph is  $xy = n$ .

Write down the value of  $n$ .

Answer(a)(ii)  $n = \dots\dots\dots$  [1]

- (b) (i) Write down the order of rotational symmetry of the graph.

*Answer(b)(i)* ..... [1]

- (ii) On the grid, draw the lines of symmetry of the graph. [2]

- (iii) Write down the equation of each line of symmetry.

*Answer(b)(iii)* ..... and ..... [2]

- (c) (i) One line of symmetry crosses both curves.

Write down the  $x$  co-ordinates of the points where this line meets each curve.  
Give your answers to 1 decimal place.

*Answer(c)(i)*  $x =$  ..... and  $x =$  ..... [2]

- (ii) On the grid, draw the line which passes through the point (0, 4) and is parallel to the line of symmetry in **part (c)(i)**. [1]

- (iii) Write down the equation of this line in the form  $y = mx + c$ .

*Answer(c)(iii)*  $y =$  ..... [2]

---

- 7 Alex has  $d$  dollars to spend.  
He buys a book which costs \$9 less than 2 times  $d$ .

(a) Write down an algebraic expression, in terms of  $d$ , for the cost of the book.

*Answer(a)* \$ ..... [2]

(b) The actual cost of the book is \$7.80.

Find the value of  $d$ .

*Answer(b)*  $d =$  ..... [2]

(c) How much does Alex have left after buying the book?

*Answer(c)* \$ ..... [1]

---

- 8 The area,  $A$ , of a sector of a circle of radius  $r$  is given by the formula below.

$$A = \frac{\pi r^2}{5}$$

- (a) Calculate the area when the radius is 7.5 cm.

*Answer(a)* .....  $\text{cm}^2$  [2]

- (b) Make  $r$  the subject of the formula.

*Answer(b)*  $r =$  [3]

- (c) Calculate  $r$  when  $A = 4.8 \text{ cm}^2$ .

*Answer(c)*  $r =$  ..... cm [2]

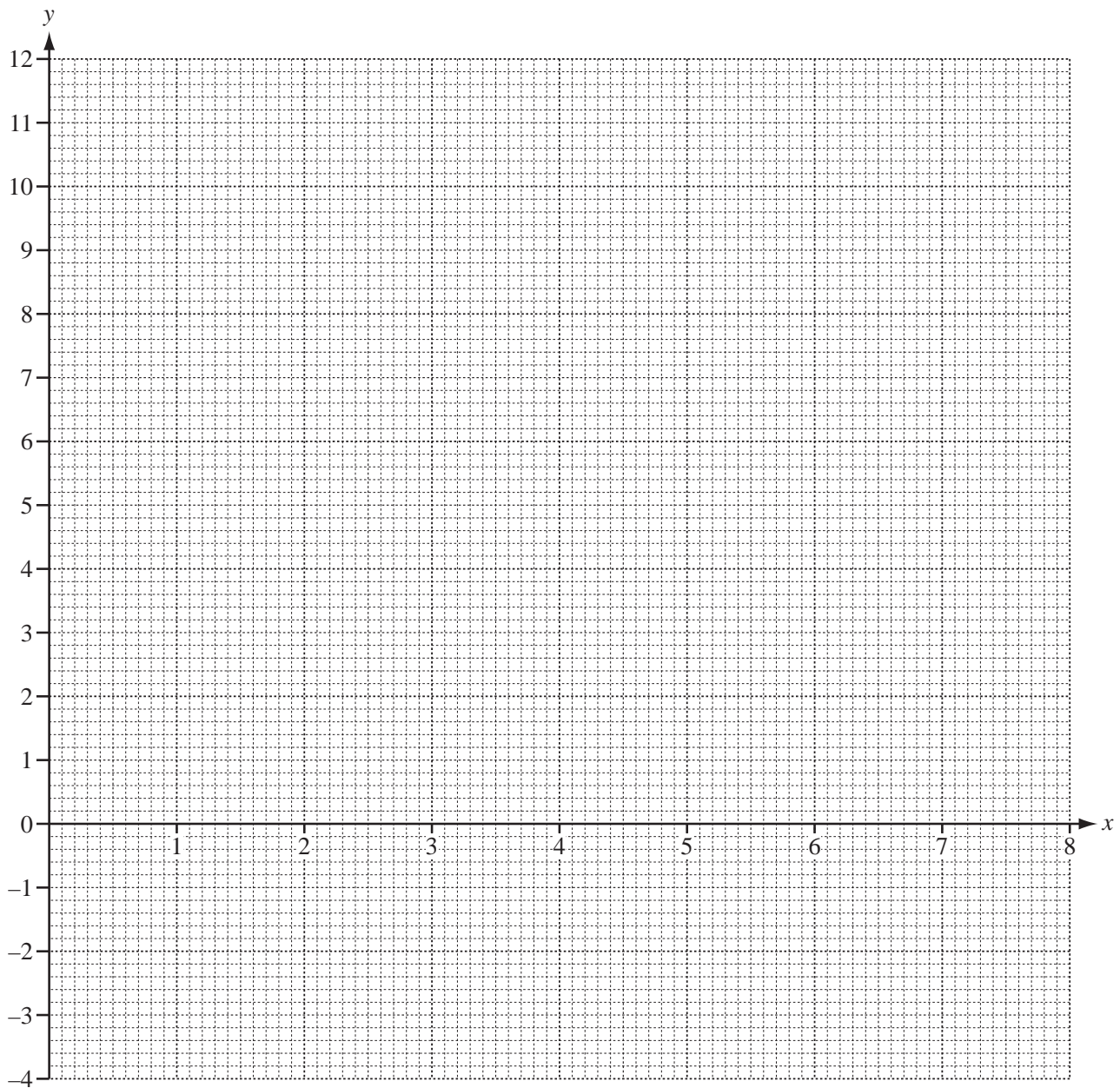
---

- 9 (a) (i) Complete the table for  $y = 12 - x^2$ .

$x$	0	1	2	3	4
$y$	12	11			-4

[2]

- (ii) On the grid, draw the graph of  $y = 12 - x^2$  for  $0 \leq x \leq 4$ .



[3]

- (iii) Use your graph to solve the equation  $12 - x^2 = 0$ .

Answer (a)(iii)  $x =$  ..... [1]

- (b) (i) Complete the table for  $y = \frac{12}{x}$ ,  $x \neq 0$ .

$x$	1	2	3	4	5	6	7	8
$y$	12	6	4		2.4		1.7	

[3]

- (ii) On the grid opposite, draw the graph of  $y = \frac{12}{x}$  for  $1 \leq x \leq 8$ .

[3]

- (c) Write down the co-ordinates of the points of intersection of the two graphs.

Answer(c) ( ..... , ..... ), ( ..... , ..... ) [2]

---

- 19 (a) When  $x = -3$  and  $y = 4$ , find the value of

(i)  $x^3$ ,

Answer(a)(i) ..... [1]

(ii)  $xy^2$ .

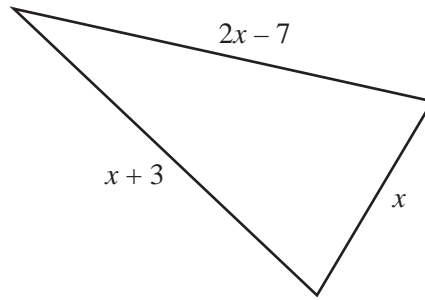
Answer(a)(ii) ..... [1]

(b) Simplify  $\frac{z^{-1}}{z^{-2}}$ .

Answer(b) ..... [1]

---

8

NOT TO  
SCALE

The lengths, in centimetres, of the sides of a triangle are  $x$ ,  $x + 3$  and  $2x - 7$ .  
The perimeter of the triangle is 52 cm.

- (a) Use this information to write down an equation in  $x$ .

Answer(a) ..... [1]

- (b) Find the value of  $x$ .

Answer(b)  $x =$  ..... [2]

- 9 The area of a circle is  $19.7 \text{ cm}^2$ .  
Calculate the radius of the circle.

Answer ..... cm [3]

- 10 Simplify

(a)  $p^3 \times p^4$ ,

Answer(a) ..... [1]

(b)  $12q^8 \div 3q^2$ .

Answer(b) ..... [2]



- 18 (a) Factorise  $3y^2 - 7xy$ .

Answer(a) ..... [1]

- (b) Expand the brackets and simplify completely.

$$p(4p + 5r) + 2r(6p + r)$$

Answer(b) ..... [3]

- 19 Erica is tiling the floor of a rectangular room of length 3 metres and width 2.5 metres. She uses square tiles of side 25 centimetres.

- (a) Calculate

- (i) how many tiles will fit along the length of the room,

Answer(a)(i) ..... [1]

- (ii) how many tiles she will need altogether.

Answer(a)(ii) ..... [2]

- (b) Work out the area of **one tile**

- (i) in square centimetres,

Answer(b)(i) .....  $\text{cm}^2$  [1]

- (ii) in square metres.

Answer(b)(ii) .....  $\text{m}^2$  [1]

12 (a)  $\frac{1}{27} = 3^x$ .

Write down the value of  $x$ .

Answer(a)  $x =$  ..... [1]

(b) Simplify

(i)  $p^7 \times p^{-2}$ ,

Answer(b)(i) ..... [1]

(ii)  $m^3 \div m^7$ .

Answer(b)(ii) ..... [1]

13 (a) Work out  $\frac{0.68 + 2.57 \times 1.76}{63}$ .

Write down all the figures from your calculator display.

Answer(a) ..... [1]

(b) Write your answer to **part (a)** in standard form correct to 3 significant figures.

Answer(b) ..... [2]

14 Solve the simultaneous equations.

$$3x - 2y = 15$$

$$2x + y = 17$$

Answer  $x =$  .....

$y =$  ..... [3]

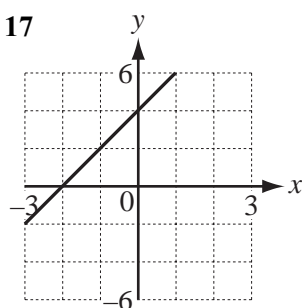
13 Solve the simultaneous equations.

$$3x + y = 5$$

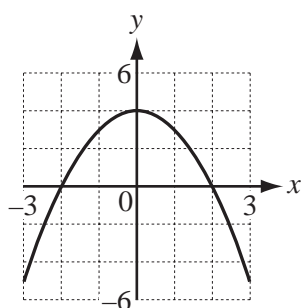
$$5x + y = 9$$

Answer  $x =$  .....  
 $y =$  ..... [2]

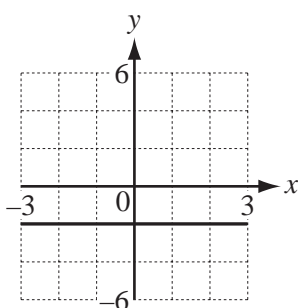
17



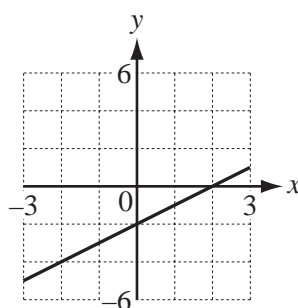
A



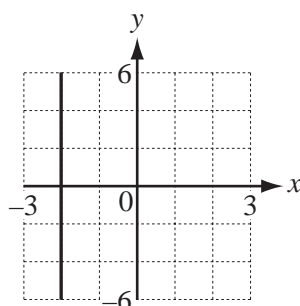
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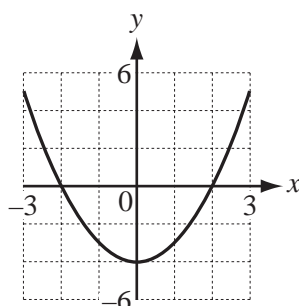
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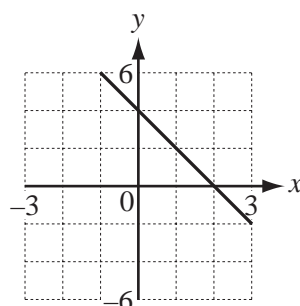
D



E



F



G

Write down the letter of the graph which is

(a)  $y = x - 2$ ,

Answer(a) ..... [1]

(b)  $x = -2$ ,

Answer(b) ..... [1]

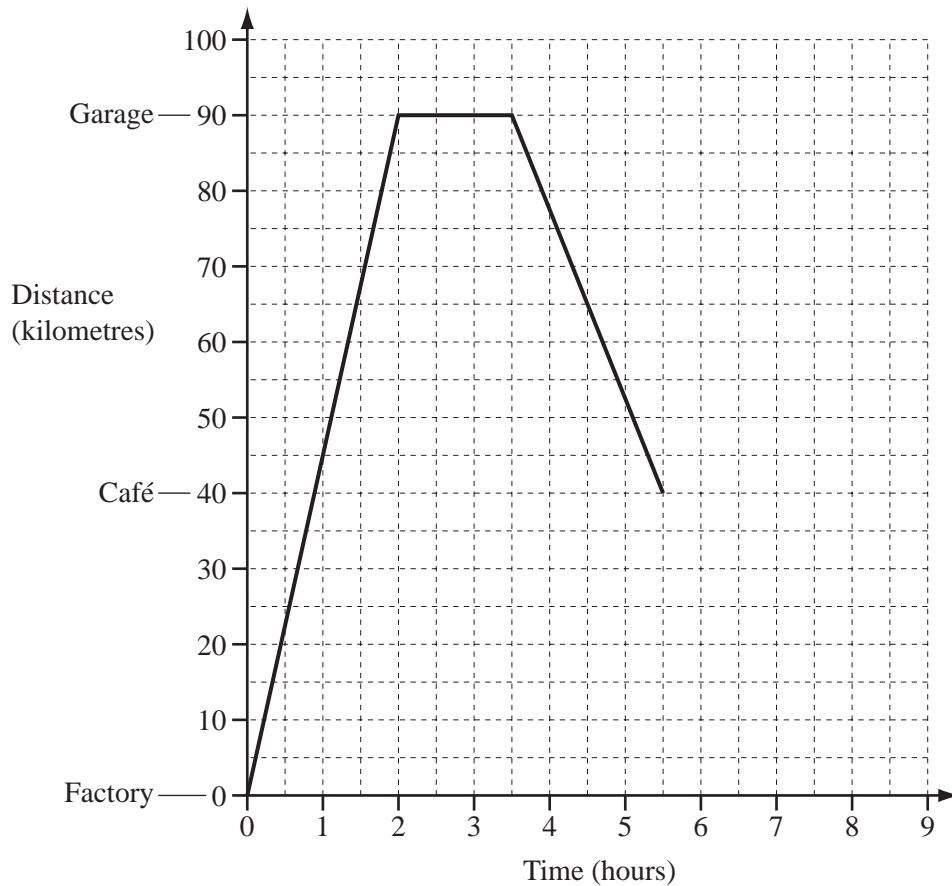
(c)  $y = -2x + 4$ ,

Answer(c) ..... [1]

(d)  $y = x^2 - 4$ .

Answer(d) ..... [1]

20



The travel graph shows part of the journey of a truck driver.

The driver leaves a factory to deliver tyres to a garage.

After unloading the tyres, the driver returns to the factory, but stops at a café for 1 hour.

He then completes the journey at an average speed of 80 km/h.

- (a) Calculate the average speed of the truck on its journey from the factory to the garage.

Answer(a) ..... km/h [1]

- (b) Write down the length of time the truck stays at the garage.

Answer(b) ..... hours [1]

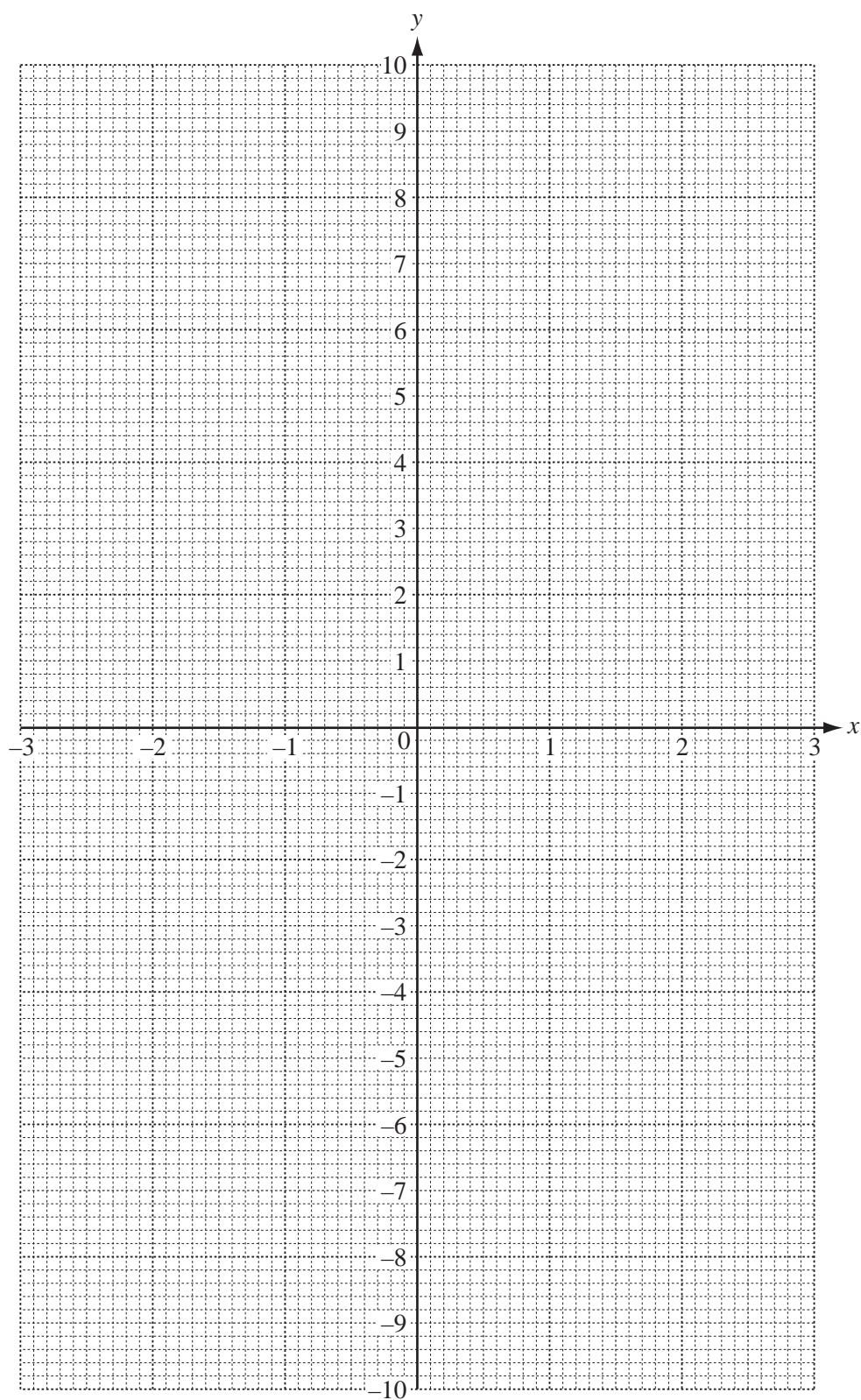
- (c) Complete the travel graph. [2]

- 6 (a) Complete the table of values for the function  $y = \frac{3}{x}$ ,  $x \neq 0$ .

$x$	-3	-2.5	-2	-1.5	-1	-0.5	-0.3		0.3	0.5	1	1.5	2	2.5	3
$y$	-1	-1.2		-2	-3	-6					3	2	1.5		1

[3]

- (b) On the grid below, draw the graph of  $y = \frac{3}{x}$  for  $-3 \leq x \leq -0.3$  and  $0.3 \leq x \leq 3$ .



[5]

- (c) Use your graph to solve the equation  $\frac{3}{x} = 7$ .

Answer(c)  $x =$  ..... [1]

- (d) Complete the table of values for  $y = \frac{2x}{3} - 1$ .

$x$	-3	0	3
$y$			

[2]

- (e) On the grid, draw the straight line  $y = \frac{2x}{3} - 1$  for  $-3 \leq x \leq 3$ . [2]

- (f) Write down the co-ordinates of the points where the line  $y = \frac{2x}{3} - 1$  intersects the graph of  $y = \frac{3}{x}$ .

Answer(f) ( ..... , ..... ) and ( ..... , ..... ) [2]

7

$$S = a + 4d$$

- (a) Find  $S$  when  $a = 17$  and  $d = -5$ .

