



## GCSE Foundation/Higher 14

*Algebra*

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Questions



73 minutes

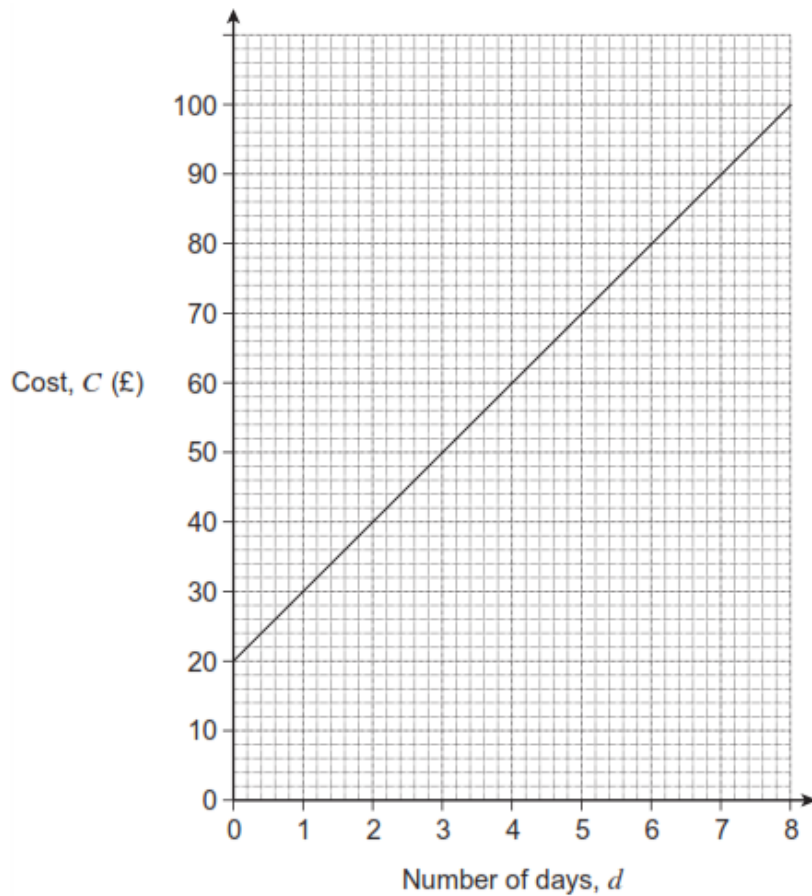


68 marks

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*Graphs*

**Q1.** The graph shows the cost,  $C$  (£), of hiring a car for  $d$  days from Roy's Rentals.



(a) Circle the correct formula for hiring a car from Roy's Rentals.

$C = 20d + 100$      
  $C = 10d + 20$      
  $C = 20d + 10$      
  $C = 5d + 20$

(1)

(b) The cost of hiring a car from First Cars is given by the formula  $C = 8d + 30$

Plot the graph of  $C = 8d + 30$  on the grid above.

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(2)

(c) Toby wants to hire a car for 7 days.

Which of these firms should he use?  
Give a reason for your answer.

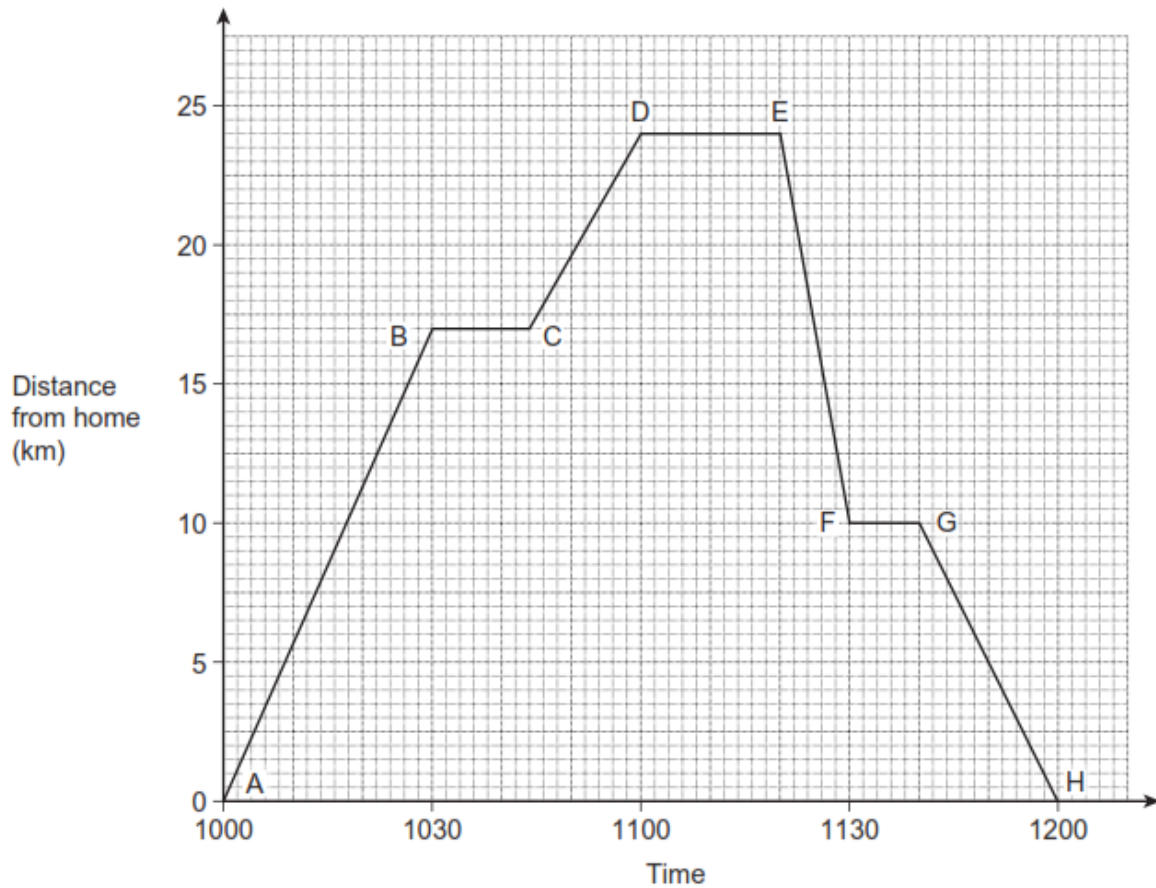
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(2)  
(Total 5 marks)