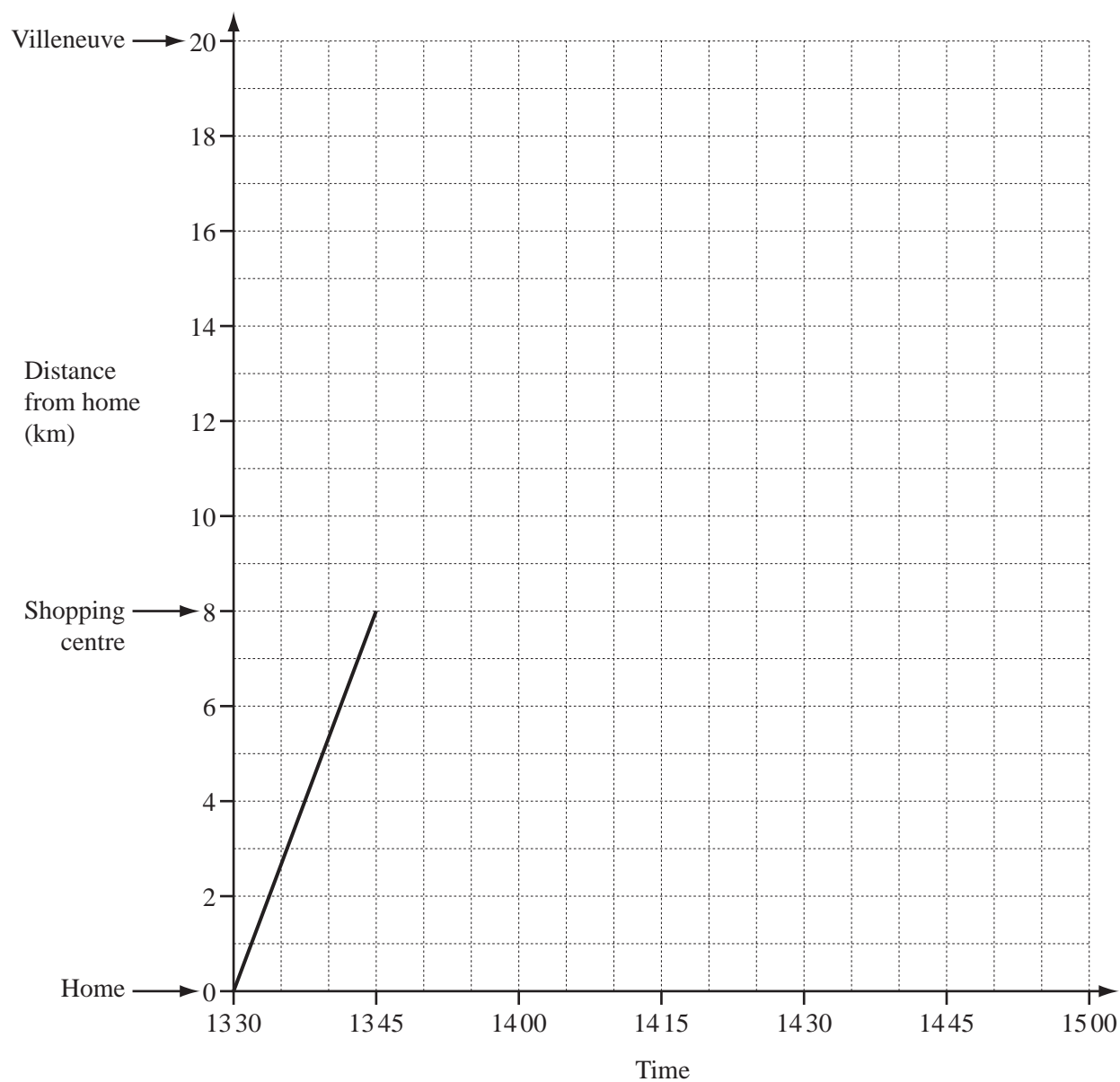
Answer(a)  $S =$  ..... [2]

- (b) Find  $d$  when  $S = 37$  and  $a = 5$ .

Answer(b)  $d =$  ..... [2]

- (c) Make  $d$  the subject of the formula  $S = a + 4d$ .

Answer(c)  $d =$  ..... [2]



12

$$z = 2x - y$$

(a) Find  $z$  when  $x = -3$  and  $y = 7$ .

Answer(a)  $z =$  ..... [1]

(b) Make  $x$  the subject of the formula.

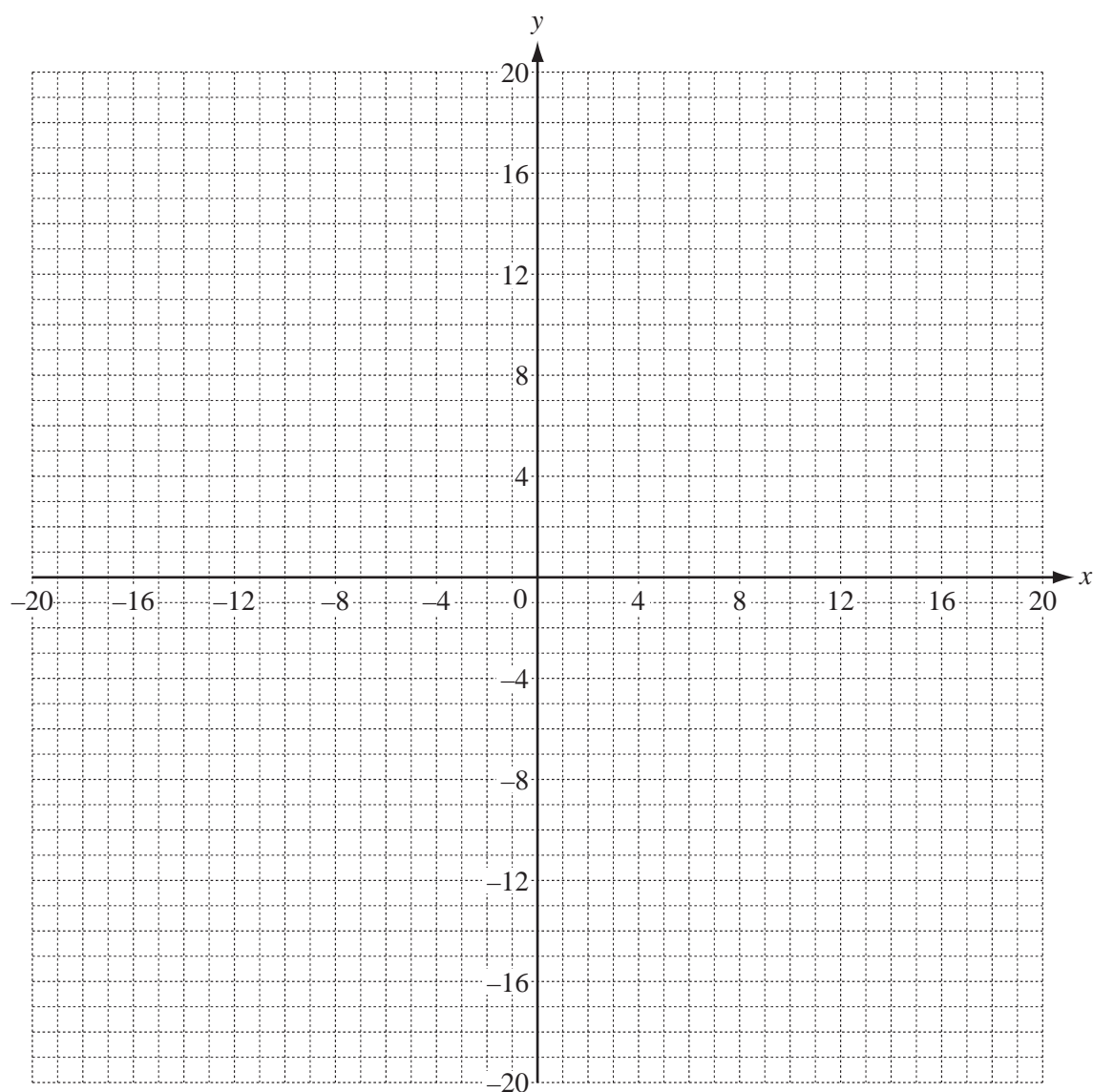
Answer(b)  $x =$  ..... [2]

- 8 (a) Complete the table for the function  $y = \frac{18}{x}$ , ( $x \neq 0$ ).

$x$	-18	-9	-6	-3	-2	-1		1	2	3	6	9	18
$y$				-6	-9	-18		18	9	6			

[3]

- (b) On the grid below, draw the graph of  $y = \frac{18}{x}$  for  $-18 \leq x \leq -1$  and  $1 \leq x \leq 18$ .



[4]

- (c) Write down the order of rotational symmetry of the graph.

Answer(c) ..... [1]



(d) (i) On the grid, draw the graph of  $y = x$ . [1]

(ii) Write down the co-ordinates of the points of intersection of  $y = x$  and  $y = \frac{18}{x}$ .

*Answer(d)(ii)* ( ..... , ..... ) and ( ..... , ..... ) [2]

(e) On the grid, draw the reflection of  $y = x$  in the  $y$ -axis. [1]

9 (a) Simplify the following expressions.

(i)  $5k + 3p - 2 + p - 2k - 5$

*Answer(a)(i)* ..... [2]

(ii)  $5y^2 - 4x + 5x - 7y^2$

*Answer(a)(ii)* ..... [2]

(b) Expand the following expressions.

(i)  $3(4 + 7g)$

*Answer(b)(i)* ..... [1]

(ii)  $5m(5m^2 - t^2)$

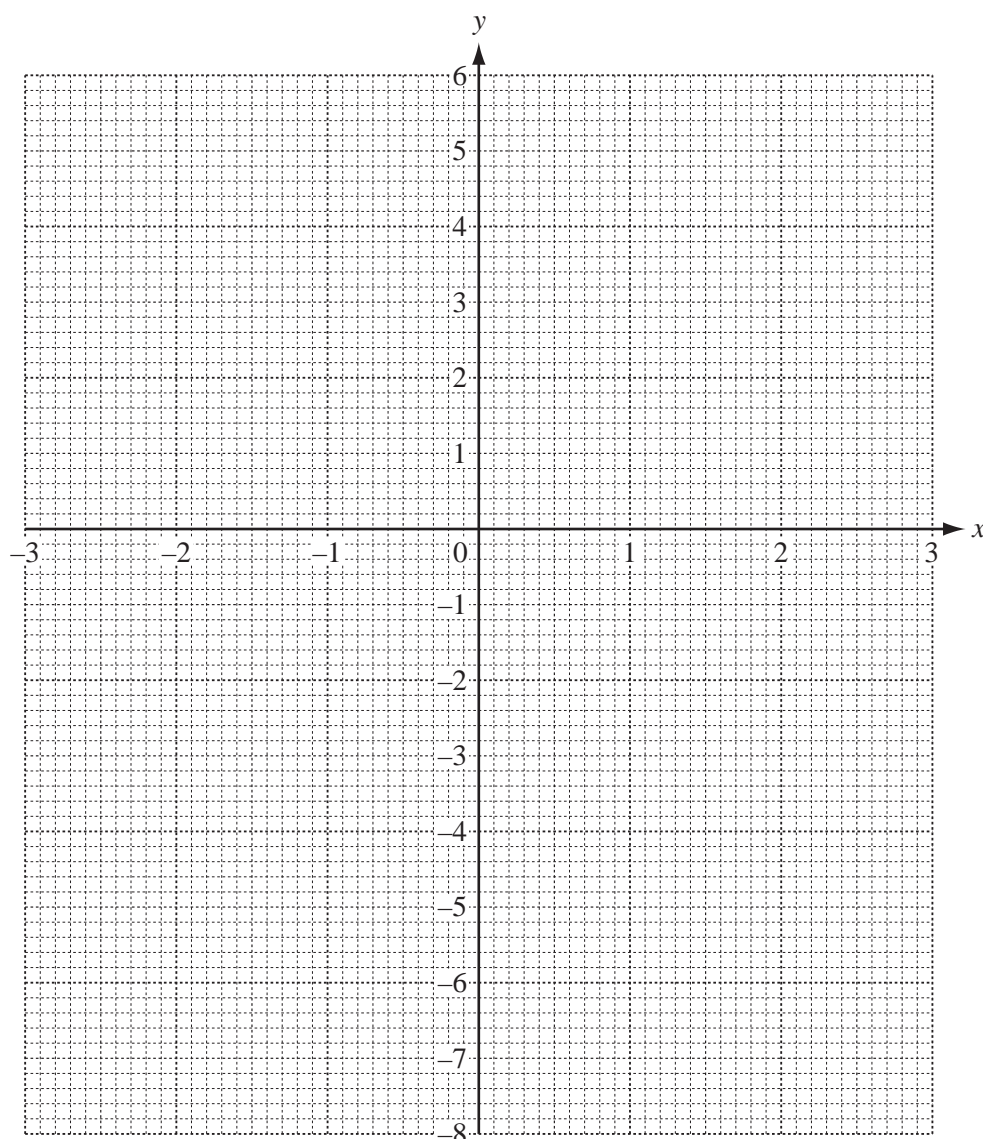
*Answer(b)(ii)* ..... [2]

- 3 (a) Complete the table of values for  $y = 5 + x - x^2$ .

$x$	-3	-2	-1	0	1	2	3
$y$	-7	-1		5		3	

[3]

- (b) On the grid below draw the graph of  $y = 5 + x - x^2$  for  $-3 \leq x \leq 3$ .



[4]

- (c) Use your graph to solve the equation  $5 + x - x^2 = 2$ .

Answer(c)  $x =$  ..... or  $x =$  ..... [2]

- (d) (i) Complete the table of values for  $y = 2x - 1$ .

$x$	-3	0	3
$y$			

[2]

- (ii) On the grid, draw the straight line  $y = 2x - 1$  for  $-3 \leq x \leq 3$ .

[2]

- (iii) Write down the gradient of  $y = 2x - 1$ .

Answer(d)(iii) ..... [1]

- (e) Write down the co-ordinates of the points where the line  $y = 2x - 1$  intersects the graph of  $y = 5 + x - x^2$ .

Answer(e) ( ..... , ..... ) and ( ..... , ..... ) [2]

- 4 (a) Solve the equation.

$$3(x + 1) + 5(x - 3) = 48$$

Answer(a)  $x =$  ..... [3]

- (b) Make  $f$  the subject of the formula  $g = 7f - 5$ .

Answer(b)  $f =$  ..... [2]

- (c) Factorise **completely**  $6xy - 10yz$ .

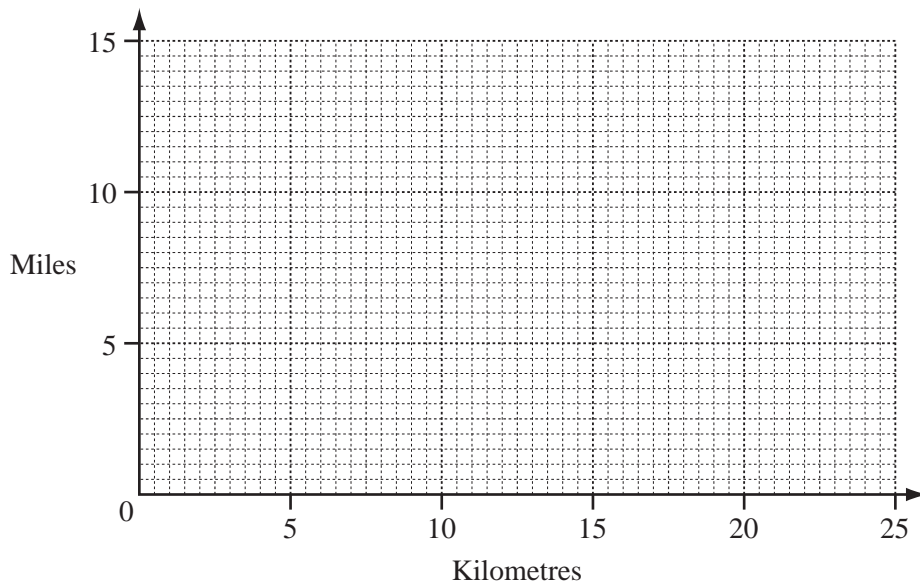
Answer(c) ..... [2]

**10** Solve the simultaneous equations

$$\begin{aligned} 5x - y &= 15, \\ 7x - 5y &= 3. \end{aligned}$$

Answer  $x =$  .....  
 $y =$  ..... [3]

---

**11**

Distance can be measured in miles or kilometres. 24 kilometres is approximately equal to 15 miles.

(a) Draw a straight line on the grid to show the conversion between kilometres and miles. [2]

(b) Use your graph to estimate the number of kilometres equal to 12 miles.

Answer (b) ..... km [1]

---

- 14 (a)** Find the value of  $p$  when  $p^3 = -27$ .

*Answer(a)*  $p =$  ..... [1]

- (b)** Find the value of  $q$  when  $q^{-1} = \frac{1}{6}$ .

*Answer(b)*  $q =$  ..... [1]

- (c)** Simplify  $8s^2 \div 2s^{-1}$ .

*Answer(c)* ..... [2]

---

**15**

$$J = \frac{md}{3}$$

- (a)** Find the value of  $d$  when  $J = 35$  and  $m = 7$ .

*Answer(a)*  $d =$  ..... [2]

- (b)** Make  $d$  the subject of the formula.

*Answer(b)*  $d =$  ..... [2]

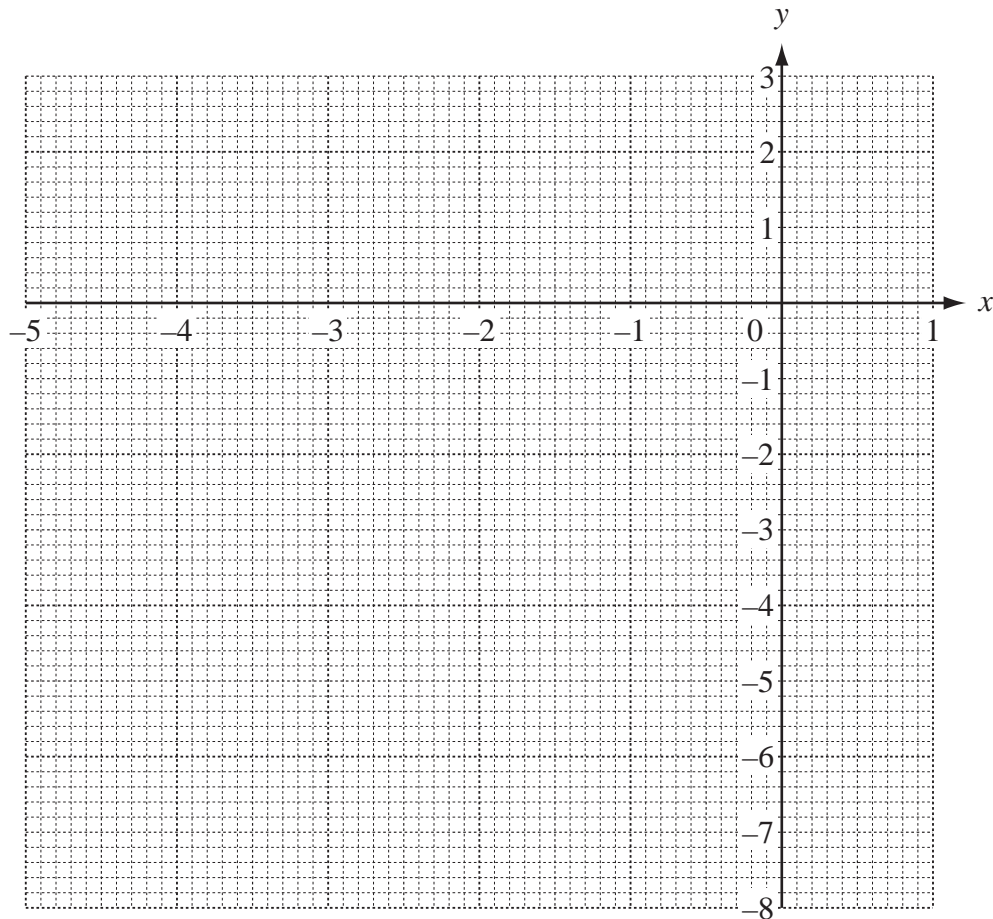
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- 5 (a) Complete the table of values for  $y = x^2 + 4x - 3$ .

$x$	-5	-4	-3	-2	-1	0	1
$y$		-3		-7	-6	-3	

[3]

- (b) On the grid below draw the graph of  $y = x^2 + 4x - 3$  for  $-5 \leq x \leq 1$ .



[4]

- (c) (i) Write down the co-ordinates of the lowest point of the graph.

Answer(c)(i) ( ..... , ..... ) [1]

- (ii) Write down the solutions of the equation  $x^2 + 4x - 3 = 0$ .

Answer(c)(ii)  $x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

(d) (i) Mark the point  $(-2, 1)$  on the grid and label it  $A$ . [1]

(ii) Draw the straight line joining  $A$  to the point where the graph of  $y = x^2 + 4x - 3$  cuts the  $y$ -axis. [1]

(iii) Find the gradient of your line.

Answer(d)(iii) ..... [2]

(iv) Write down the equation of your line in the form  $y = mx + c$ .

Answer(d)(iv)  $y =$  ..... [2]

6 Ravinder scores  $x$  marks in a test.

(a) Manpreet scores 4 more marks than Ravinder.  
Write down Manpreet's mark in terms of  $x$ .

Answer(a) ..... [1]

(b) Tamsin scores 3 times as many marks as Ravinder.  
Write down Tamsin's mark in terms of  $x$ .

Answer(b) ..... [1]

(c) (i) Write down and simplify the total of the three marks in terms of  $x$ .

Answer(c)(i) ..... [2]

(ii) The mean of these marks is 28. Show that  $5x + 4 = 84$ .

Answer (c)(ii)

[1]

(iii) Solve the equation  $5x + 4 = 84$ .

Answer(c)(iii)  $x =$  ..... [2]

(d) What mark did Tamsin score?

Answer(d) ..... [1]

(e) Dinesh scored 63 marks out of 75.  
Work out the mark Dinesh scored as a percentage.

Answer(e) ..... % [2]

**3 All the times given in this question are the local time in Paris.**

Pierre left Paris at 08 00 to go to his office in London.

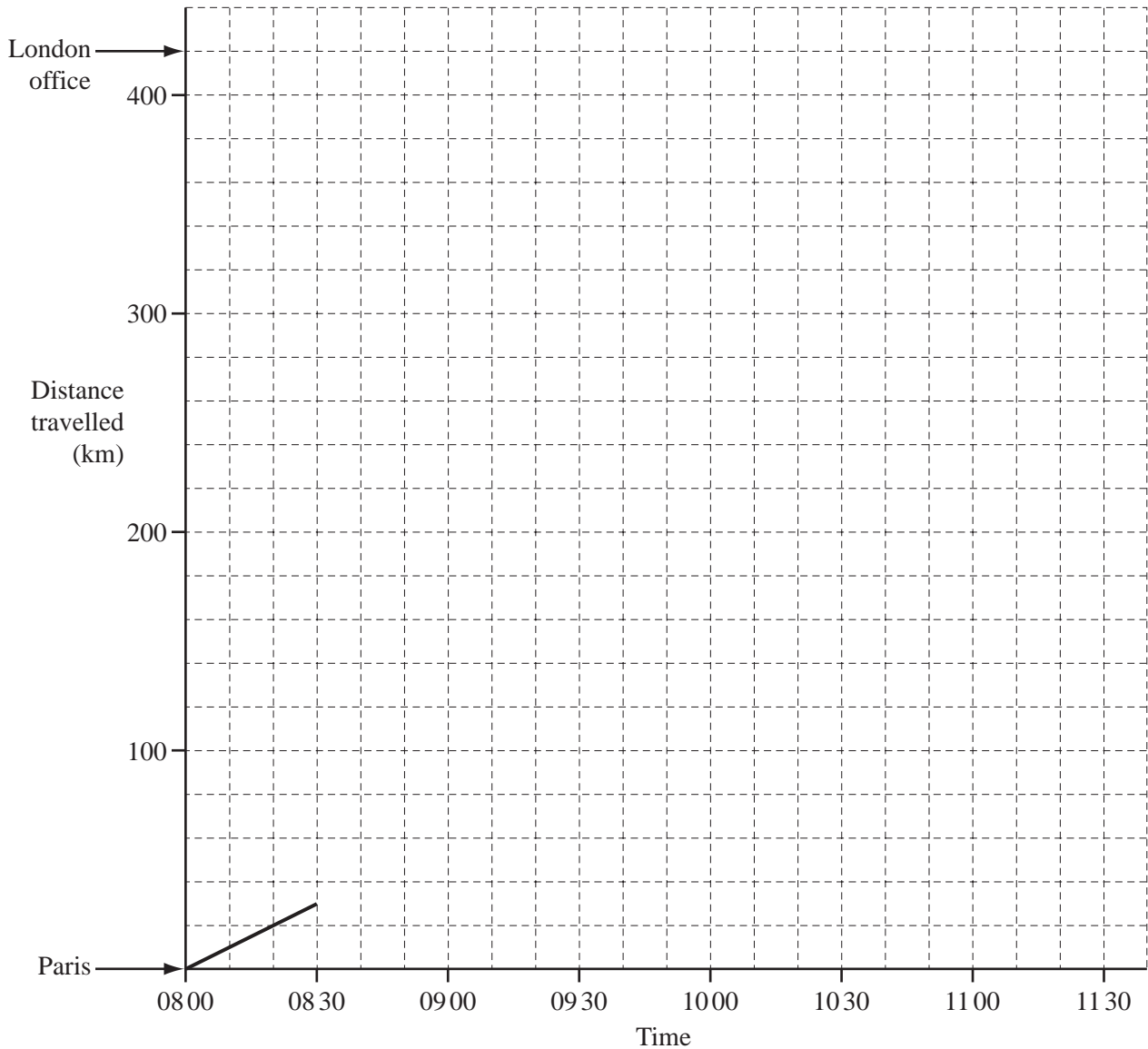
He travelled 30 kilometres to the airport.

He arrived at 08 30 and his plane left one hour later.

It flew 350 kilometres to London airport and landed at 10 15.

Pierre left London airport at 10 50 and he arrived at his office in London 40 minutes later.

**(a)** On the grid below, complete the travel graph.



[4]



- (b) (i)** How long is the flight from Paris to London?  
Give your answer in hours.

*Answer(b)(i)* ..... h [1]

- (ii)** Calculate the average speed of the flight, in kilometres/hour.

*Answer(b)(ii)* ..... km/h [2]

- (c)** Pierre's colleague, Annette, travelled from Paris to London by train.  
She left at 09 50 and arrived at the London office at 12 45.  
Calculate the difference in the times taken by Pierre and Annette for the whole journey.  
Give your answer in minutes.

*Answer(c)* ..... min [3]

---

4 (a) Garcia and Elena are each given  $x$  dollars.

(i) Elena spends 4 dollars.

Write down an expression in terms of  $x$  for the number of dollars she has now.

Answer(a)(i) \$ ..... [1]

(ii) Garcia doubles his money by working and then is given another 5 dollars.

Write down an expression in terms of  $x$  for the number of dollars he has now.

Answer(a)(ii) \$ ..... [1]

(iii) Garcia now has three times as much money as Elena.

Write down an equation in  $x$  to show this.

Answer(a)(iii) ..... [1]

(iv) Solve the equation to find the value of  $x$ .

Answer(a)(iv)  $x =$  ..... [3]

(b) Solve the simultaneous equations

$$\begin{aligned} 3x - 2y &= 3, \\ x + 4y &= 8. \end{aligned}$$

Answer(b)  $x =$  .....

$y =$  ..... [3]

7

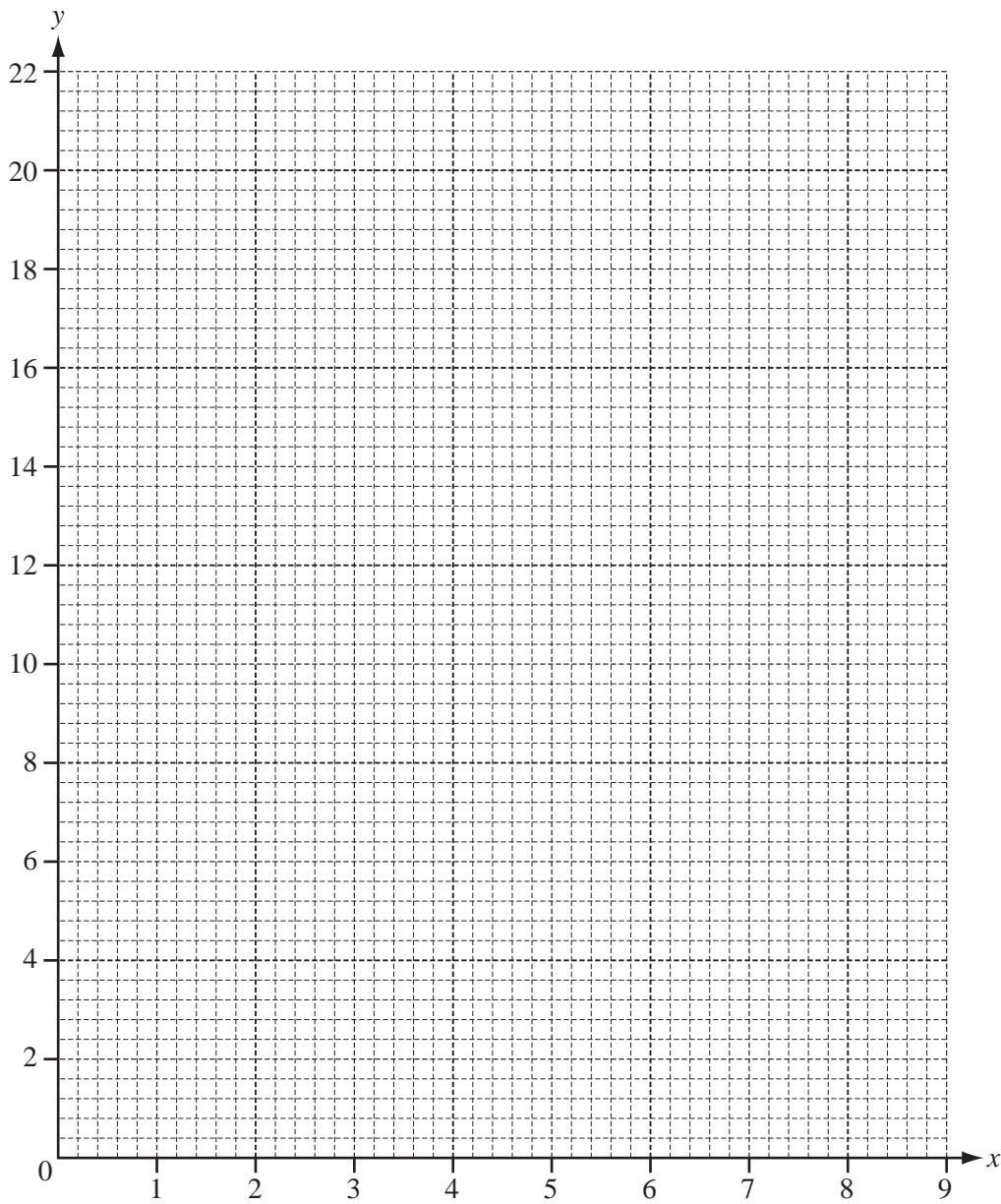
$$y = 9x - x^2.$$

- (a) Complete the table of values for this equation.

$x$	0	1	2	3	4	5	6	7	8	9
$y$		8			20	20			8	0

[3]

- (b) On the grid below, draw the graph of  $y = 9x - x^2$  for  $0 \leq x \leq 9$ .



[4]

- (c) Write down the values of  $x$  and  $y$  at the highest point of the curve.

*Answer(c)*  $x =$  .....  
 $y =$  ..... [2]

- (d) (i) On the grid, draw the line  $y = 6$  for  $0 \leq x \leq 9$ . [1]

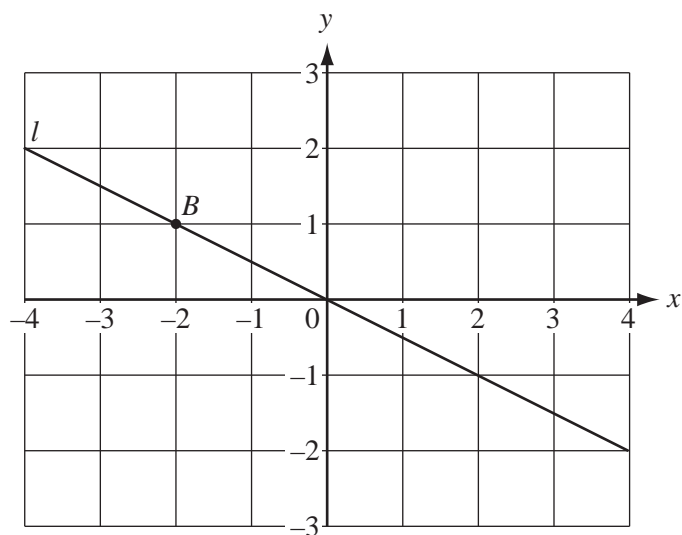
- (ii) Use this line to find the solutions of the equation

$$9x - x^2 = 6.$$

Give your answers correct to one decimal place.

*Answer(d)(ii)*  $x =$  ..... or  $x =$  ..... [2]

---



(a) Mark clearly on the diagram the point with co-ordinates (3, 2) and label it A. [1]

(b) Write down the co-ordinates of the point B.

Answer(b) ( ..... , ..... ) [1]

(c) Find the gradient of the line  $l$ .

Answer(c) ..... [1]

16 Simplify

(a)  $\left(\frac{1}{p}\right)^0$ ,

Answer(a) ..... [1]

(b)  $q^4 \times q^7$ ,

Answer(b) ..... [1]

(c)  $(r^2)^{-3}$ .

Answer(c) ..... [1]

5 Aminata and her brother live 18 kilometres from a shopping centre.

- (a) Aminata leaves home at 09 00 and runs 3 kilometres to a bus stop.  
She arrives there at 09 30.

Write down her average speed, in kilometres per hour.

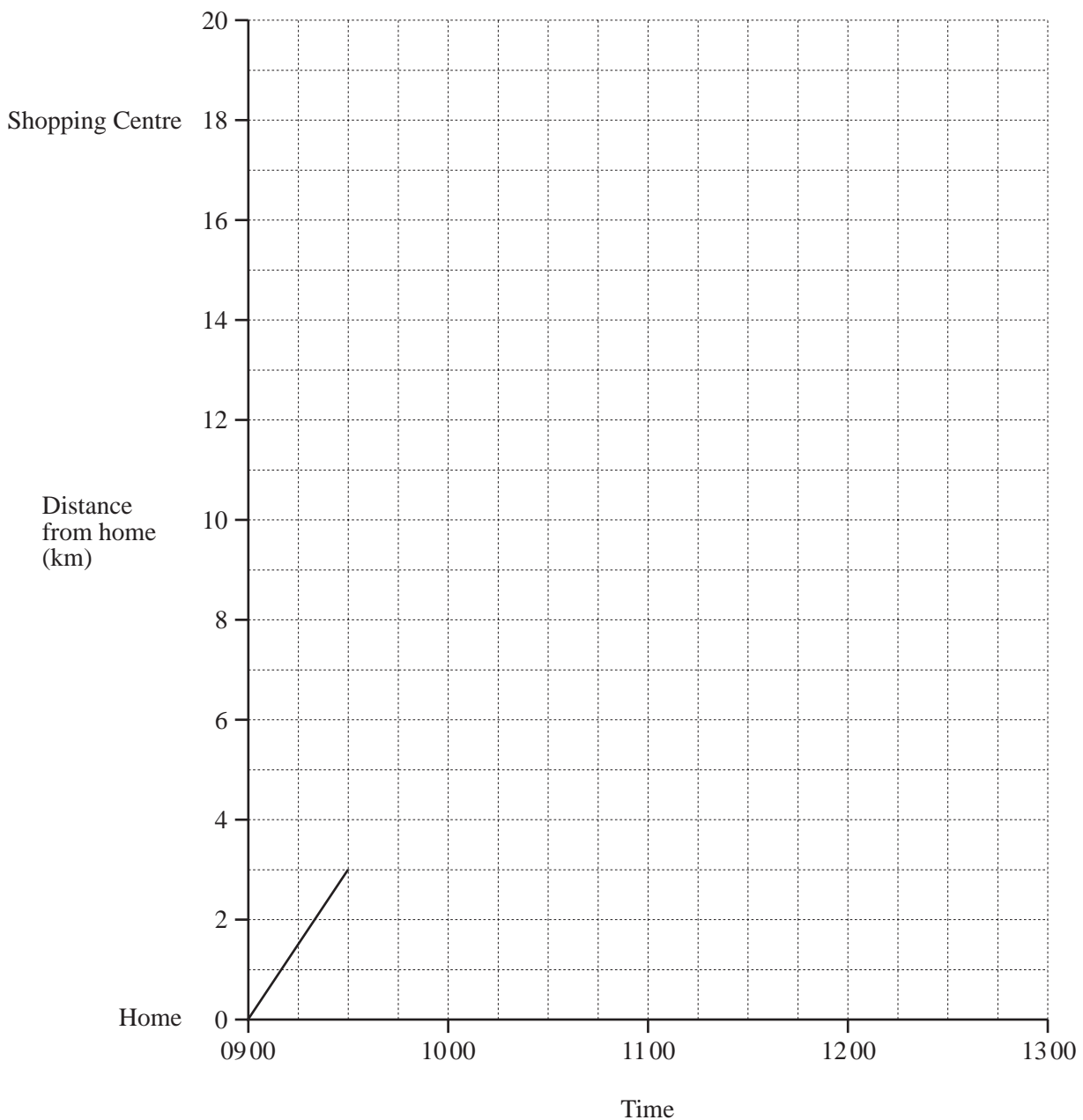
Answer(a) ..... km/h [1]

- (b) She waits 15 minutes for the bus.  
The bus travels the remaining 15 kilometres to the shopping centre at an average speed of 20 km/h.

- (i) At what time does she arrive at the shopping centre?

Answer(b)(i) ..... [2]

- (ii) On the grid below, complete the travel graph showing her journey to the shopping centre.



[2]

- (c) Her brother leaves home at 11 15.  
He travels to the shopping centre by car at an average speed of 54 km/h.

(i) Work out how long, in minutes, he takes to travel to the shopping centre.

*Answer(c)(i)* ..... minutes [1]

(ii) Show his journey on the grid. [1]

- (d) Aminata and her brother leave the shopping centre at 12 00.  
They travel home by car and arrive at 12 45.

(i) Show their journey home on the grid. [1]

(ii) Calculate the average speed of their journey home.

*Answer(d)(ii)* ..... km/h [2]

6 (a)  $2y = 75 - 7x$

(i) Find  $y$  when  $x = 7$ .

*Answer(a)(i)*  $y =$  ..... [2]

(ii) Find  $x$  when  $y = 6$ .

*Answer(a)(ii)*  $x =$  ..... [2]

(b) Make  $x$  the subject of the equation  $2y = 75 - 7x$ .

*Answer(b)*  $x =$  ..... [2]

(c) Solve these simultaneous equations.

$$\begin{aligned} 4x - y &= 45 \\ 7x + 2y &= 75 \end{aligned}$$

*Answer(c)*  $x =$  .....

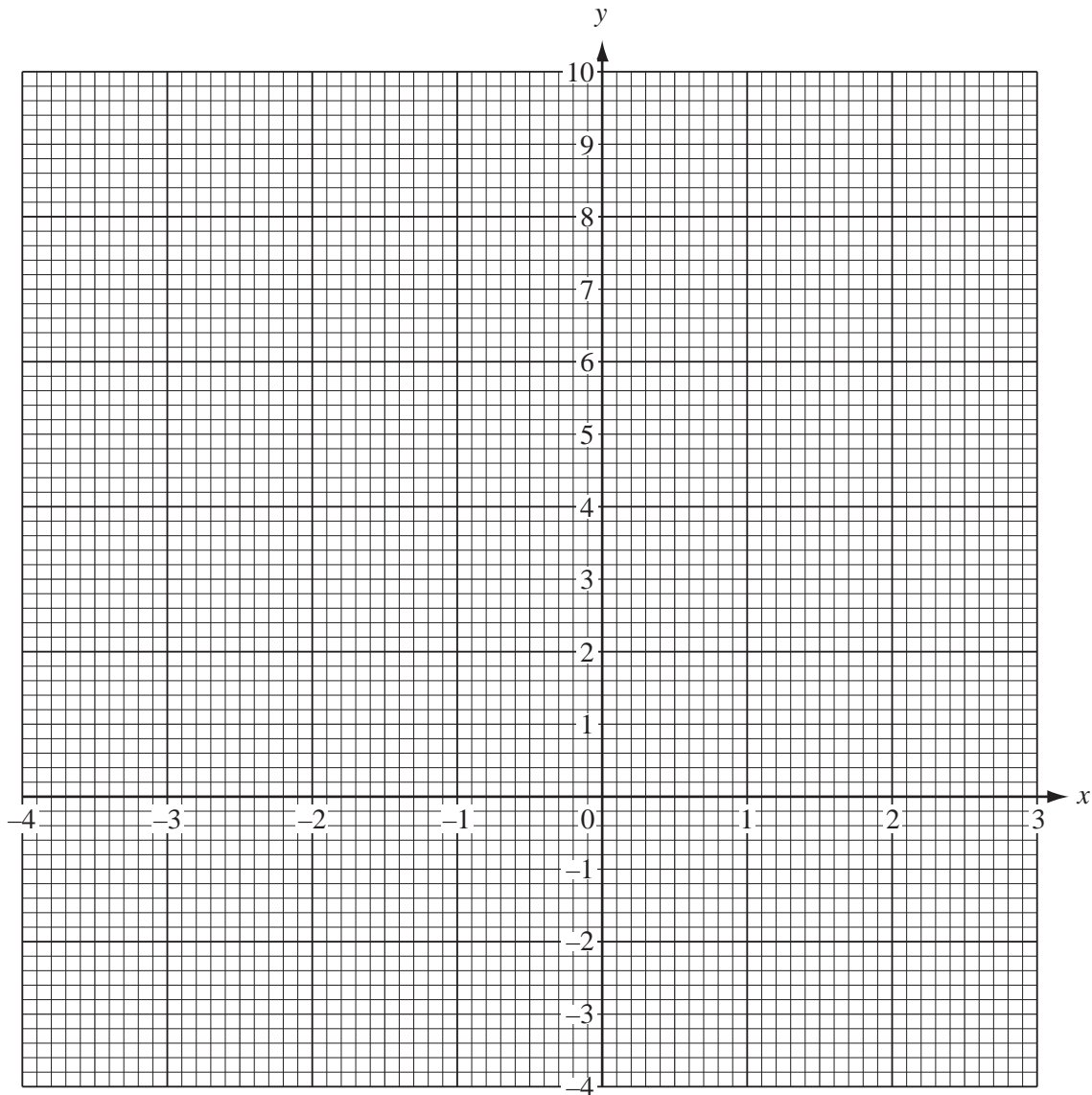
$y =$  ..... [3]

- 7 (a) Complete the table of values for the equation  $y = x^2 + x - 3$ .