**Q2.** Amy leaves home in her car at 1000 and returns at 1200.  
The graph shows her journey.



(a) How far does she travel in her car altogether?

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Answer ..... km

(1)

- (b) For how long does the car stop altogether?

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Answer ..... minutes

(2)

- (c) On which part of her journey is she travelling at the fastest speed?  
Give a reason for your answer.

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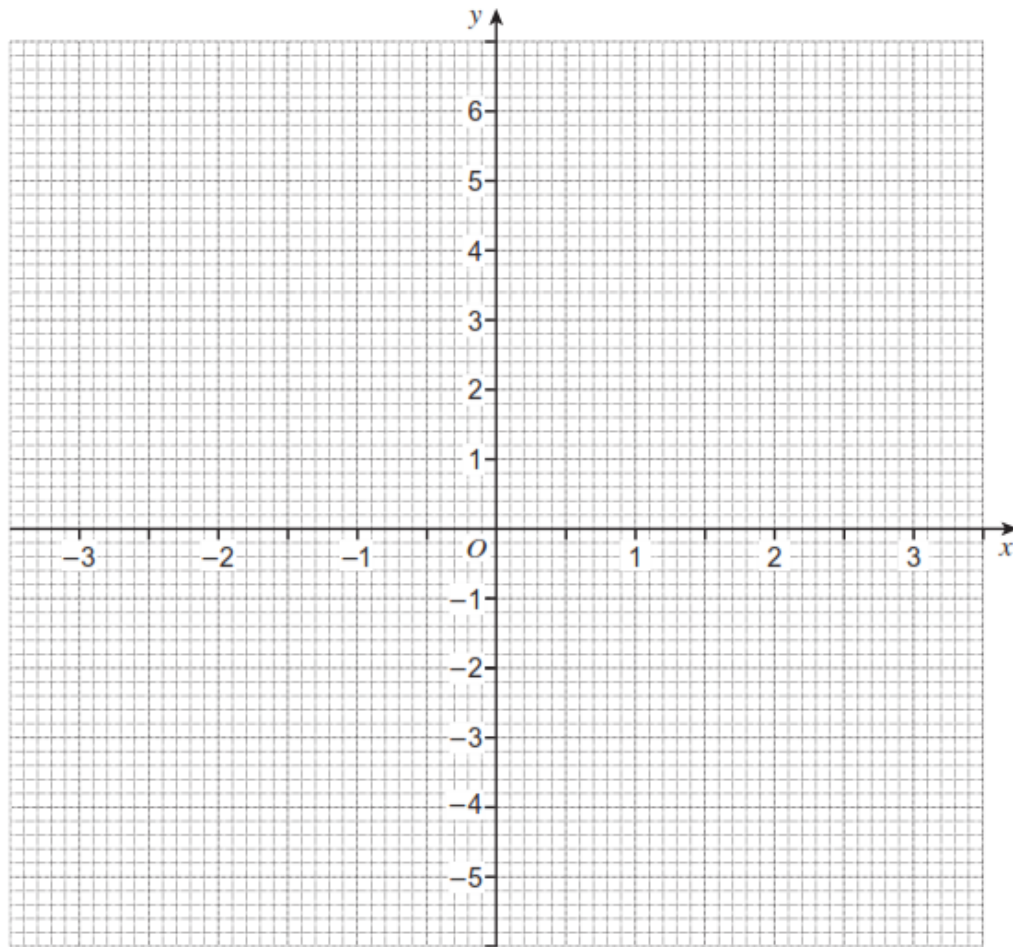
(2)  
(Total 5 marks)

- Q3.** (a) Complete the table of values for  $y = x^2 - 4$

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

(2)

- (b) Draw the graph of  $y = x^2 - 4$  for values of  $x$  from  $-3$  to  $3$ .



(3)

- (c) Draw the graph of  $y = 2$  on the grid opposite for values of  $x$  from  $-3$  to  $3$ .