$x$	-4	-3	-2	-1	0	1	2	3
$y$	9		-1	-3		-1		9

[3]

- (b) On the grid, draw the graph of  $y = x^2 + x - 3$ .



[4]

- (c) Write down the coordinates of the lowest point of the curve.

Answer(c) ( ..... , ..... ) [2]

- (d) (i) Draw the line of symmetry of the graph. [1]

- (ii) Write down the equation of the line of symmetry.

Answer(d)(ii) ..... [1]



4 (a) Solve the equations

(i)  $3x - 4 = 14$ ,

Answer(a)(i)  $x =$  ..... [2]

(ii)  $\frac{y+1}{5} = 2$ ,

Answer(a)(ii)  $y =$  ..... [2]

(iii)  $3(2z - 7) - 2(z - 3) = -9$ .

Answer(a)(iii)  $z =$  ..... [3]

(b) Donna sent  $p$  postcards and  $q$  letters to her friends.

(i) The total number of postcards and letters she sent was 12.

Write down an equation in  $p$  and  $q$ .

Answer(b)(i) ..... [1]

(ii) A stamp for a postcard costs 25 cents and a stamp for a letter costs 40 cents.  
She spent 375 cents on stamps altogether.

Write down another equation in  $p$  and  $q$ .

Answer(b)(ii) ..... [1]

(iii) Solve these equations to find the values of  $p$  and  $q$ .

Answer(b)(iii)  $p =$  ..... and  $q =$  ..... [3]

- 8 (a) The width of a rectangle is  $x$  centimetres.

The length of the rectangle is 3 centimetres more than the width.

Write down an expression, in terms of  $x$ , for

- (i) the length of the rectangle,

*Answer(a)(i)* ..... cm [1]

- (ii) the area of the rectangle.

*Answer(a)(ii)* .....  $\text{cm}^2$  [1]

- (iii) The area of the rectangle is 7 square centimetres.

Show that  $x^2 + 3x - 7 = 0$ .

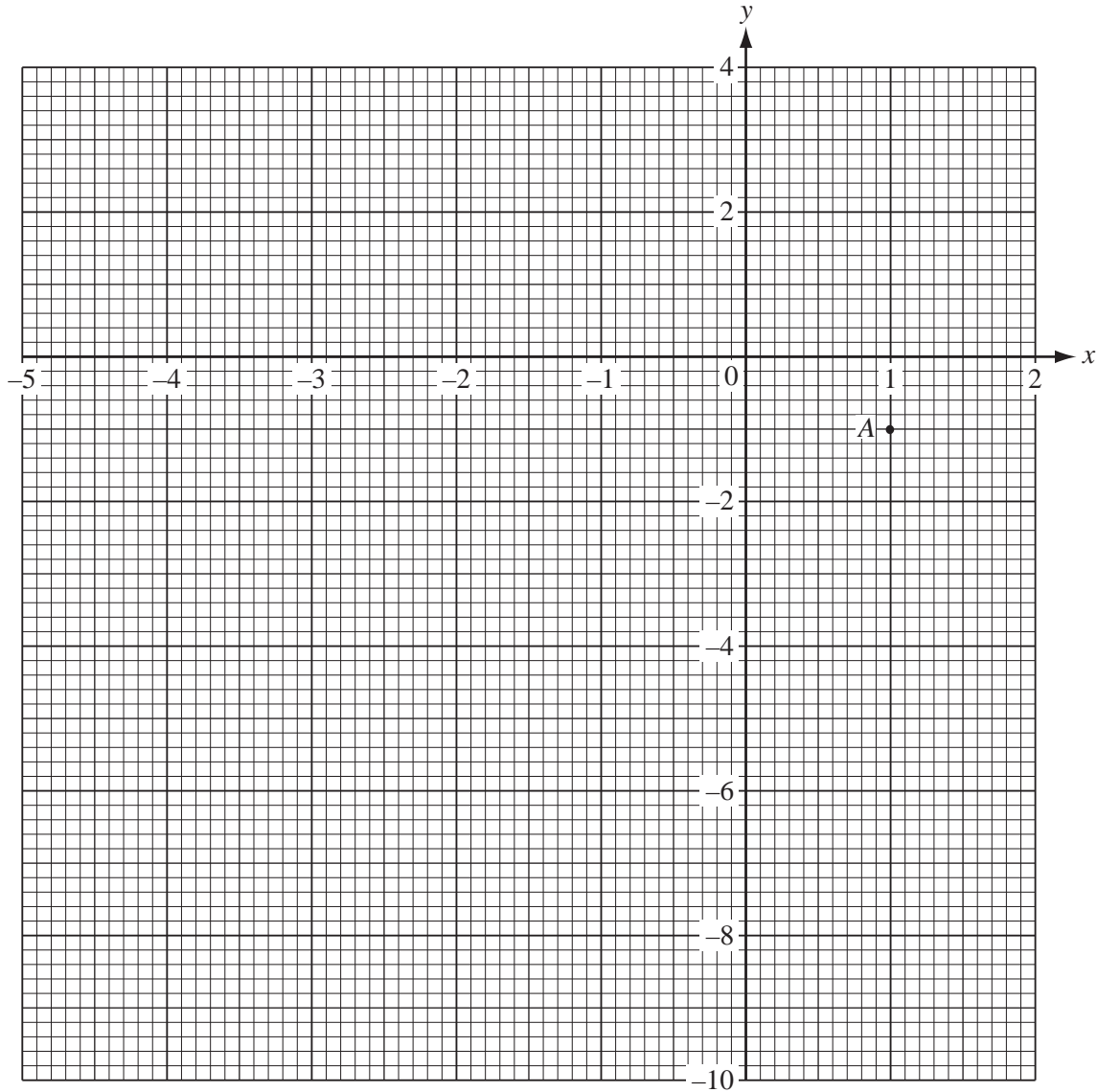
*Answer (a)(iii)*

- (b) (i) Complete the tables of values for the equation  $y = x^2 + 3x - 7$ . [1]

$x$	-5	-4	-3	-2	-1	0	1	2
$y$	3		-7	-9		-7		3

[3]

- (ii) On the grid below, draw the graph of  $y = x^2 + 3x - 7$  for  $-5 \leq x \leq 2$ .



- (c) (i) Use your graph to find the solutions to the equation  $x^2 + 3x - 7 = 0$ . [4]

Answer(c)(i)  $x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

- (ii) Find the length of the rectangle in **part (a)**.

Answer(c)(ii)  $\dots\dots\dots$  cm [1]

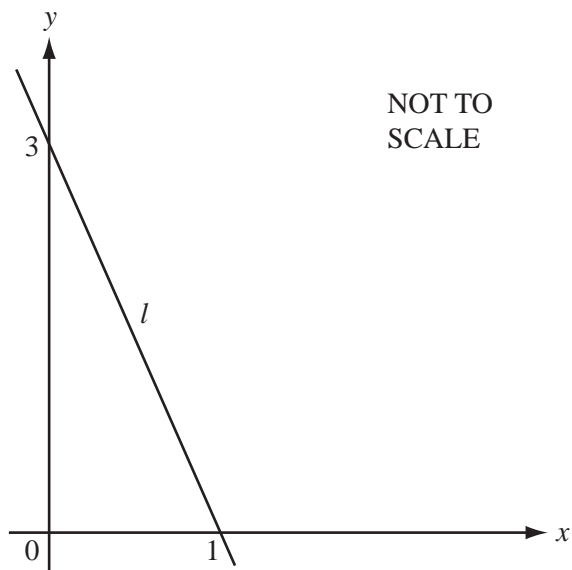
- (d) The point  $A(1, -1)$  is marked on the grid.

- (i) Draw a straight line through  $A$  with a gradient of 2. [1]

- (ii) Write down the equation of this line in the form  $y = mx + c$ .

Answer(d)(ii)  $y = \dots\dots\dots$  [2]

12



A straight line,  $l$ , crosses the  $x$ -axis at  $(1, 0)$  and the  $y$ -axis at  $(0, 3)$ .

- (a) Find the gradient of the line  $l$ .

Answer(a) ..... [1]

- (b) Write down the equation of the line  $l$ , in the form  $y = mx + c$ .

Answer(b)  $y =$  ..... [2]

- 13 A school has 240 students.

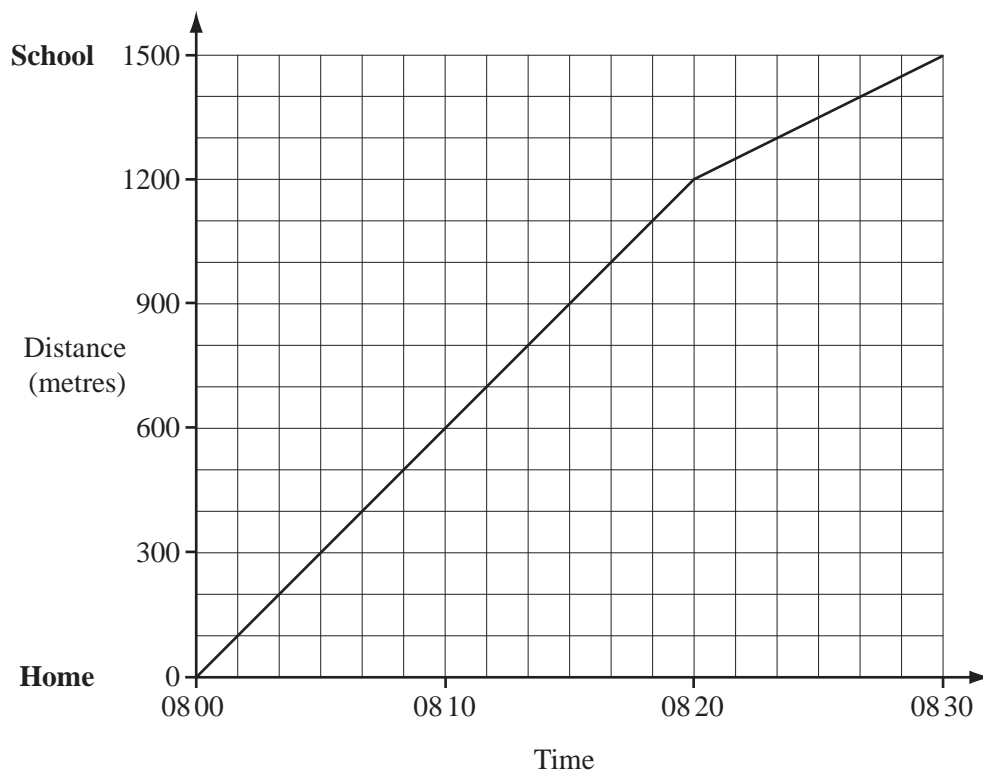
- (a) There are 131 girls.  
What percentage of the students are girls?

Answer(a) ..... [2]

- (b) One day 6.25% of the 240 students are absent.  
Work out the number of students who are absent.

Answer(b) ..... [2]

19



The travel graph shows Maria's walk to school one Monday morning.

(a) Calculate her speed during the first 20 minutes

(i) in metres / minute,

Answer(a)(i) ..... m / min [1]

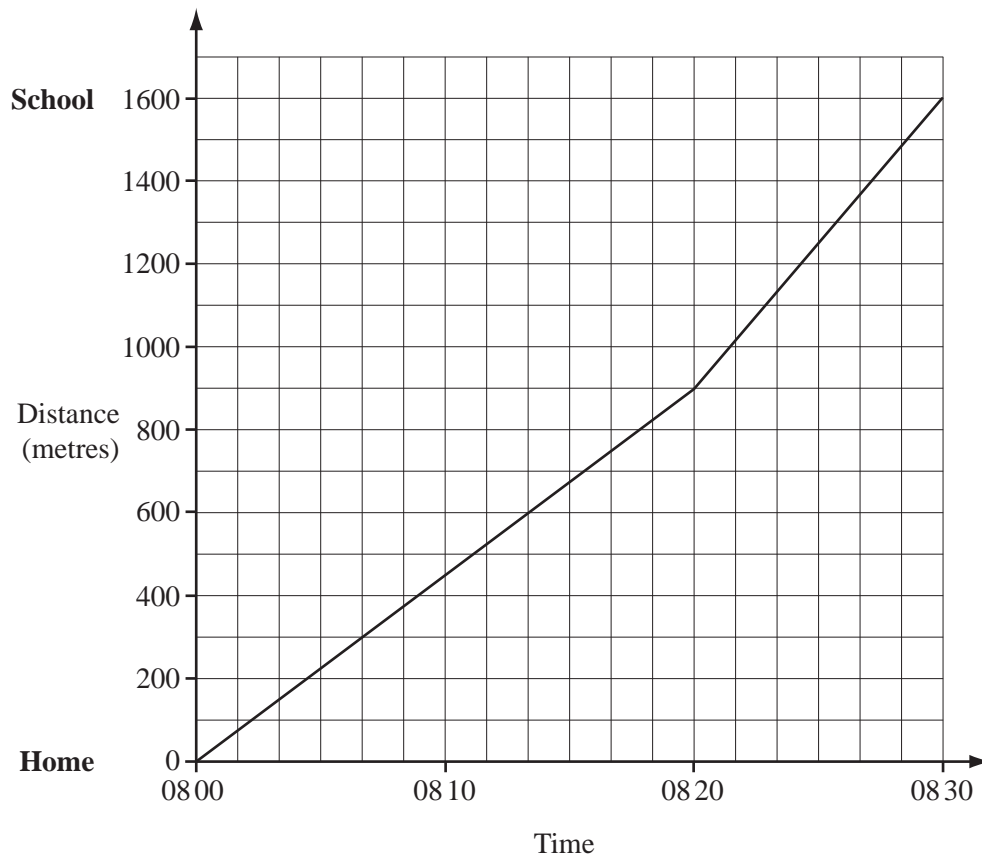
(ii) in kilometres / hour.

Answer(a)(ii) ..... km / h [2]

(b) Calculate the average speed of her walk from home to school in kilometres / hour.

Answer(b) ..... km / h [2]

19



The travel graph shows Cecilia's walk to school one Monday morning.

(a) Calculate her speed during the first 20 minutes

(i) in metres/minute,

Answer(a)(i) ..... m/min [1]

(ii) in kilometres/hour.

Answer(a)(ii) ..... km/h [2]

(b) Calculate the average speed of her walk from home to school in kilometres/hour.

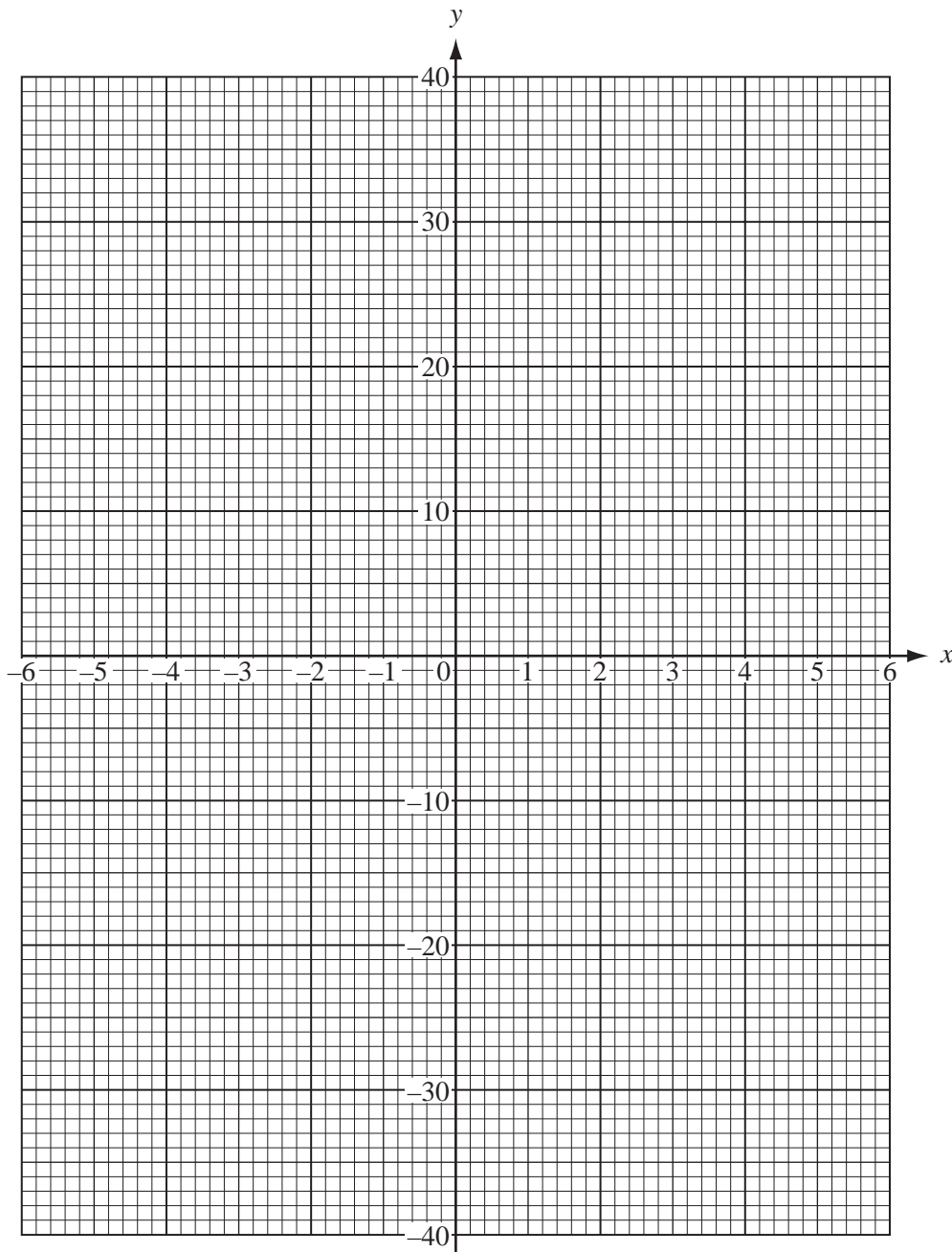
Answer(b) ..... km/h [2]

- 3 (a) Complete the table for the function  $y = \frac{36}{x}$ , ( $x \neq 0$ ).

$x$	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6
$y$		-7.2	-9		-18				18		9	7.2	

[3]

- (b) On the grid below, draw the graph of  $y = \frac{36}{x}$  for  $-6 \leq x \leq -1$  and  $1 \leq x \leq 6$ .



[4]

- (c) Use your graph to find  $x$  when  $y = 21$ .

Answer(c)  $x =$  ..... [1]

(d) Complete the table for the function  $y = x^2$ .

$x$	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
$y$		25	16		4	1		1	4		16	25	

[2]

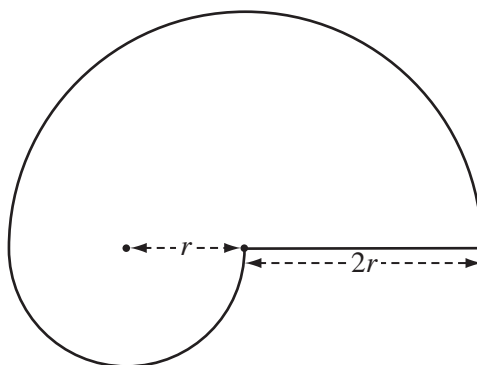
(e) On the same grid, draw the graph of  $y = x^2$  for  $-6 \leq x \leq 6$ .

[4]

(f) Write down the co-ordinates of the point of intersection of the graphs of  $y = \frac{36}{x}$  and  $y = x^2$ .

Answer(f) ( ..... , ..... ) [1]

4



The area of the shape is given by the formula  $A = \frac{5\pi r^2}{2}$ .

(a) Calculate the area when  $r = 3$  cm.

Answer(a)  $A =$  .....  $\text{cm}^2$  [2]

(b) Calculate the value of  $r$  when  $A = 200 \text{ cm}^2$ .

Answer(b)  $r =$  ..... cm [3]

(c) Make  $r$  the subject of the formula.

Answer(c) ..... [3]



6 (a) Pencils cost 5 cents each and erasers cost 4 cents each.

(i) Work out the **total** cost of 10 pencils and 7 erasers.

*Answer(a)(i)* ..... cents [1]

(ii) Write down, in terms of  $p$  and  $e$ , the **total** cost of  $p$  pencils and  $e$  erasers.

*Answer(a)(ii)* ..... cents [1]

(b) The cost of a pen is  $x$  cents and the cost of a ruler is  $y$  cents.

2 pens and 3 rulers have a total cost of 57 cents.

5 pens and 1 ruler have a total cost of 58 cents.