(1)

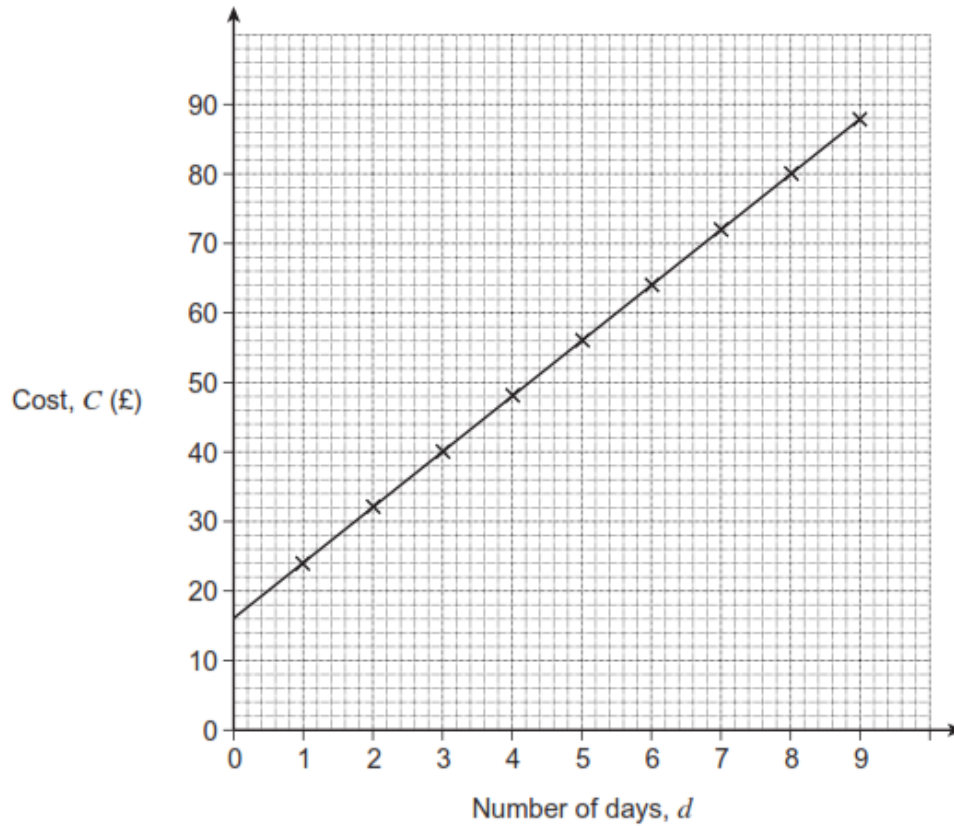
- (d) Write down the  $x$ -coordinates of the points of intersection of the two graphs.

Answer ..... and .....

(2)

(Total 8 marks)

- Q4.** The graph shows the cost,  $C$  (£), of hiring a circular saw from Branch Tool Hire for a number of days,  $d$ .



- (a) Circle the correct formula for the cost,  $C$ .

$C = 24d$        $C = 8d + 24$        $C = 16d + 8$        $C = 8d + 16$

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(1)

- (b) The cost of hiring a circular saw from Woods Tool Hire is given by the formula

$$C = 9d + 11$$

Sam thinks that Woods Tool Hire is always cheaper.

Is this true?

Tick a box.

Yes

☐

No

☐

Give reasons for your answer.

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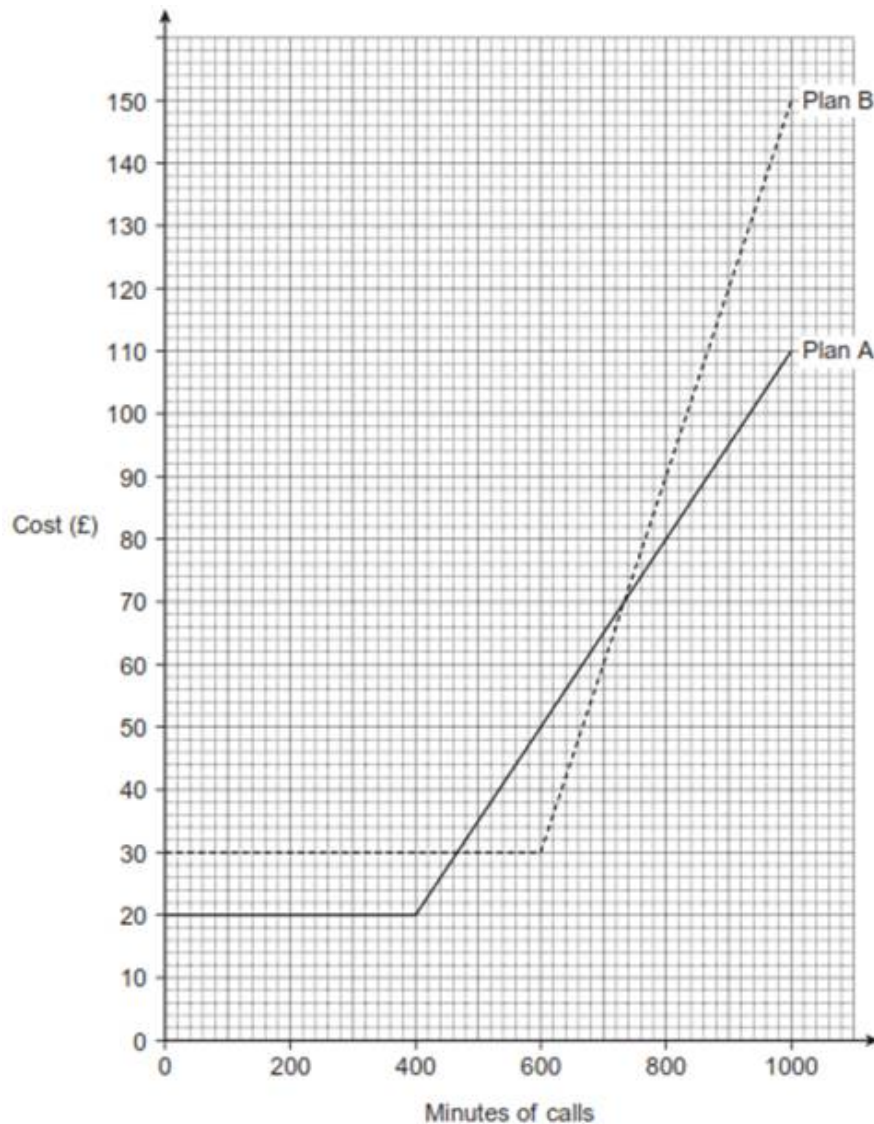
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(3)  
(Total 4 marks)