(i) Write down two equations in  $x$  and  $y$ .

*Answer(b)(i)* .....  
 ..... [2]

(ii) Find the value of  $x$  and the value of  $y$ .

*Answer(b)(ii)*  $x =$  .....  
 $y =$  ..... [4]

- 12 Write down the equation of the straight line through  $(0, -1)$  which is parallel to  $y = 3x + 5$ .

Answer  $y =$  ..... [2]

---

- 13 (a)  $4^p \times 4^5 = 4^{15}$ . Find the value of  $p$ .

Answer(a)  $p =$  ..... [1]

- (b)  $2^7 \div 2^q = 2^4$ . Find the value of  $q$ .

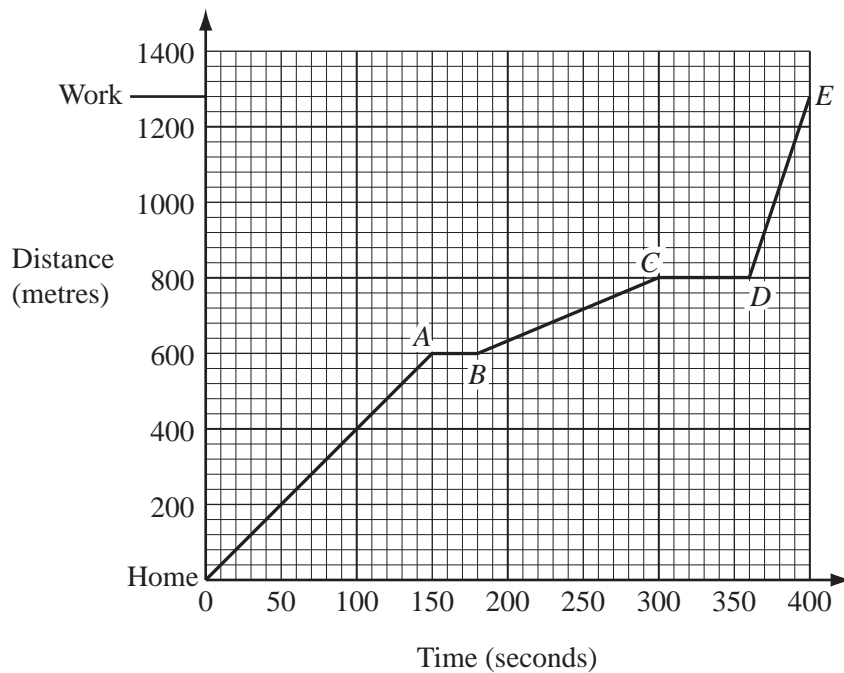
Answer(b)  $q =$  ..... [1]

- (c)  $5^r = \frac{1}{25}$ . Find the value of  $r$ .

Answer(c)  $r =$  ..... [1]

---

21



The graph shows the distance travelled by a cyclist on a journey from Home to Work.

- (a) The cyclist stopped twice at traffic lights.

For how many seconds did the cyclist wait altogether?

Answer(a) ..... s [2]

- (b) For which part of the journey did the cyclist travel fastest?

Answer(b) ..... [1]

- (c) (i) How far did the cyclist travel from Home to Work?

Answer(c)(i) ..... m [1]

- (ii) Calculate the cyclist's average speed for the whole journey.

Answer(c)(ii) ..... m/s [3]

- 12 Write down the equation of the straight line through  $(0, -3)$  which is parallel to  $y = 2x + 3$ .

Answer  $y =$  ..... [2]

---

- 13 (a)  $3^p \times 3^5 = 3^{14}$ . Find the value of  $p$ .

Answer(a)  $p =$  ..... [1]

- (b)  $2^8 \div 2^q = 2^3$ . Find the value of  $q$ .

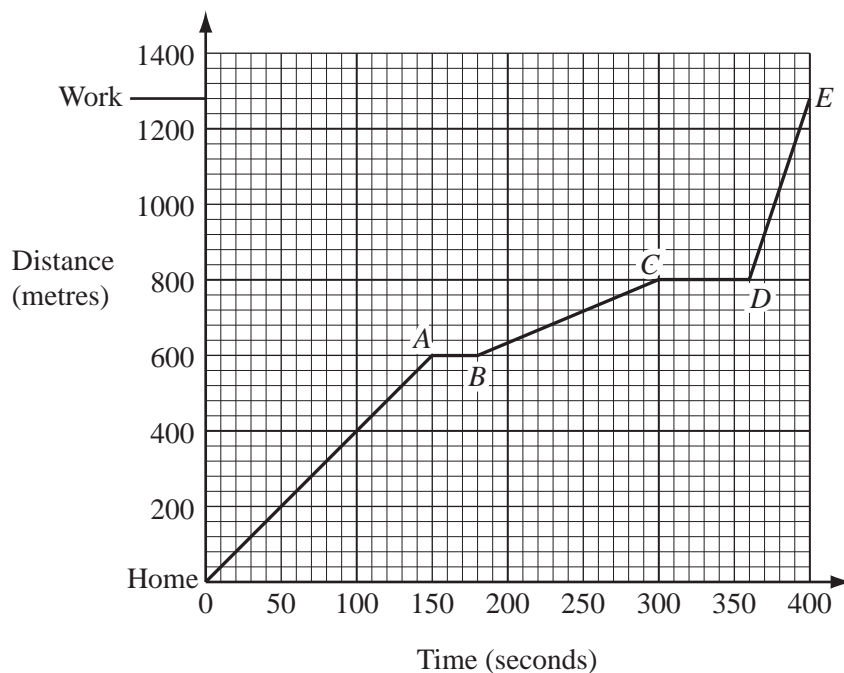
Answer(b)  $q =$  ..... [1]

- (c)  $6^r = \frac{1}{36}$ . Find the value of  $r$ .

Answer(c)  $r =$  ..... [1]

---

21



The graph shows the distance travelled by a cyclist on a journey from Home to Work.

- (a) The cyclist stopped twice at traffic lights.

For how many seconds did the cyclist wait altogether?

Answer(a) ..... s [2]

- (b) For which part of the journey did the cyclist travel fastest?

Answer(b) ..... [1]

- (c) (i) How far did the cyclist travel from Home to Work?

Answer(c)(i) ..... m [1]

- (ii) Calculate the cyclist's average speed for the whole journey.

Answer(c)(ii) ..... m/s [3]

- 3 (a) Kinetic energy,  $E$ , is related to mass,  $m$ , and velocity,  $v$ , by the formula

$$E = \frac{1}{2}mv^2.$$

- (i) Calculate  $E$  when  $m = 5$  and  $v = 12$ .

Answer(a)(i)  $E =$  ..... [2]

- (ii) Calculate  $v$  when  $m = 8$  and  $E = 225$ .

Answer(a)(ii)  $v =$  ..... [2]

- (iii) Make  $m$  the subject of the formula.

Answer(a)(iii)  $m =$  ..... [2]

- (b) Factorise completely  $xy^2 - x^2y$ .

Answer(b) ..... [2]

- (c) Solve the equation  $3(x - 5) + 2(14 - 3x) = 7$ .

Answer(c)  $x =$  ..... [3]

- (d) Solve the simultaneous equations

$$\begin{aligned} 4x + y &= 13, \\ 2x + 3y &= 9. \end{aligned}$$

Answer(d)  $x =$  .....  
 $y =$  ..... [3]

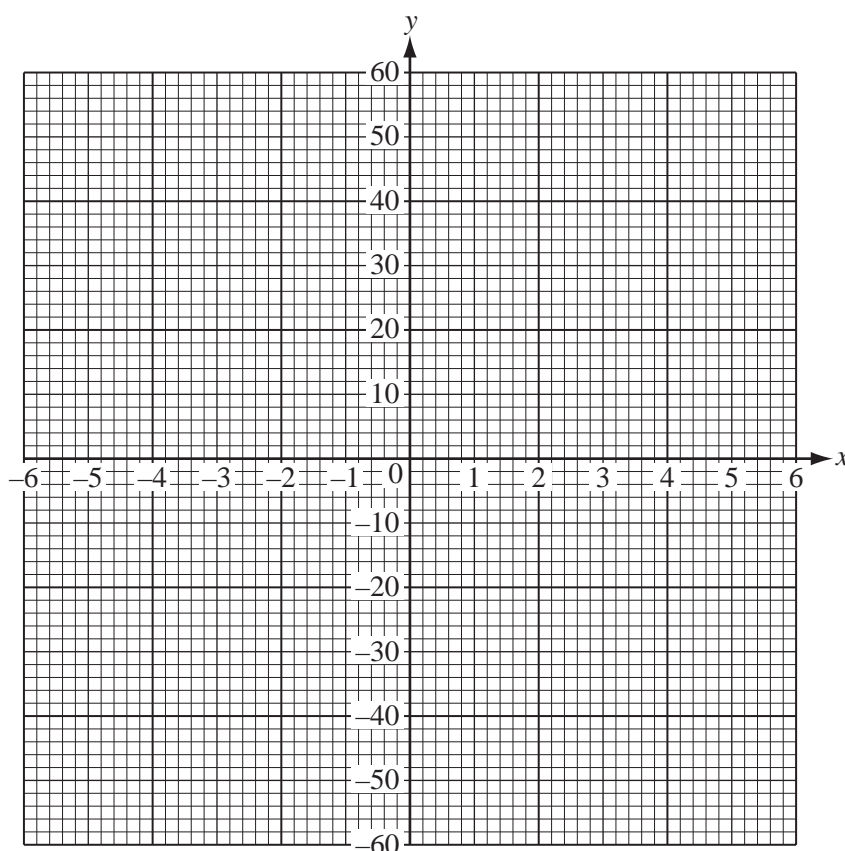
- 4 (a) The table shows corresponding values of  $x$  and  $y$  for the function

$$y = \frac{60}{x} \quad (x \neq 0).$$

$x$	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6
$y$		-12	-15		-30		60				12	10

[2]

- (i) Fill in the missing values of  $y$  in the table above.  
(ii) Plot the points on the grid below and draw the graph for  $-6 \leq x \leq -1$  and  $1 \leq x \leq 6$ .



[4]

- (b) Write down the order of rotational symmetry of the graph.

Answer(b) ..... [1]

- (c) Draw the lines of symmetry of the graph on the grid.

[2]

- (d) One line of symmetry intersects the graph at two points.

- (i) Write down the co-ordinates of these two points.

Answer(d)(i) ( ..... , ..... ) and ( ..... , ..... ) [2]

- (ii) Write down the equation of this line of symmetry.

Answer(d)(ii) ..... [1]

- (e) Find the gradient of the other line of symmetry.

Answer(e) ..... [1]

16 Write down the value of  $x$  when

(a)  $2^x = 8$ ,

Answer(a)  $x = \dots\dots\dots$  [1]

(b)  $3^x = \frac{1}{81}$ .

Answer(b)  $x = \dots\dots\dots$  [1]

---

17 The surface area of a sphere with radius  $r$  is  $A = 4\pi r^2$ .

(a) Calculate the surface area of a sphere with a radius of 5 centimetres.

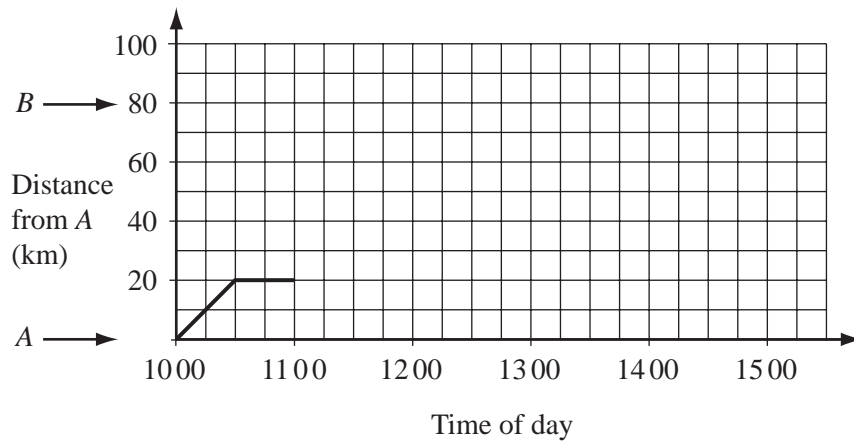
Answer(a)  $\dots\dots\dots \text{cm}^2$  [1]

(b) Make  $r$  the subject of the formula  $A = 4\pi r^2$ .

Answer(b)  $r = \dots\dots\dots$  [2]

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18



(a) Carla drives from town  $A$  to a supermarket.  
At 11 00 she continues her journey to town  $B$ , driving at 80 km/h.  
The first part of the journey is shown on the grid above.

(i) How many minutes is Carla at the supermarket?

Answer(a) (i)  $\dots\dots\dots$  min [1]

(ii) Draw the rest of her journey to town  $B$  on the grid. [1]

(b) Carla spends 1 hour in town  $B$  and then drives back to town  $A$ , at a constant speed, arriving at 14 30.

Show this information on the grid. [2]

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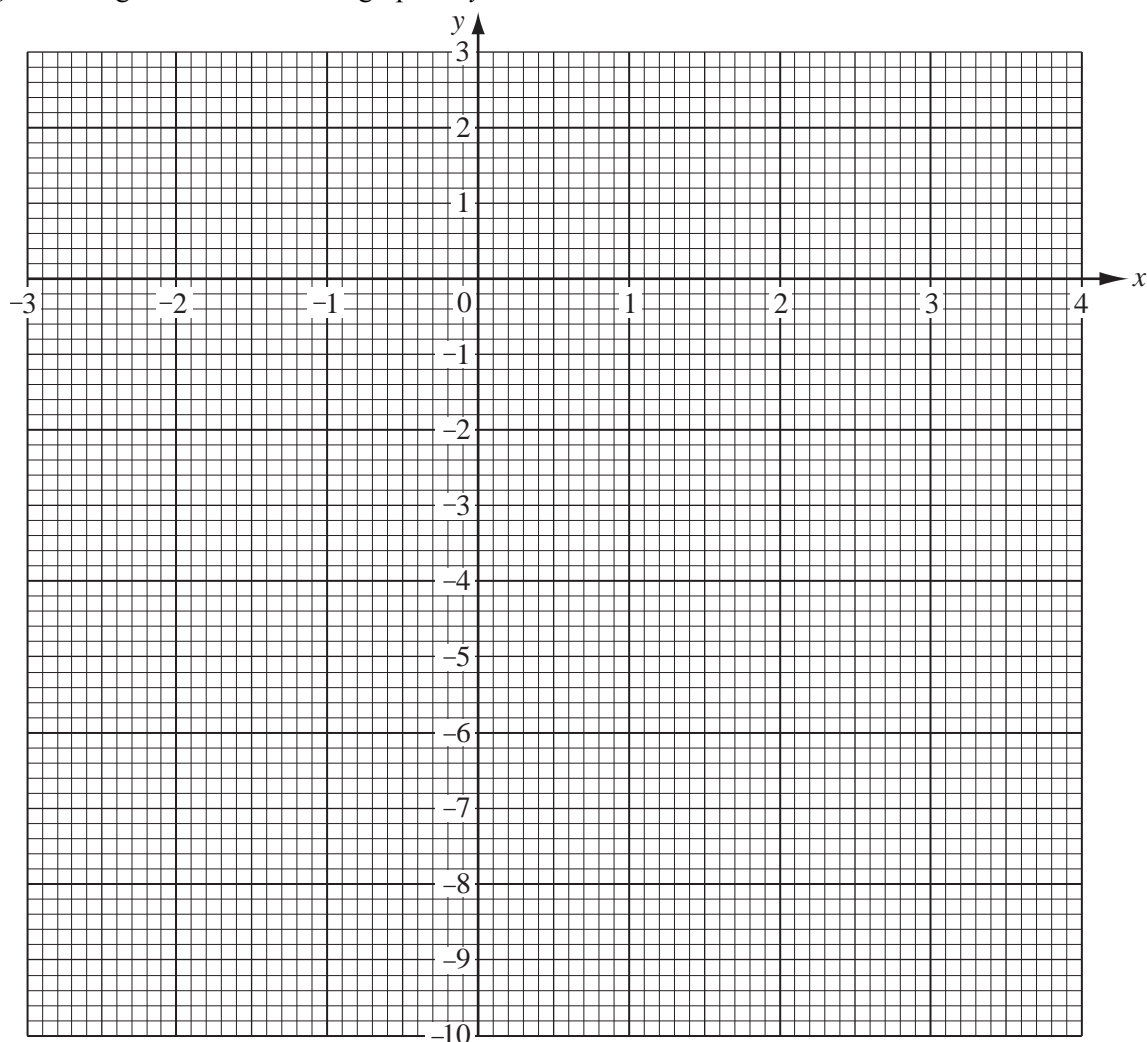


- 2 (a) Complete the table for the equation  $y = -x^2 + x + 2$ .

$x$	-3	-2	-1	0	1	2	3	4
$y$	-10		0	2	2	0		

[3]

- (b) On the grid below draw the graph of  $y = -x^2 + x + 2$ .



[4]

- (c) On the grid, draw the line of symmetry of your graph.

[1]

- (d) Use your graph to find the maximum value of  $y$ .

Answer(d)  $y = \dots\dots\dots$  [1]

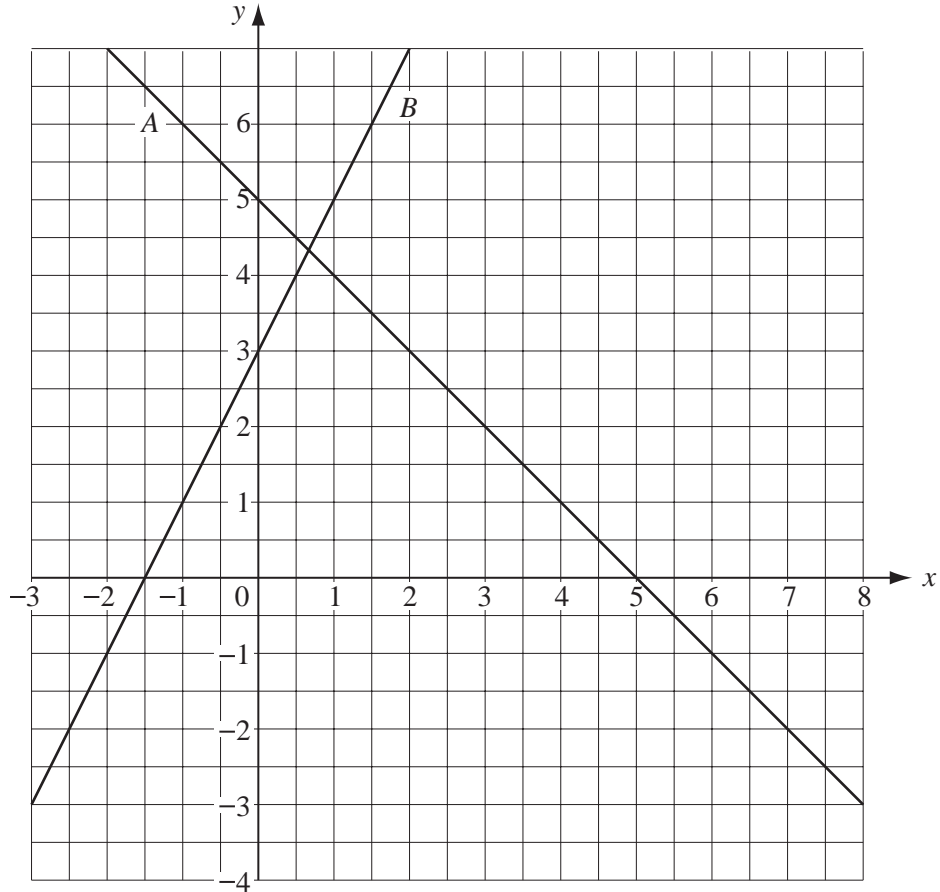
- (e) Draw the line  $y = 1$  on the grid.

[1]

- (f) Write down the two values of  $x$  for which  $-x^2 + x + 2 = 1$ .

Answer(f)  $x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

7



Two straight lines labelled  $A$  and  $B$  are shown on the grid above.

- (a) Find the gradient of line  $A$ .

Answer(a) ..... [2]

- (b) The equation of line  $B$  can be written as  $y = mx + c$ .  
Find the values of  $m$  and  $c$ .

Answer(b)  $m =$  .....

$c =$  ..... [2]

- (c) (i) On the diagram draw the line which is parallel to  $B$  and passes through the point  $(1, -1)$ .

[1]

- (ii) Write down the equation of this line.

Answer(c) (ii) ..... [2]

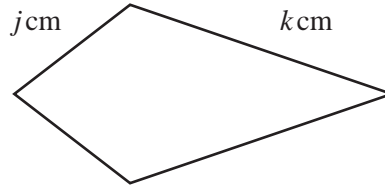
- 3 (a) Simplify the expression  $5p - 2q - (p + q)$ .

Answer(a) ..... [2]

- (b) Solve the equation  $3(2x - 5) = 27$ .

Answer(b)  $x =$  ..... [3]

- (c) A kite has sides of length  $j$  cm and  $k$  cm.