- Q5.** Plan A and Plan B are two monthly mobile phone plans. Here are the details of Plan A.

Monthly charge	£20
400 minutes of calls	Free
Each extra minute	15p

The graph shows the costs for both plans.



- (a) Ben usually makes about 800 minutes of calls a month.

Which plan should he choose?  
Give a reason for his choice.

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(2)



(b) Sarah chooses Plan B.

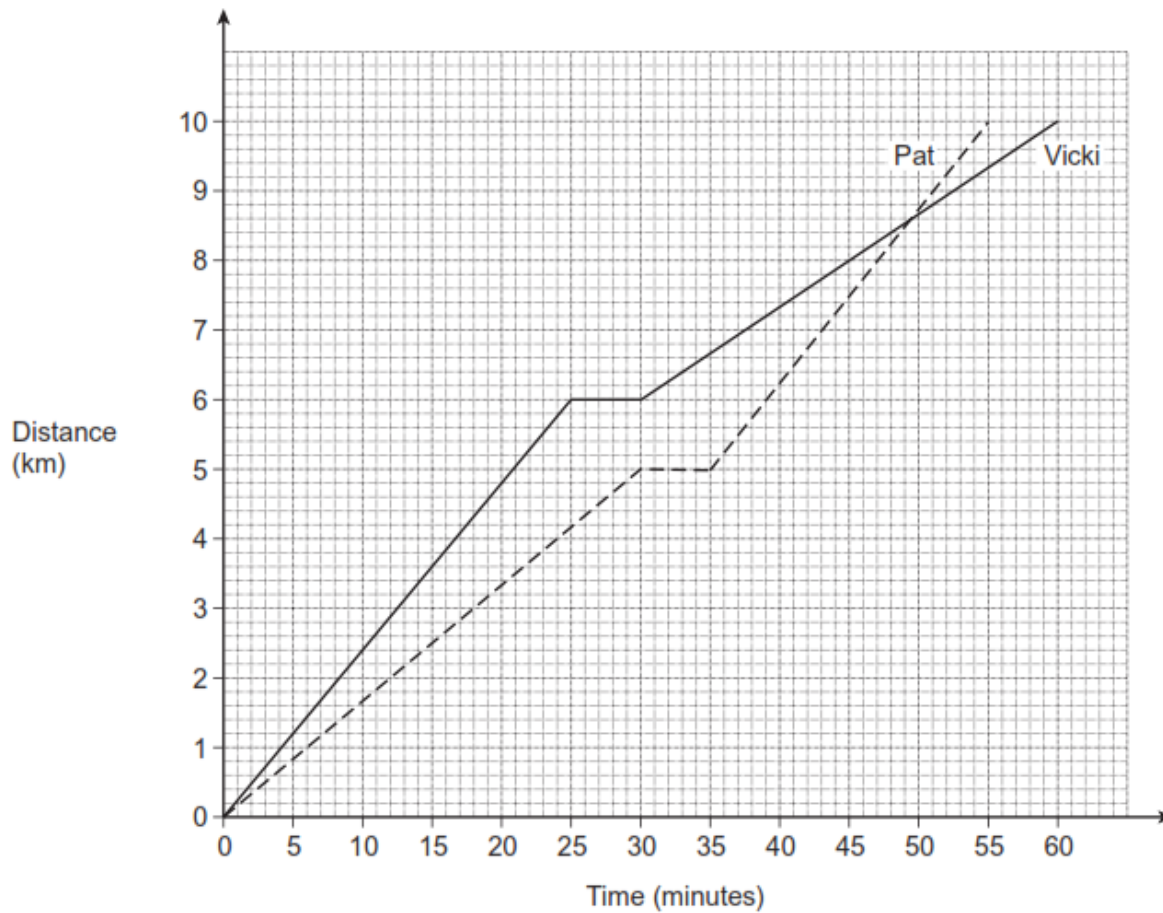
How much does she pay for each extra minute of calls?

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Answer .....

(3)  
(Total 5 marks)

**Q6.** The graph shows two training runs by Pat and Vicki.



(a) After how many minutes does Pat overtake Vicki?

Answer ..... minutes

(1)

- (b) How far ahead is Vicki when Pat starts again after her rest?