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- (i) Write down an expression in terms of  $j$  and  $k$  for the perimeter of the kite.

Answer(c)(i) .....cm [1]

- (ii) The perimeter of the kite is 72 centimetres.  
Write down an equation in  $j$  and  $k$ .

Answer(c)(ii) ..... [1]

- (iii) If  $k = 2j$ , find the value of  $k$ .

Answer(c)(iii)  $k =$  ..... [2]

- (d) (i) Use the formula  $w = \frac{s-t}{r}$  to find the value of  $w$  when  $s = \frac{5}{6}$ ,  $t = \frac{2}{3}$  and  $r = \frac{1}{2}$ .

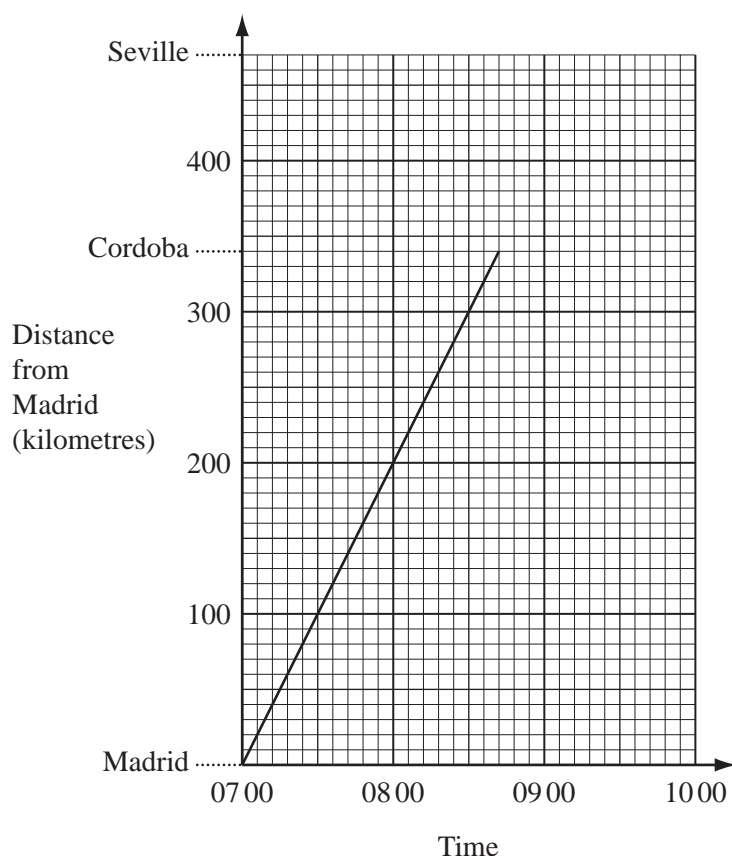
Show all your working clearly.

Answer(d)(i) ..... [3]

- (ii) Rearrange the formula in **part (d)(i)** to find  $s$  in terms of  $w$ ,  $r$  and  $t$ .

Answer(d)(ii)  $s =$  ..... [2]

- 5 A train leaves Madrid at 07 00 and travels to Cordoba, a distance of 340 kilometres. The distance-time graph shows the journey.



- (a) Find the average speed of the train from Madrid to Cordoba, in kilometres per hour.

Answer(a) ..... km/h [2]

- (b) The train stops for 12 minutes at Cordoba. It then continues its journey at the same average speed to Seville.

(i) Complete the graph to show its journey. [2]

- (ii) At what time does it arrive in Seville?

Answer(b)(ii) ..... [1]

- (c) Another train leaves Seville at 07 30 and travels, without stopping, to Madrid. This train arrives in Madrid at 09 45.

(i) Draw a line on the grid to show this journey. [2]

- (ii) How far from Madrid are the two trains when they pass each other?

Answer(c)(ii) ..... km [1]

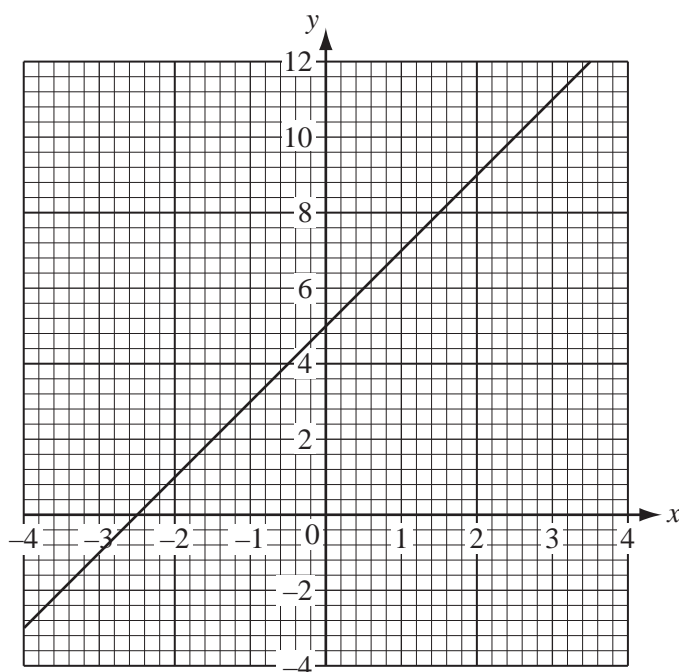
- (iii) Calculate the average speed of the train from Seville to Madrid, in kilometres per hour.

Answer(c)(iii) ..... km/h [2]

- 7 (a) The equation of a straight line is  $y = mx + c$ .  
Which letter in this equation represents the gradient?

Answer(a) ..... [1]

(b)



Write down the equation of the line shown on the grid above.

Answer(b) ..... [2]

- (c) Complete the table of values for  $y = 12 - x^2$ .

$x$	-4	-3	-2	-1	0	1	2	3	4
$y$	-4	3		11		11	8		-4

[3]

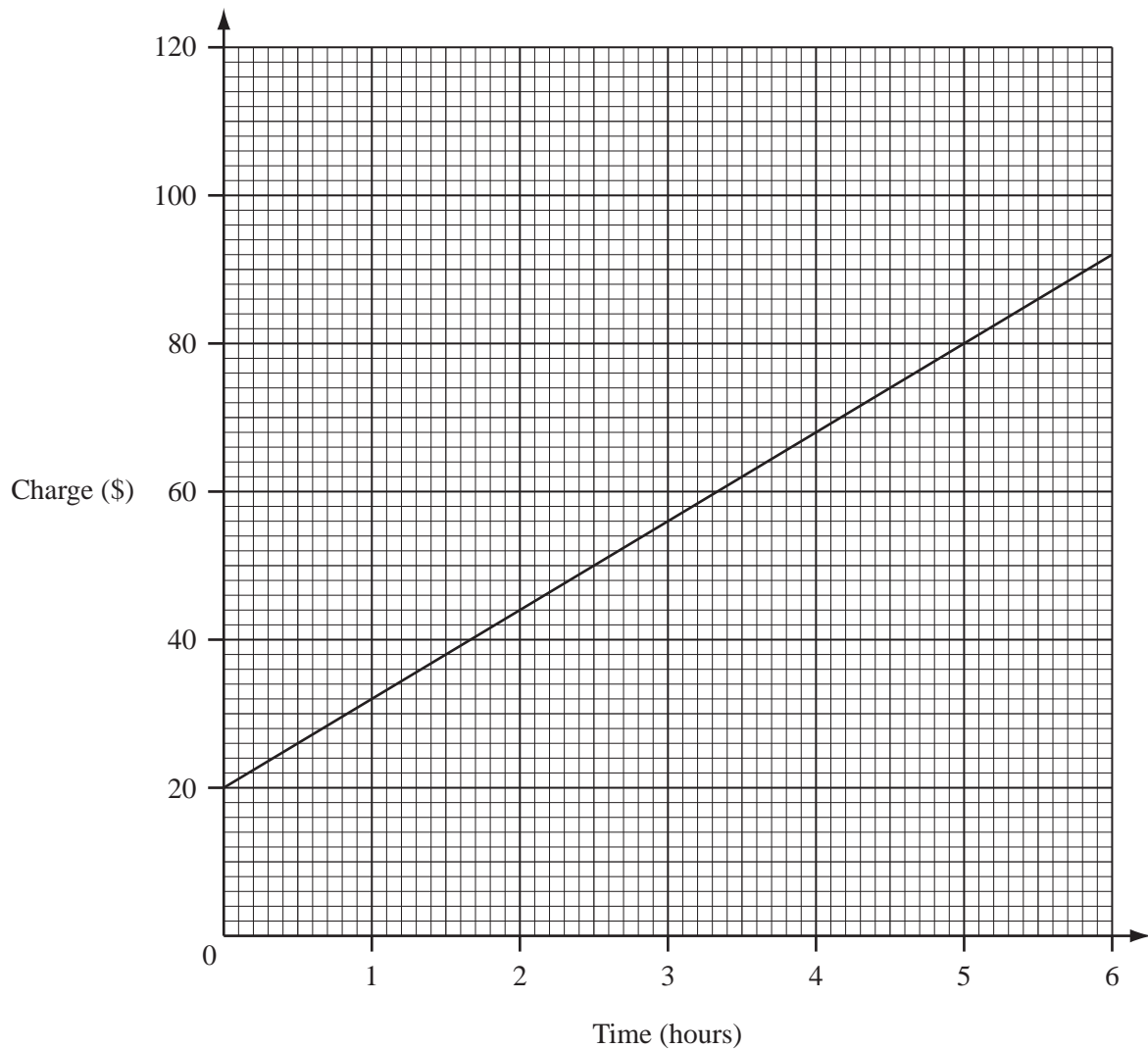
- (d) On the grid above, draw the graph of  $y = 12 - x^2$ .

[3]

- (e) Write down the coordinates of the points of intersection of the straight line with your curve.

Answer(e) (....., ..... ) and (....., ..... ) [2]

- 21 The graph below shows the amount a plumber charges for up to 6 hours work.



- (a) How much does he charge for  $3\frac{1}{2}$  hours work?

Answer(a) \$..... [1]

- (b) The plumber charged \$50.  
How many hours did he work?

Answer(b) .....hours [1]

- (c) Another plumber charges \$16 per hour.

(i) Draw a line on the grid above to show his charges. Start your line at (0,0). [2]

- (ii) Write down the number of hours for which the two plumbers charge the same amount.

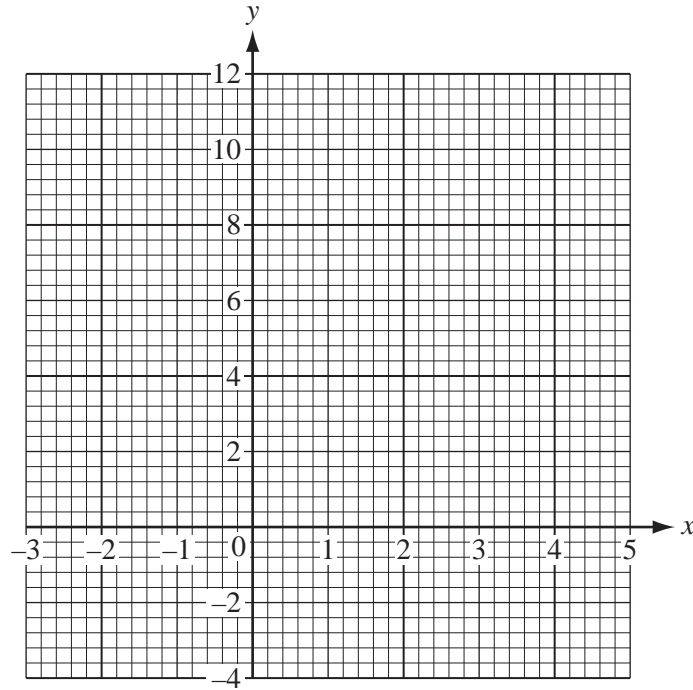
Answer(c)(ii) .....hours [1]

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

$x$	-3	-2	-1	0	1	2	3	4	5
$y$	12		0		-4	-3	0	5	

[3]

- (ii) Draw the graph of  $y = x^2 - 2x - 3$  on the grid below.



[4]

- (iii) Use your graph to find the solutions to  $x^2 - 2x - 3 = -1$ .  
Give your answers to 1 decimal place.

Answer(a)(iii)  $x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

- (b) (i) Complete the table of values for the equation  $y = \frac{2}{x}$ .

$x$	0.25	0.5	1	2	3	4	5
$y$		4		1	0.7	0.5	0.4

[1]

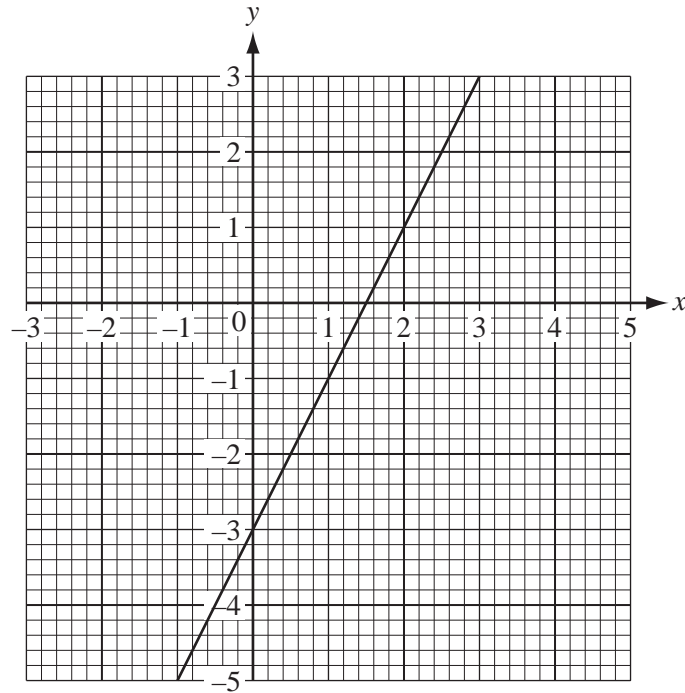
- (ii) On the same grid draw the graph of  $y = \frac{2}{x}$  for  $0.25 \leq x \leq 5$ .

[3]

- (iii) Write down the  $x$  co-ordinate of the point of intersection of your two graphs.

Answer(b)(iii)  $x = \dots\dots\dots$  [1]

7 (a)



The simultaneous equations  $2x - y = 3$  and  $x + y = 2$  can be solved graphically.

- (i) Which of these equations is shown by the line on the grid above?

Answer(a)(i) ..... [1]

- (ii) Find the gradient of the line on the grid.

Answer(a)(ii) ..... [2]

- (iii) Complete the table below for the other equation.

$x$	-1	0	1	2	3
$y$					

[2]

- (iv) Draw this line on the grid above.

[1]

- (v) Use **your graphs** to write down the solution to the two equations.

Give your values correct to 1 decimal place.

Answer(a)(v)  $x =$  .....

$y =$  ..... [3]



- (b) Use algebra to solve the following simultaneous equations **exactly**.  
Show all your working.

$$\begin{aligned} 2x - y &= 3, \\ x + y &= 2. \end{aligned}$$

Answer(b)  $x =$  .....

$y =$  ..... [4]

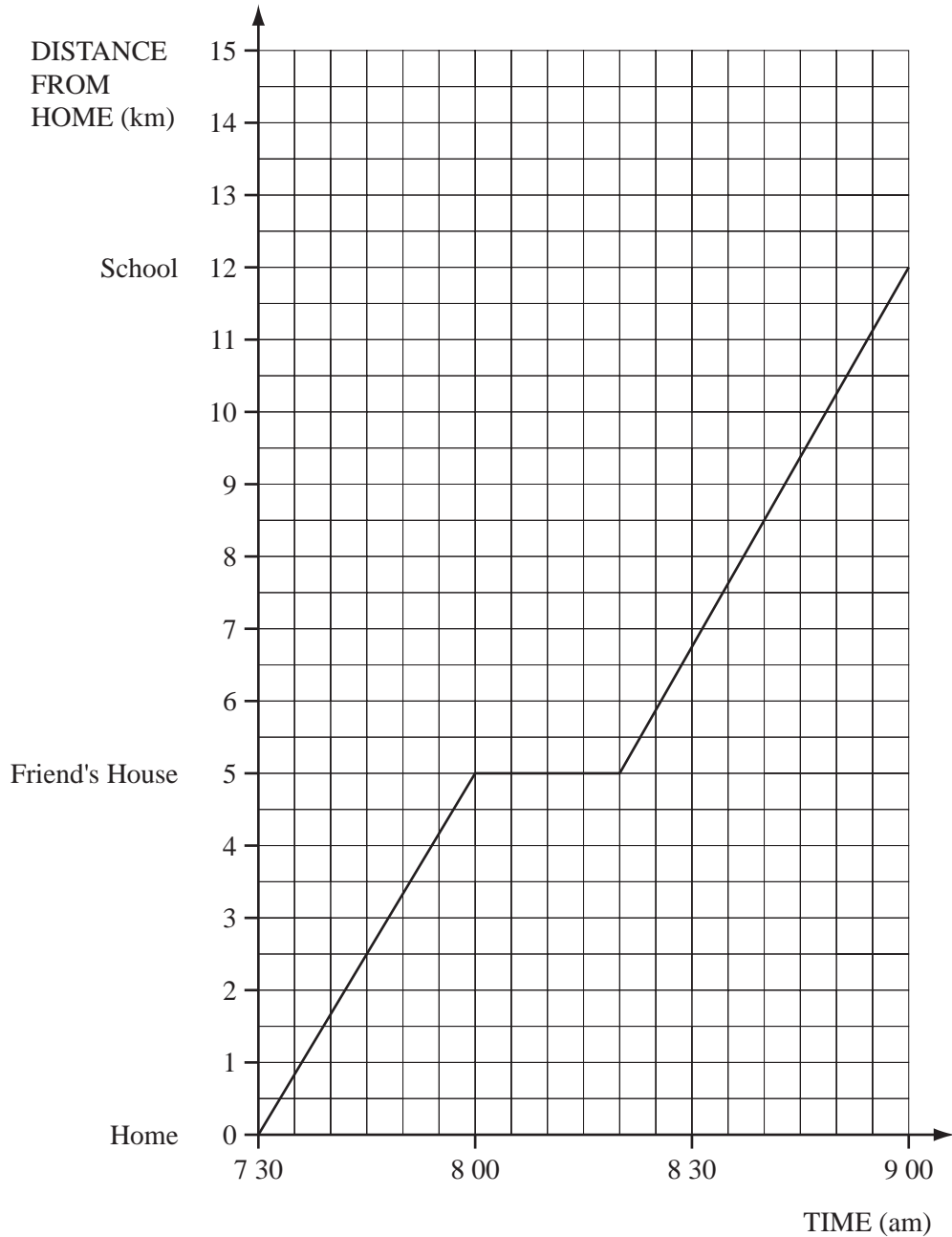
- 12 Make  $s$  the subject of the formula

$$p = st - q.$$

Answer  $s =$  ..... [2]

---

22



Ricardo rode to his friend's house. He waited for his friend to get ready. Then they cycled together to school. Ricardo's journey is shown on the grid.

- (a) Work out the speed at which Ricardo cycled to his friend's house.

Answer (a) ..... km/h [2]

- (b) How long did he wait for his friend?

Answer (b) ..... min [1]

- (c) Ricardo's brother left home at 8 00 am.  
He cycled directly to school at a constant speed of 15 kilometres per hour.  
**Draw** his journey on the **grid opposite**.

[1]

- (d) How many minutes earlier than Ricardo did his brother arrive at school?

*Answer (d)* ..... min [1]

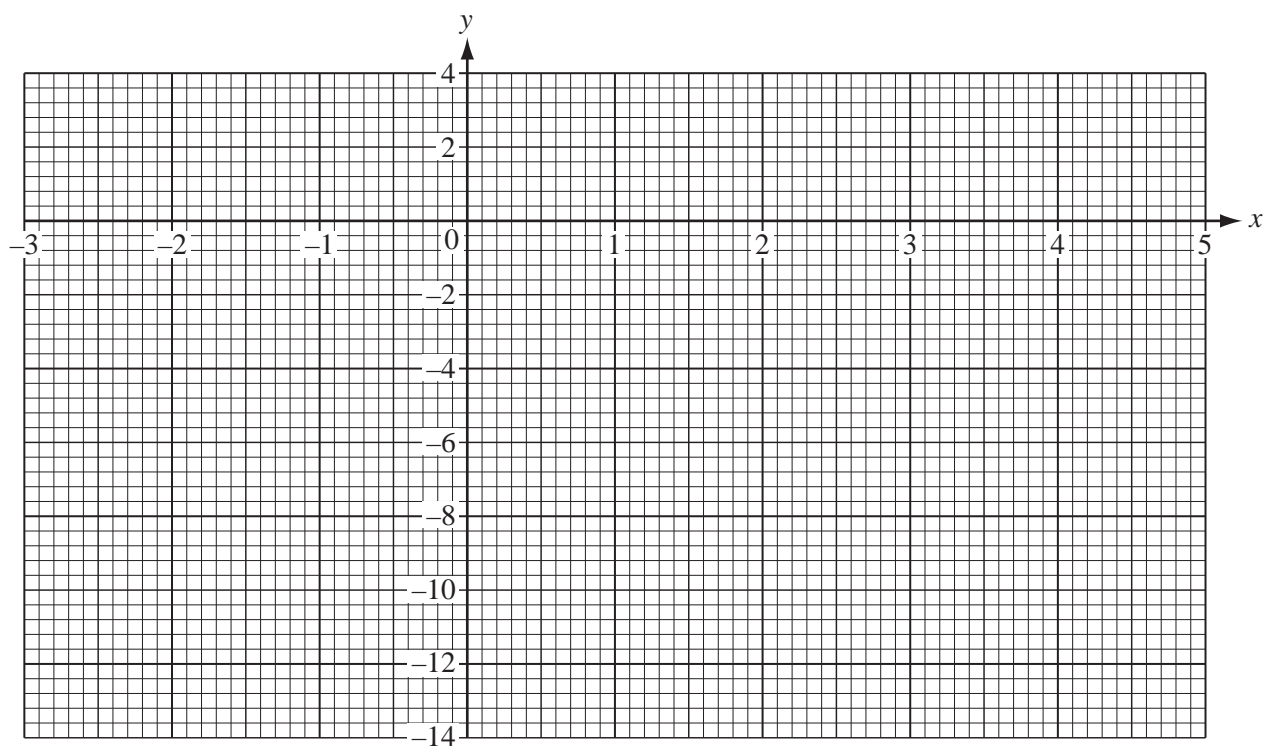
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- 2 (a) Complete the table of values for  $y = 1 + 2x - x^2$ .