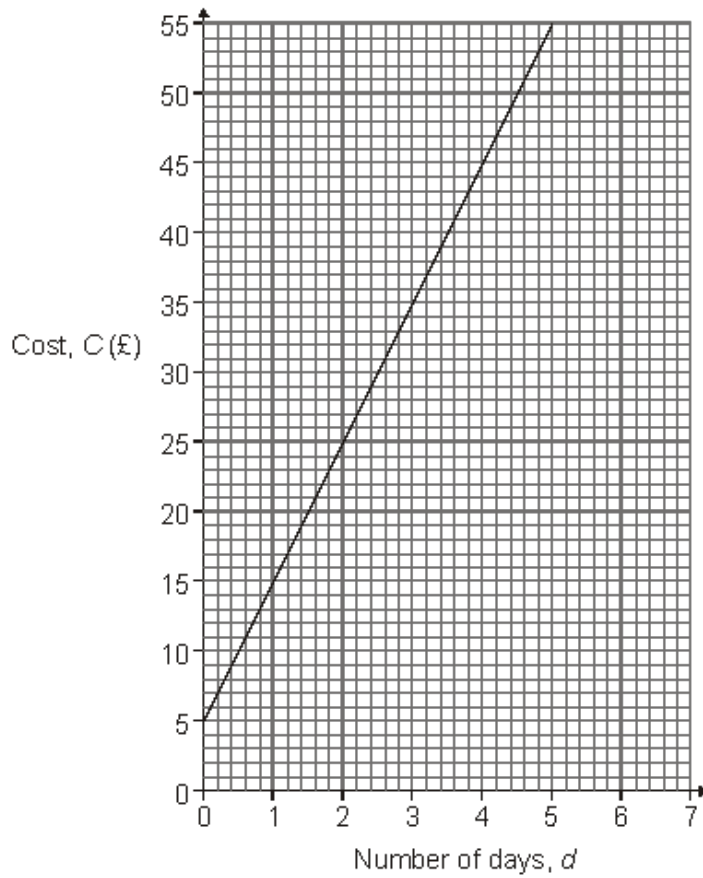
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Answer ..... km

(2)  
 (Total 3 marks)

- Q7.** An activity centre hires out road bikes and mountain bikes.

The graph shows the cost,  $C$  (£) of hiring a road bike for a number of days,  $d$ .



- (a) Circle the correct formula connecting the cost,  $C$  and the number of days,  $d$  for hiring a road bike.

$C = 2d + 5$

$C = 5d + 10$

$C = 10d + 5$

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(1)

- (b) The cost of hiring a mountain bike is given by the formula  $C = 5d + 15$   
Rowan would like to hire a mountain bike.  
He thinks that a mountain bike will always cost more to hire than a road bike.

Is this true?

Yes

☐

No

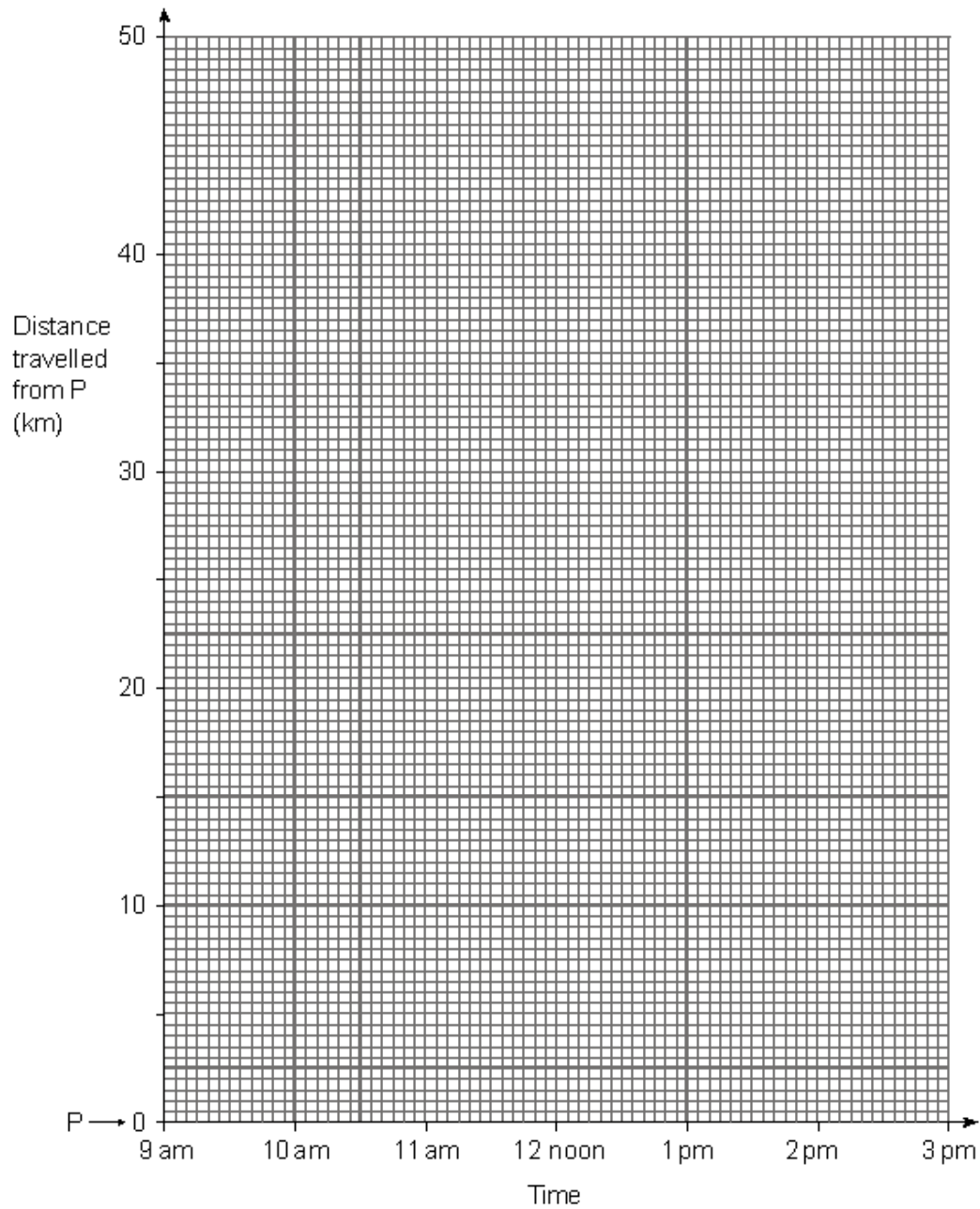
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Explain your answer.

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(3)  
(Total 4 marks)

**Q8.** You may use the grid below to help you solve this problem.



At 9 am a man leaves point P and walks along a road at a steady speed of 6 kilometres per hour.

At 12 noon a cyclist leaves P, on the same road in the same direction, at a steady speed of 20 kilometres per hour.

After travelling for an hour the cyclist gets a puncture which delays her for 30 minutes.

She then continues at 20 kilometres per hour until she overtakes the walker.

- (a) At what time did the cyclist overtake the walker?

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Answer .....

(3)

- (b) A motorist leaves P, travelling at a steady speed of 50 kilometres per hour.  
The motorist overtakes the walker at the same time as the cyclist.

At what time did the motorist leave P?

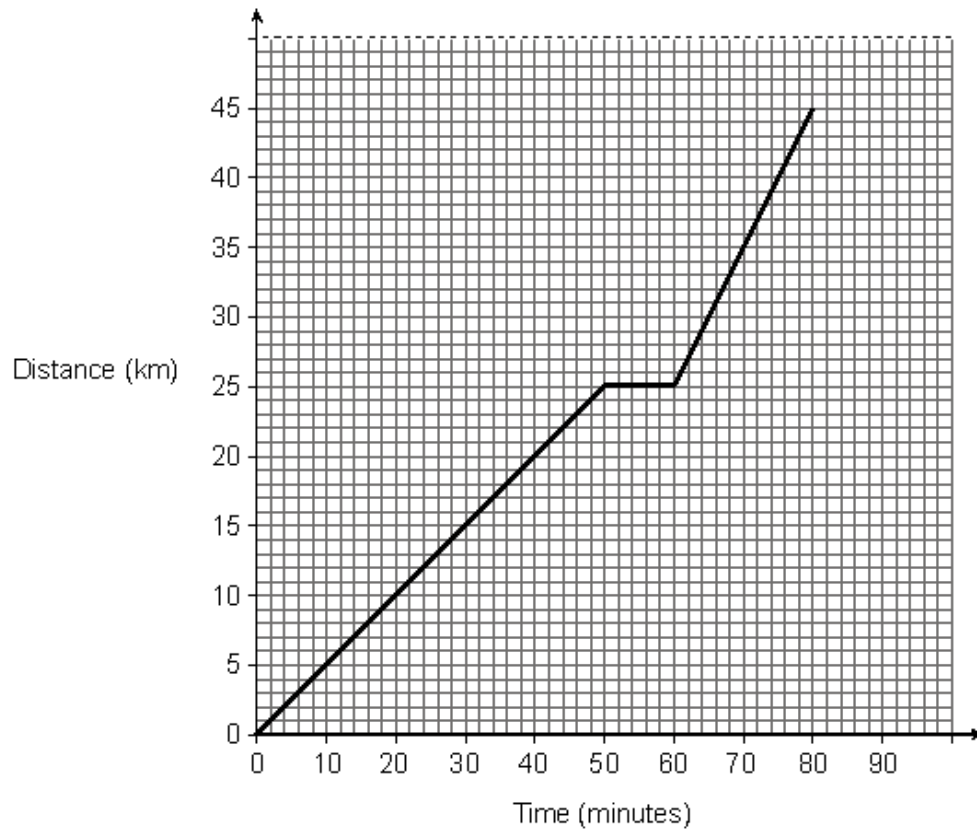
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Answer .....

(2)

(Total 5 marks)

**Q9.** Here is a distance-time graph for a train journey.



(a) For how long does the train stop on the journey?

Answer ..... minutes

(1)

(b) (i) On which part of the journey does the train travel fastest?  
Put a circle around the part of the graph that shows this.

(1)

(ii) Explain how you know.