$x$	-3	-2	-1	0	1	2	3	4	5
$y$	-14	-7				1	-2		-14

[3]

- (b) Draw the graph of  $y = 1 + 2x - x^2$  on the grid below.



[4]

- (c) Use your graph to find the solutions to the equation  $1 + 2x - x^2 = 0$ .

Answer (c)  $x =$  .....

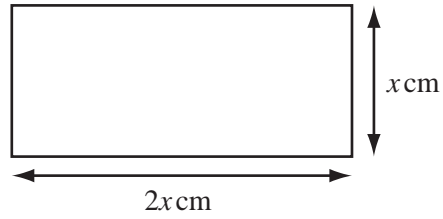
or  $x =$  ..... [2]

- (d) (i) On the grid, draw the line of symmetry of the graph. [1]

- (ii) Write down the equation of this line of symmetry.

Answer(d)(ii) ..... [1]

6 (a)

NOT TO  
SCALE

The perimeter of the rectangle in the diagram above is 36 centimetres.

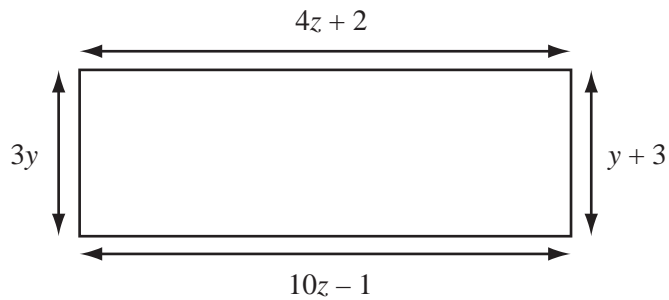
- (i) Find the value of  $x$ .

Answer(a)(i)  $x = \dots\dots\dots$  [2]

- (ii) Using this value of  $x$ , calculate the area of the rectangle.

Answer(a)(ii)  $\dots\dots\dots \text{ cm}^2$  [2]

(b)

NOT TO  
SCALE

The diagram above shows another rectangle.

- (i) In this rectangle  $3y = y + 3$ .  
Solve the equation to find  $y$ .

Answer(b)(i)  $y = \dots\dots\dots$  [2]

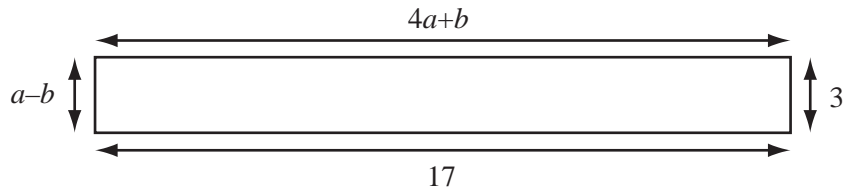
- (ii) Write down an equation in  $z$ .

Answer(b)(ii)  $\dots\dots\dots$  [1]

- (iii) Solve the equation in part (b)(ii) to find  $z$ .

Answer(b)(iii)  $z = \dots\dots\dots$  [3]

(c)

NOT TO  
SCALE

The diagram above shows another rectangle.

(i) Write down two equations in  $a$  and  $b$ .

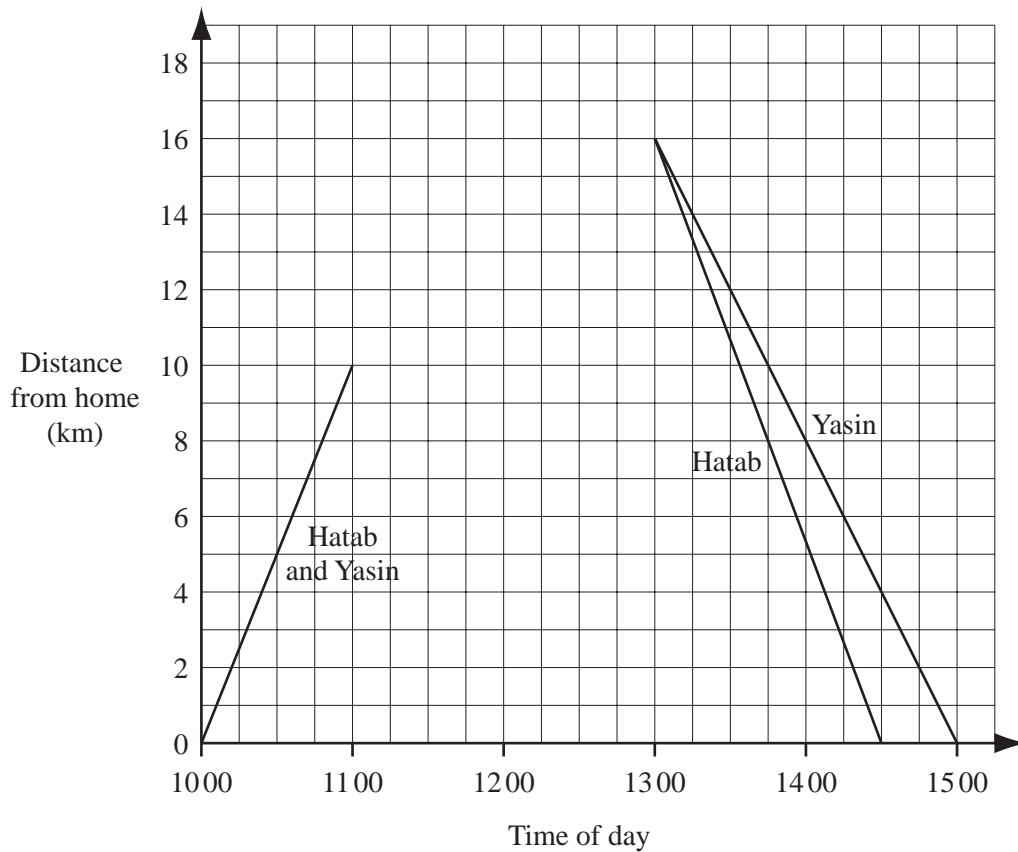
Answer(c)(i) .....  
 ..... [2]

(ii) Solve these two equations simultaneously to find  $a$  and  $b$ .

Answer(c)(ii)  $a =$  .....  
 $b =$  ..... [3]

---

- 1 (a) Two friends, Hatab and Yasin, went on a cycle ride.  
Part of the distance-time graph for their journey is shown below.



For the first part of the journey they cycled at the same speed.

- (i) Find their speed for the first part of the journey.

Answer(a)(i) ..... km/h [1]

- (ii) At 11 00 they stopped for half an hour. Show this on the graph. [1]

- (iii) They continued on their ride and at 12 45 they were 16 kilometres from home.  
Show this part of the journey on the graph. [1]

- (iv) They stopped again and then had a race going home.

- (a) For how long did they stop?

Answer(a)(iv)(a) ..... min [1]

- (b) Who won the race?

Answer(a)(iv)(b) ..... [1]

- (v) What was the total length of their journey?

Answer(a)(v) ..... km [1]

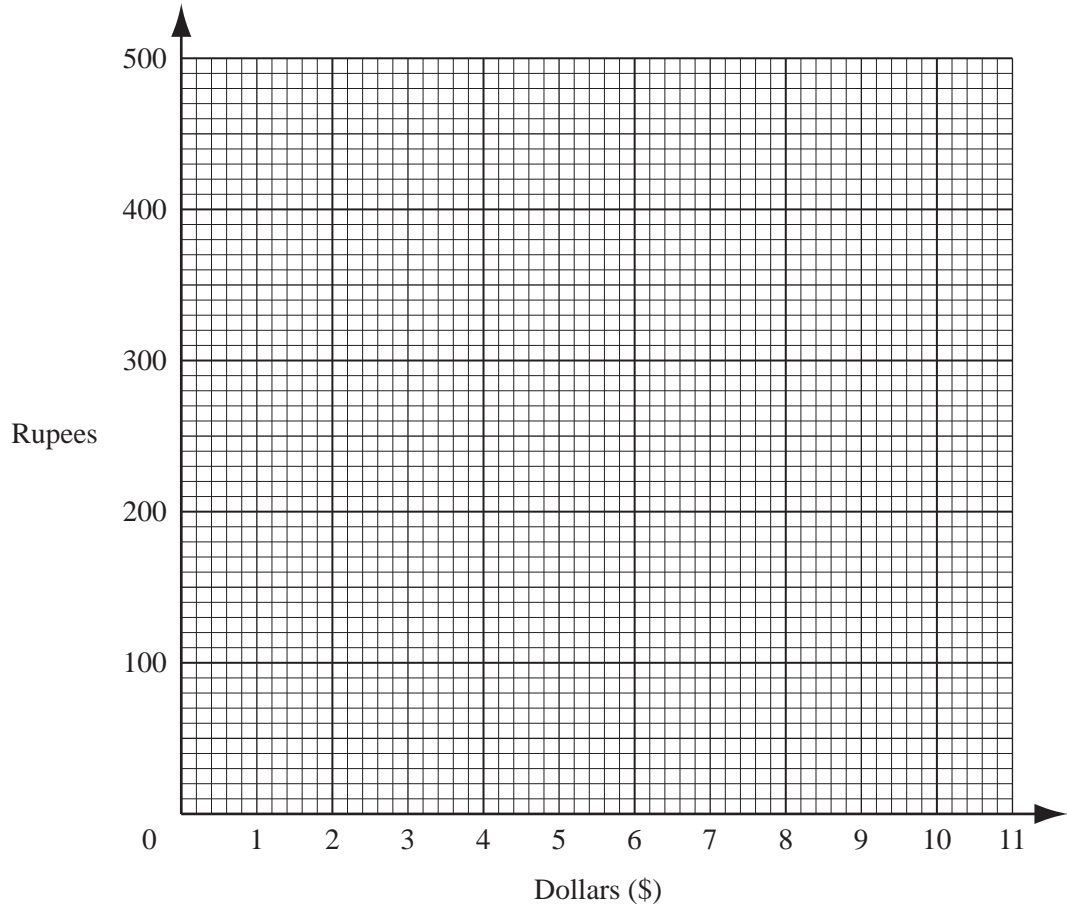
(b) On a certain day the conversion rate between dollars (\$) and Indian rupees was

$$\text{\$1} = 45 \text{ rupees.}$$

(i) How many rupees were equivalent to \\$10?

Answer(b)(i) ..... rupees [1]

(ii) Use this information to draw a conversion graph on the axes below.



[2]

(iii) Use your graph to find

(a) how many rupees were equivalent to \\$6.80,

Answer(b)(iii)(a) ..... rupees [1]

(b) how many dollars were equivalent to 480 rupees.

Answer(b)(iii)(b) \\$ ..... [1]

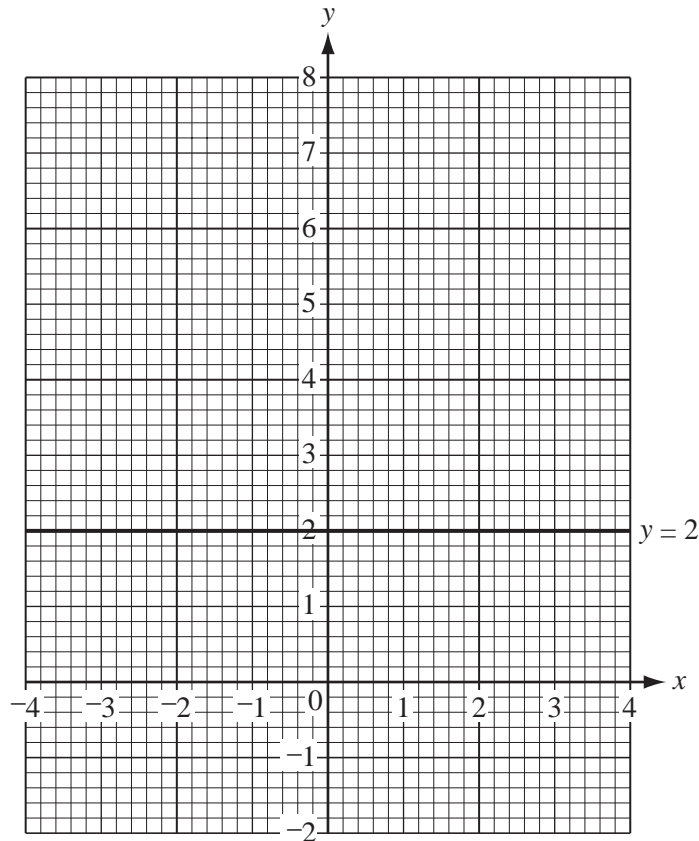


- 6 (a) Complete the table below for  $y = x^2 - 2x$ .

$x$	-2	-1	0	1	2	3	4
$y$	8			-1		3	8

[3]

- (b) On the grid below, draw the graph of  $y = x^2 - 2x$  for  $-2 \leq x \leq 4$ .



[4]

- (c) The line  $y = 2$  is drawn on the diagram.

Use your graph to find the values of  $x$  that solve the equation  $x^2 - 2x = 2$ .

Answer(c)  $x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

- (d) Complete the table below for  $y = 4 - x$ .

$x$	-4	0	4
$y$	8		

[2]

- (e) On the grid above, draw the line  $y = 4 - x$  for  $-4 \leq x \leq 4$ .

[1]

- (f) Write down the  $x$  coordinates of the points of intersection of the graphs of  $y = x^2 - 2x$  and  $y = 4 - x$ .

Answer(f)  $x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

- 7 (a) Rajeesh thought of a number.  
He multiplied this number by 2.  
He then added 10.  
The answer was 42.

(i) What was the number Rajeesh first thought of?

Answer(a)(i) ..... [1]

- (ii) Simon thought of a number  $x$ .  
He multiplied this number by 3 and then added 8.  
Write down an expression in  $x$  for his answer.

Answer(a)(ii) ..... [2]

- (b) Simplify  $-8a + 7b - a - 2b$ .

Answer(b) ..... [2]

- (c) Factorise fully  $6a - 9a^2$ .

Answer(c) ..... [2]

- (d) Make  $t$  the subject of the formula

$$v = u + at.$$

Answer(d)  $t =$  ..... [2]

- (e) Solve the simultaneous equations

$$\begin{aligned} 8x + 2y &= 13, \\ 3x + y &= 4. \end{aligned}$$

Answer(e)  $x =$  ..... ,  $y =$  ..... [4]

---

16

$$y = a + bc$$

- (a) Find the value of  $y$  when  $a = -3$ ,  $b = 2$  and  $c = 8$ .

Answer (a)  $y =$  ..... [2]

- (b) Make  $c$  the subject of the formula.

Answer (b)  $c =$  ..... [2]

---

12 (a)  $\left(\frac{1}{2}\right)^x = \frac{1}{8}$

Write down the value of  $x$ .

Answer (a)  $x =$  ..... [1]

(b)  $7^y = 1$

Write down the value of  $y$ .

Answer (b)  $y =$  ..... [1]

---

- 9 (a) Multiply out the brackets

$$5x(2x - 3y).$$

Answer (a)..... [2]

- (b) Factorise completely

$$6x^2 + 12x.$$

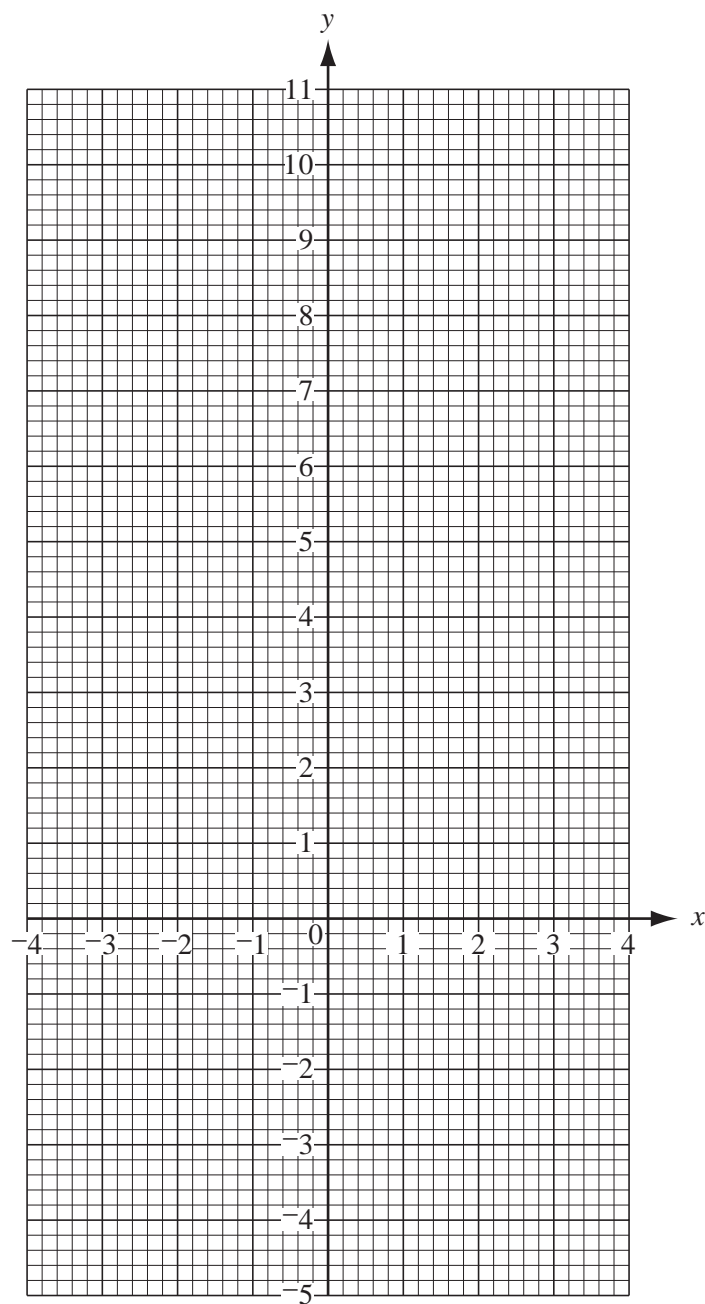
Answer (b)..... [2]

- 3 (a) Complete the table below for  $y = 8 - x^2$ .

$x$	-3.5	-3	-2.5	-2	-1.5	-1	0	1	1.5	2	2.5	3	3.5
$y$	-4.25	-1	1.75	4	5.75			7	5.75		1.75		-4.25

[3]

- (b) On the grid below, draw the graph of  $y = 8 - x^2$  for  $-3.5 \leq x \leq 3.5$ .



[4]

- (c) Using the graph, write down the values of  $x$  for which  $8 - x^2 = 0$ .

Answer(c)  $x =$  ..... and ..... [2]

- (d) Complete the table below for  $y = 2x + 5$ .

$x$	-3	0	3
$y$			11

[2]

- (e) On the grid on the opposite page, draw the line  $y = 2x + 5$  for  $-3 \leq x \leq 3$ . [2]

- (f) Find the gradient of the line  $y = 2x + 5$ .

Answer(f) ..... [2]

- (g) Using your graphs, write down the  $x$  coordinates of the intersections of the graphs of  $y = 8 - x^2$  and  $y = 2x + 5$ .