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(1)

(Total 3 marks)

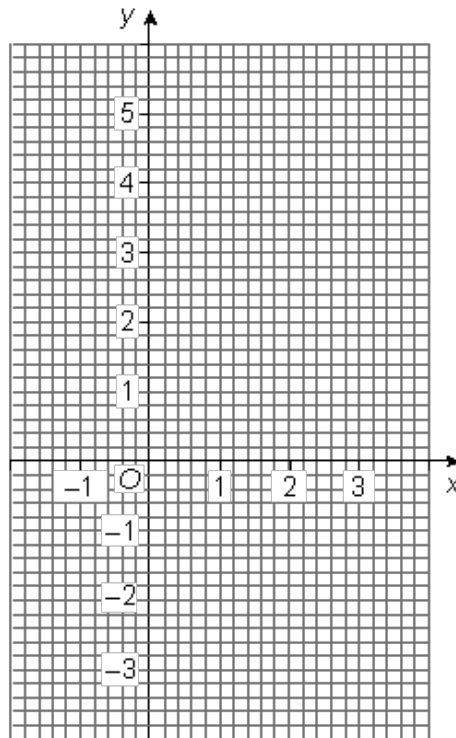
- Q10.** (a) Complete the table of values for  $y = 2x - 1$

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

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(1)

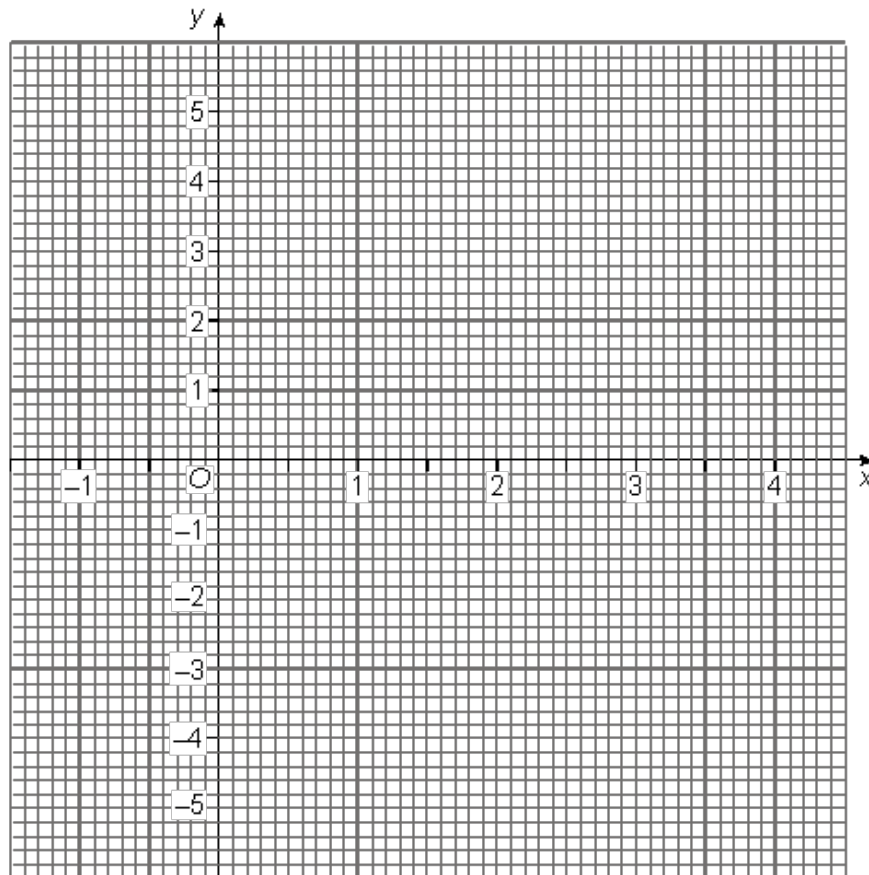
- (b) On the grid below, draw the graph of  $y = 2x - 1$  for values of  $x$  from -1 to +3



(2)  
(Total 3 marks)

- Q11.** (a) On the grid below draw the graph of  $y = 2x - 3$  for values of  $x$  from  $-1$  to  $4$ .

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(3)

- (b) The line  $y = 4.5$  crosses the line  $y = 2x - 3$  at  $P$ .

Use the graph to work out the coordinates of  $P$ .

Answer ( ..... , ..... )

(2)

(Total 5 marks)



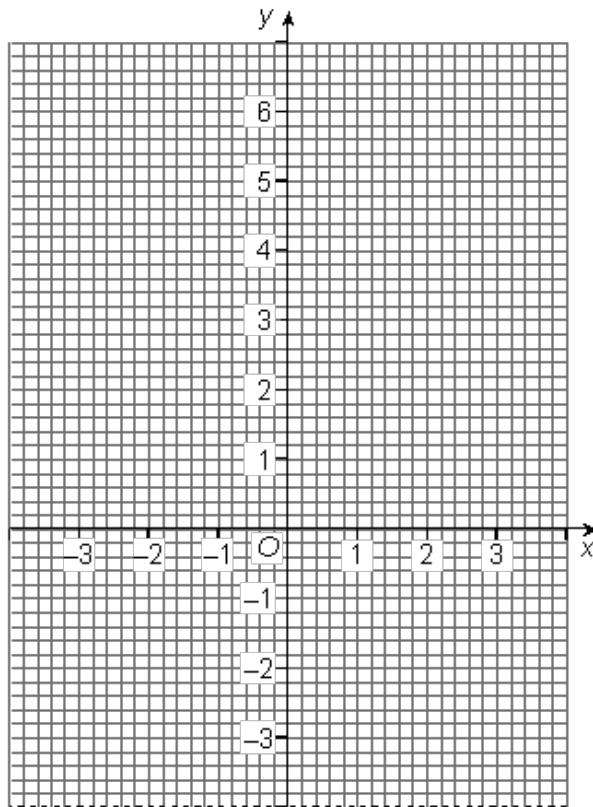
- Q12.** (a) Complete this table of values for  $y = x^2 - 3$