Answer(g)  $x =$  ..... and ..... [2]

---

## 12 Solve the simultaneous equations

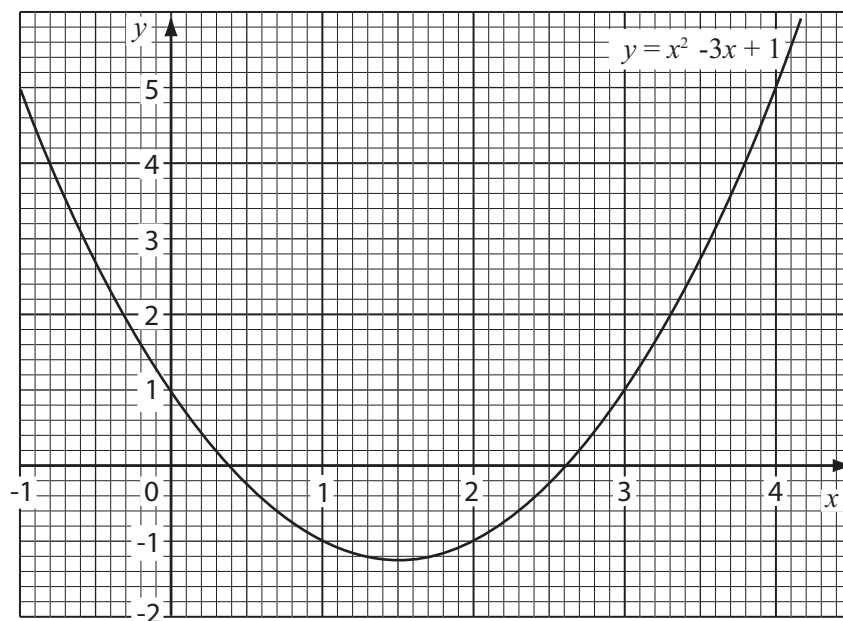
$$\begin{aligned} 3x - y &= 0, \\ x + 2y &= 28. \end{aligned}$$

Answer  $x =$  .....

$y =$  ..... [3]

---

- 18 The diagram below shows the graph of  $y = x^2 - 3x + 1$ .



- (a) Use the graph to solve the equation

$$x^2 - 3x + 1 = 0.$$

Answer (a)  $x = \dots\dots\dots$  or  $\dots\dots\dots$  [2]

- (b) (i) Complete the table for  $y = x + 1$ .

$x$	-1	1	3
$y$		2	4

[1]

- (ii) Draw the graph for  $y = x + 1$  on the grid above.

[1]

- (c) Write down the coordinates of the intersections of the two graphs.

Answer (c)  $(\dots\dots, \dots\dots)$   $(\dots\dots, \dots\dots)$  [2]

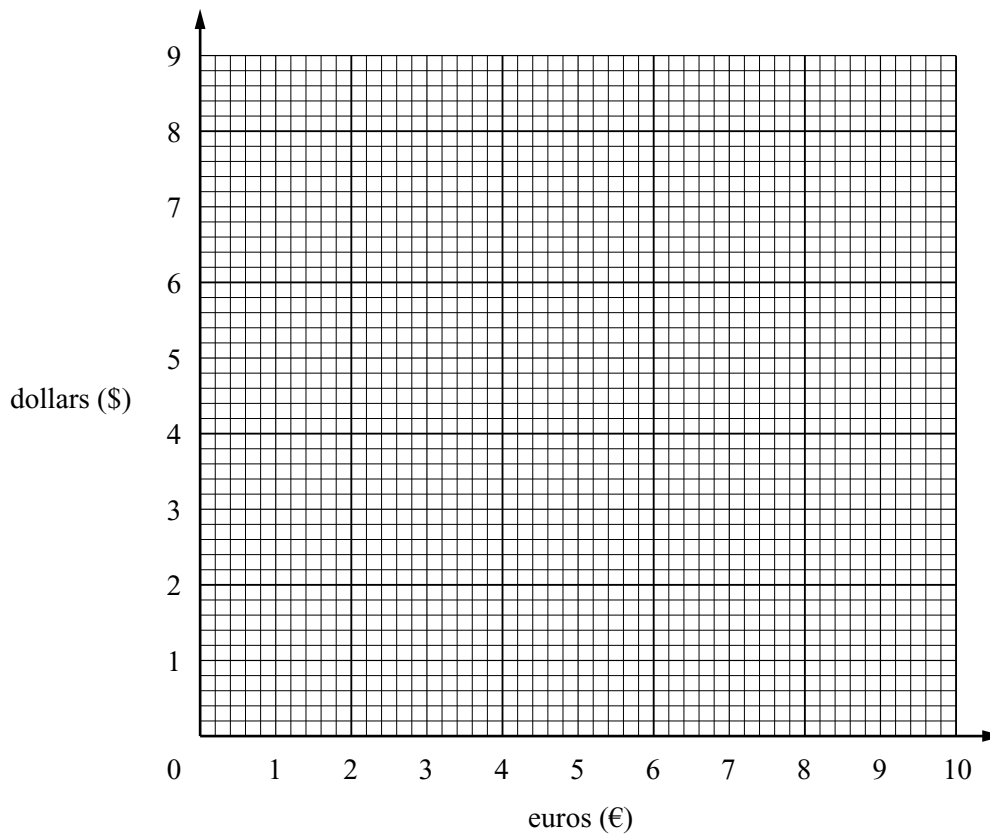
(b) The conversion rate between euros (€) and dollars (\$) was €1 = \$0.87.

(i) Complete the table.

€	0	5	10
\$	0		

[2]

(ii) Draw a graph on the grid below to convert between euros and dollars.



[2]

(iii) How many euros were equivalent to \$8?

Answer (b)(iii) €..... [1]

(iv) How many euros were equivalent to \$500?

Answer (b)(iv) €..... [1]

- 6 (a) The perimeter,  $P$ , of a triangle is given by the formula

$$P = 6x + 3.$$

- (i) Find the value of  $P$  when  $x = 4$ .

*Answer (a)(i)*  $P = \dots\dots\dots$  [1]

- (ii) Find the value of  $x$  when  $P = 39$ .

*Answer (a)(ii)*  $x = \dots\dots\dots$  [2]

- (iii) Rearrange the formula to find  $x$  in terms of  $P$ .

*Answer (a)(iii)*  $x = \dots\dots\dots$  [2]

- (b) The perimeter of another triangle is  $(9x + 4)$  centimetres.

Two sides of this triangle are of length  $2x$  centimetres and  $(3x + 1)$  centimetres.

- (i) Find an expression, in terms of  $x$ , for the length of the third side.

*Answer (b)(i)*  $\dots\dots\dots$  cm [2]

- (ii) The **perimeter** of this triangle is 49 cm. Find the length of each side.

*Answer (b)(ii)*  $\dots\dots\dots$  cm,  $\dots\dots\dots$  cm,  $\dots\dots\dots$  cm [3]



9 Solve the equation

$$x + 4 = 3(2 - x) .$$

*Answer*  $x = \dots\dots\dots$  [3]

---

11 Solve the simultaneous equations

$$\begin{aligned} 3a + 2b &= 7 , \\ a - 2b &= 5 . \end{aligned}$$

*Answer*  $a = \dots\dots\dots$

$b = \dots\dots\dots$  [3]

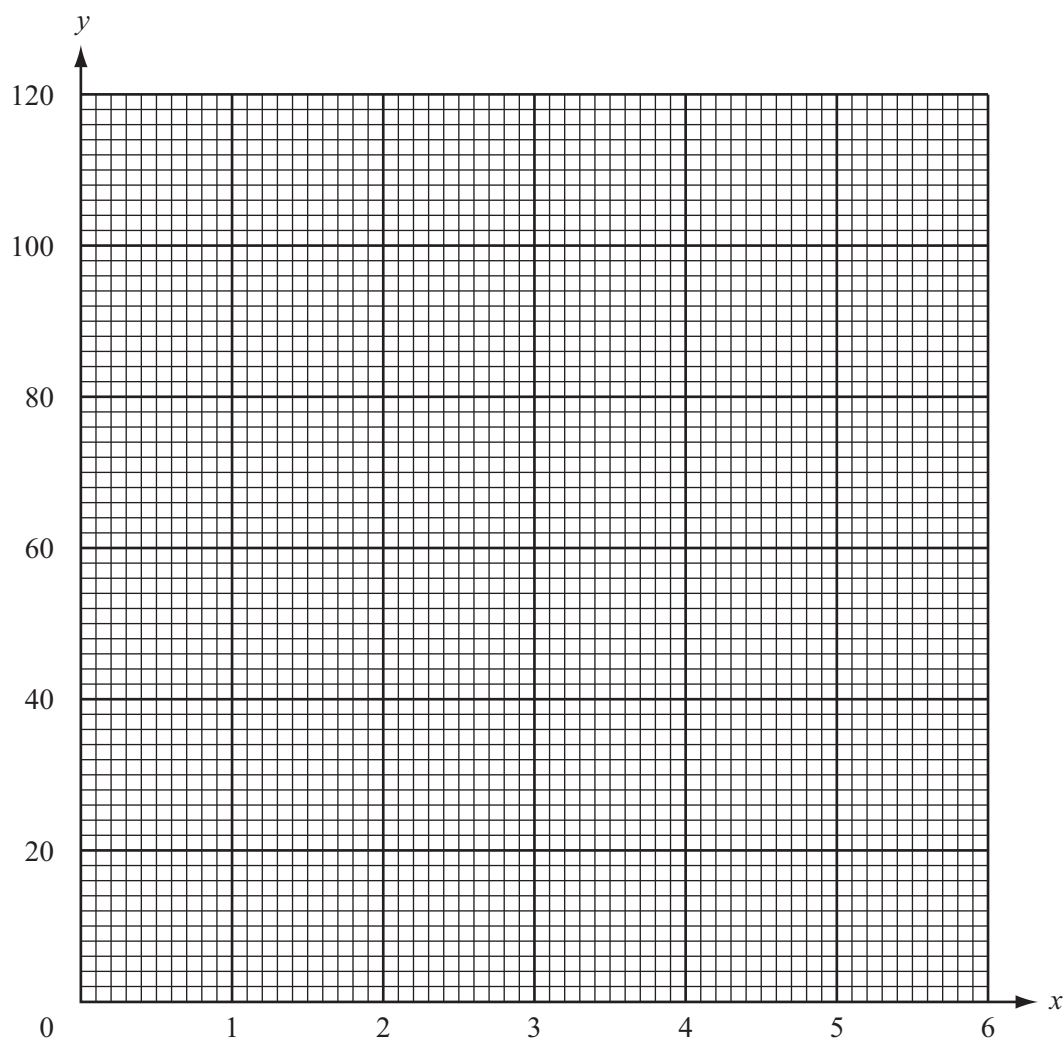
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- 2 (a) Complete the table for the equation  $y = \frac{120}{x}$ .

$x$	1	1.5	2	3	4	5	6
$y$		80	60	40	30		

[3]

- (b) On the grid below, draw the curve  $y = \frac{120}{x}$  for  $1 \leq x \leq 6$ .



[4]

- (c) Use your graph to find  $x$  when  $y = 70$ .

Answer(c)  $x = \dots\dots\dots$  [1]

- (d) Complete the table for the equation  $y = 120 - 20x$ .

$x$	0	2	4	6
$y$		80	40	

[2]

- (e) On the same grid above, draw the graph of  $y = 120 - 20x$  for  $0 \leq x \leq 6$ .

[2]

- (f) The graphs of  $y = \frac{120}{x}$  and  $y = 120 - 20x$  intersect at two points.  
Write down the coordinates of these two points.

*Answer(f)* ( ..... , ..... ) and ( ..... , ..... ) [2]

- (g) Write down the gradient of the line  $y = 120 - 20x$ .

*Answer(g)*..... [2]

---

- 3 (a) Bottles of water cost 25 cents each.

- (i) Find the cost of 7 bottles in cents.

*Answer(a)(i)*.....cents [1]

- (ii) Write down an expression in  $b$  for the cost of  $b$  bottles in cents.

*Answer(a)(ii)*.....cents [1]

- (iii) Change your answer to **part (i)** into dollars.

*Answer(a)(iii)* \$..... [1]

- (iv) Write down an expression in  $b$  for the cost of  $b$  bottles in dollars.

*Answer(a)(iv)* \$..... [1]

- (b) The total cost,  $T$ , of  $n$  bars of chocolate is given by  $T = nc$ .

- (i) Write  $c$  in terms of  $T$  and  $n$ .

*Answer(b)(i)*  $c =$  ..... [1]

- (ii) What does  $c$  represent?

*Answer(b)(ii)* ..... [1]

- (c) The average cost of a book is  $\$A$ .

- (i) The total cost of 8 books is \$36.  
Find the value of  $A$ .

*Answer(c)(i)*  $A =$  ..... [1]

- (ii) One of the 8 books is removed.  
The cost of this book is \$6.60.  
Find the new value of  $A$ .

*Answer(c)(ii)*  $A =$  ..... [2]

- (iii) The total cost of  $x$  books is \$ $y$ .  
Write an expression for  $A$  in terms of  $x$  and  $y$ .

*Answer(c)(iii)*  $A = \dots\dots\dots$  [1]

- (iv) One of the  $x$  books is removed.  
The cost of this book is \$7.  
Write a new expression for  $A$  in terms of  $x$  and  $y$ .

*Answer(c)(iv)*  $A = \dots\dots\dots$  [2]

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13

$$T = 2\sqrt{n}.$$

- (a) Find  $T$  when  $n = 25$ .

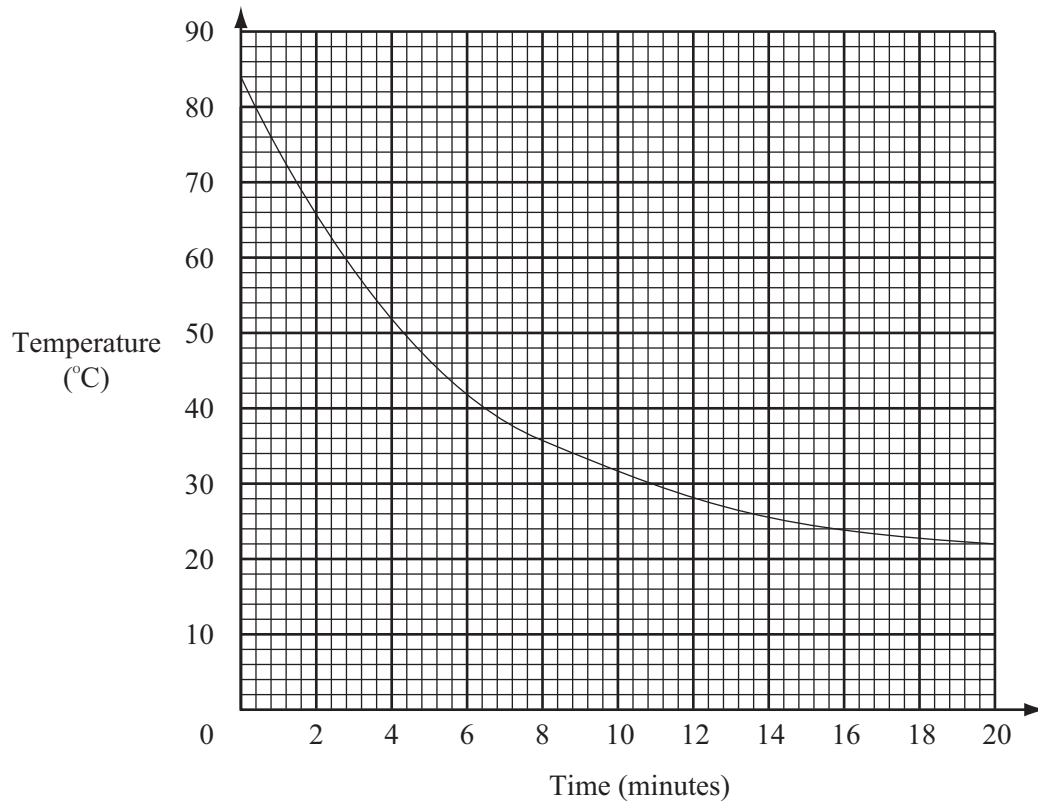
*Answer (a)*  $T = \dots\dots\dots$  [1]

- (b) Make  $n$  the subject of the formula.

*Answer (b)*  $n = \dots\dots\dots$  [2]

---

7



The graph shows the temperature of a cup of tea cooling down in a room.

(a) What is the temperature of the tea after

(i) 0 minutes,

Answer(a)(i)..... [1]

(ii) 20 minutes?

Answer(a)(ii)..... [1]

(b) After how many minutes is its temperature 30 °C?

Answer(b)..... [1]

(c) By how much has its temperature gone down between 4 minutes and 8 minutes?

Answer(c)..... [1]

(d) (i) Complete the table which shows falls in temperature.

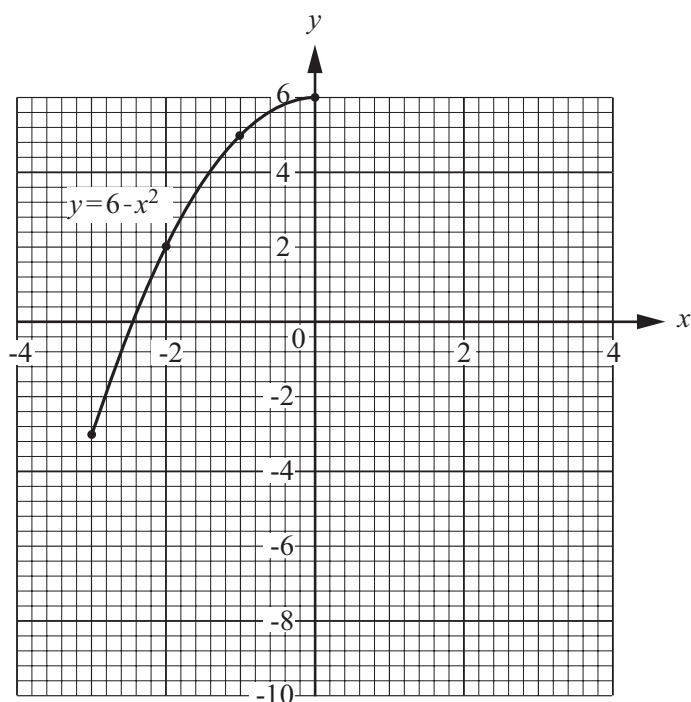
Between	0 and 4 minutes	4 and 8 minutes	8 and 12 minutes	12 and 16 minutes
Fall in temperature				

[3]

(ii) What pattern do you notice about these falls in temperature?

Answer(d)(ii)..... [1]

16



The diagram shows part of the graph of  $y = 6 - x^2$  for  $-3 \leq x \leq 0$ .

Complete the graph for  $-4 \leq x \leq 4$ .

[4]

17 The frequency of radio waves ( $F$ ) is connected to the wavelength ( $l$ ) by the formula

$$F = \frac{300\,000}{l}.$$

(a) Calculate the value of  $F$  when  $l = 1500$ .

Answer (a)  $F = \dots\dots\dots$  [1]

(b) Calculate the value of  $l$  when  $F = 433$ , giving your answer to the nearest whole number.

Answer (b)  $l = \dots\dots\dots$  [3]

19 (a) Factorise  $40a - 8b + 32c$ .

Answer (a)  $\dots\dots\dots$  [2]

(b) Solve the equations

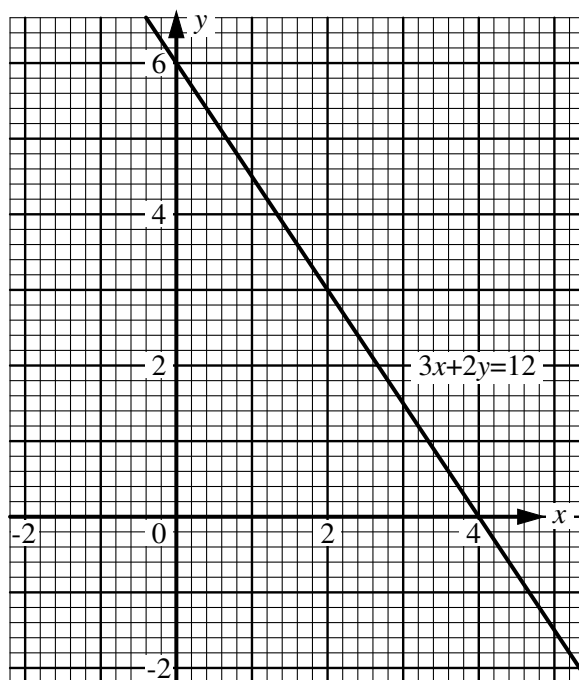
(i)  $x - 7 = 9,$

Answer (b) (i)  $x = \dots\dots\dots$  [1]

(ii)  $2(y + 1) = 3y - 5.$

Answer (b) (ii)  $y = \dots\dots\dots$  [2]

7



The graph of  $3x + 2y = 12$  is drawn on the grid above.

- (a) (i) Complete the table of values for  $y = 3x - 1$ .

$x$	0	1	2
$y$		2	

[2]

- (ii) On the grid above, draw the graph of  $y = 3x - 1$  for  $0 \leq x \leq 2$ .

[1]

- (b) Use the graphs to find the solution of the simultaneous equations

$$\begin{aligned} 3x + 2y &= 12, \\ y &= 3x - 1. \end{aligned}$$

Answer (b)  $x = \dots\dots\dots$ ,  $y = \dots\dots\dots$  [2]

- (c) Use algebra to find the **exact** solution of the simultaneous equations

$$\begin{aligned} 3x + 2y &= 12, \\ y &= 3x - 1. \end{aligned}$$

Answer (c)  $x \dots\dots\dots$ ,  $y = \dots\dots\dots$  [4]