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

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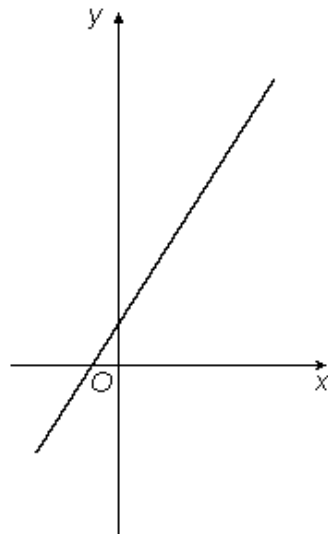
(1)

- (b) Draw the graph of  $y = x^2 - 3$  for values of  $x$  from -3 to +3.



(2)  
 (Total 3 marks)

**Q13.** The graph shows a sketch of the line  $y = 3x + 1$



Not drawn accurately

(a) Does the point  $(-2, -5)$  lie on the line?

☐

Yes

☐

No

Explain your answer.

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(2)

(b) On the graph, sketch the line  $y = 3x + 4$

(2)

(c) Rearrange the formula  $y = 3x + 1$  to make  $x$  the subject.

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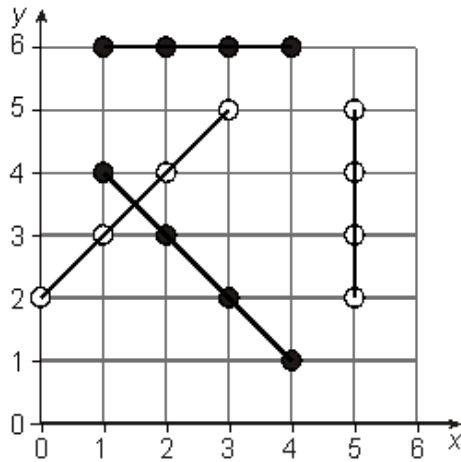
Answer .....

(2)

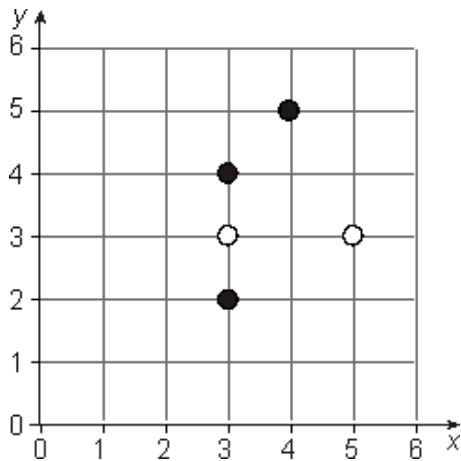
(Total 6 marks)

- Q14.** '4 in a line' is a game for two players.  
 Players take it in turns to place a coloured counter on a coordinate point.  
 The first player to place four counters in a straight line wins.

Examples of winning lines are shown on this grid.



The grid below shows an unfinished game between Ali and Sasha.  
 Ali has gone first and so far has placed three black counters.  
 Sasha is about to place her third counter at the point (4, 3).



- (a) Mark the point (4, 3) on the grid.

(1)

- (b) Explain why Sasha can be certain of winning if the counter is placed there.

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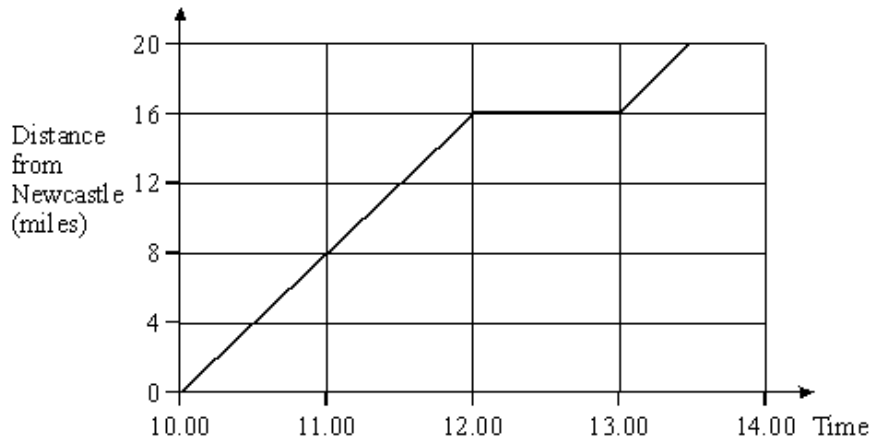
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(2)

(Total 3 marks)

- Q15.** Wayne cycles from Newcastle to Ashington, a distance of 20 miles.  
The diagram shows the distance-time graph of his journey.



- (a) How far from Newcastle is Wayne at 11.00?

Answer ..... miles

(1)

- (b) Describe what is happening between 12.00 and 13.00

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(1)

- (c) How far does Wayne travel in the first 2 hours of his journey?

Answer ..... miles

(1)

- (d) What is Wayne's average speed over the first 2 hours of his journey?

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Answer ..... mph

(2)

- (e) Darren travels from Ashington to Newcastle by bus.  
He leaves Ashington at 10.00 and arrives in Newcastle at 11.00  
On the diagram draw a possible distance-time graph of Darren's journey.

(1)

(Total 6 marks)

