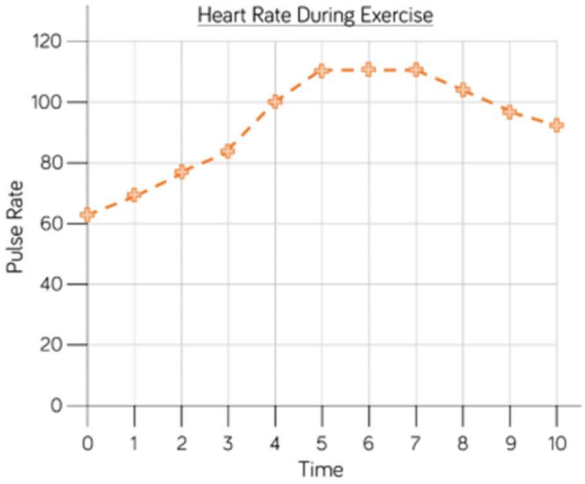
White Rose Maths Extension Question 1



How long did it take for the pulse rate to reach the highest level? Explain your answer, using the graph to. help.

What could have happened at 5 minutes?

What could have happened at 7 minutes?

Estimate what the pulse rate was after 2 and a half minutes. How did you get an accurate estimate?

Question 2

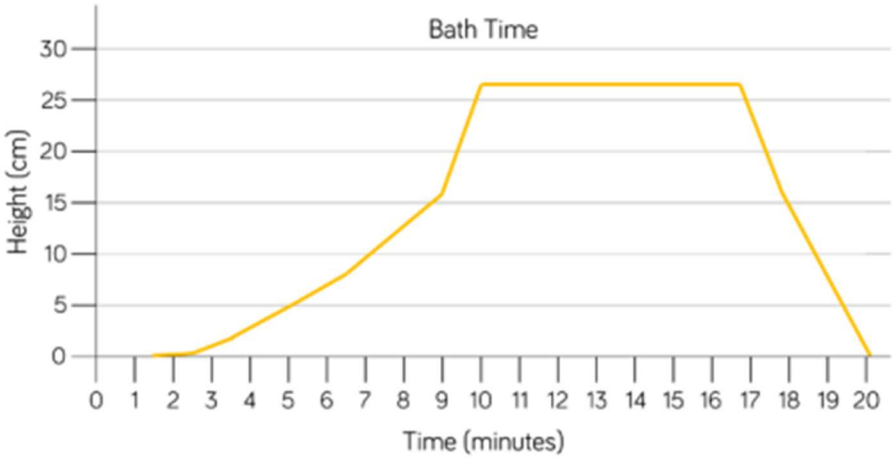
Carry out your own exercise experiment and record your heart rate on a graph like the one shown in the section above. How does it compare?

Can you make a set of questions for a friend to answer about your graph?

Can you put the information into a table?

Question 3

Here is a line graph showing a bath time. Can you write a story to explain what is happening in the graph?



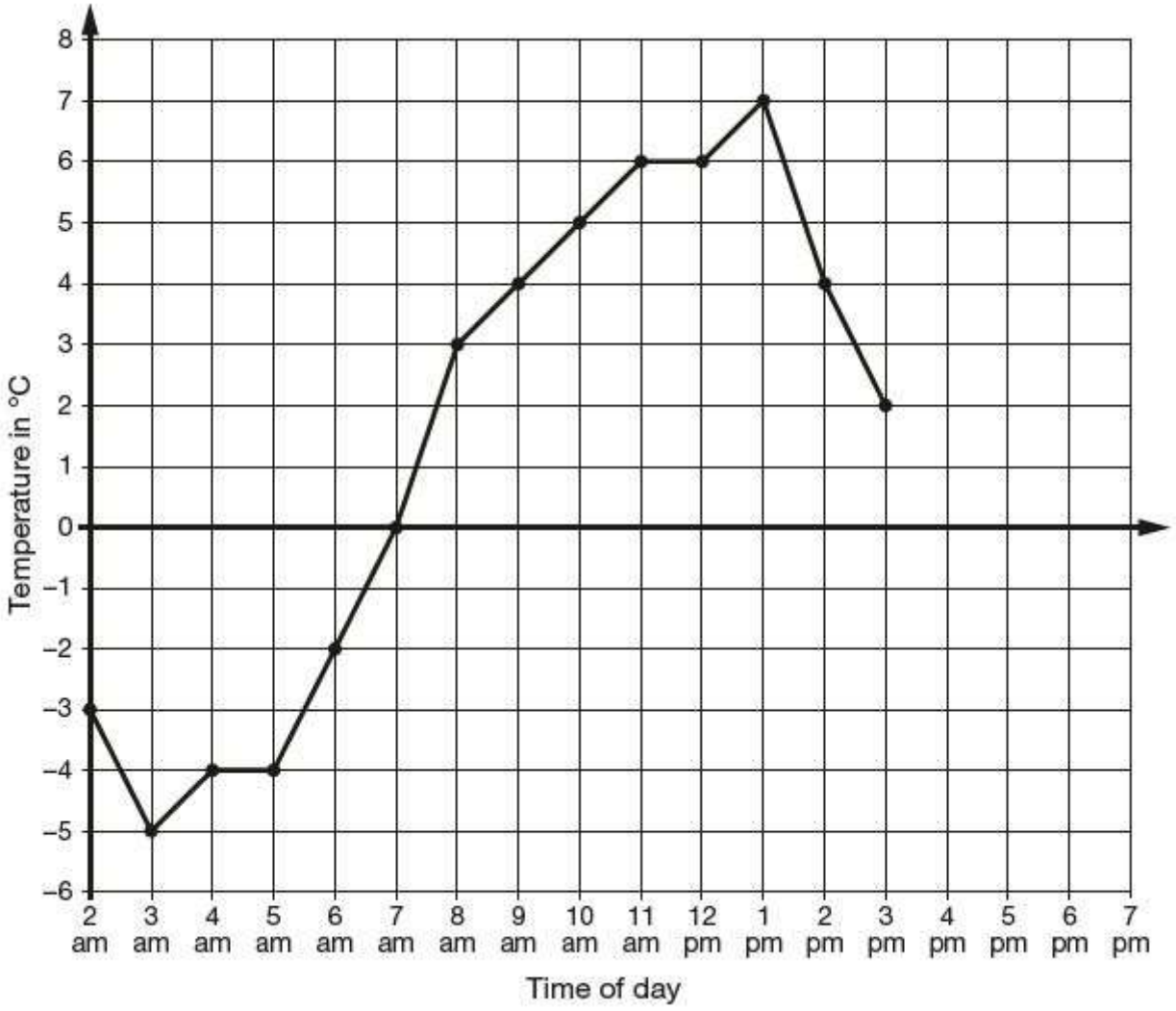
How long did it take to fill the bath?

How long did it take to empty?

The bath doesn't fill at a constant rate. Why might that be?

Testbase ExtensionQ1.

This graph shows the temperature in °C from 2 am to 3 pm on a cold day.



How many degrees **warmer** was it at 3 pm than at 3 am?

°C

1 mark

At 6 pm the temperature was 4 degrees lower than at 3 pm.

What was the temperature at 6 pm?

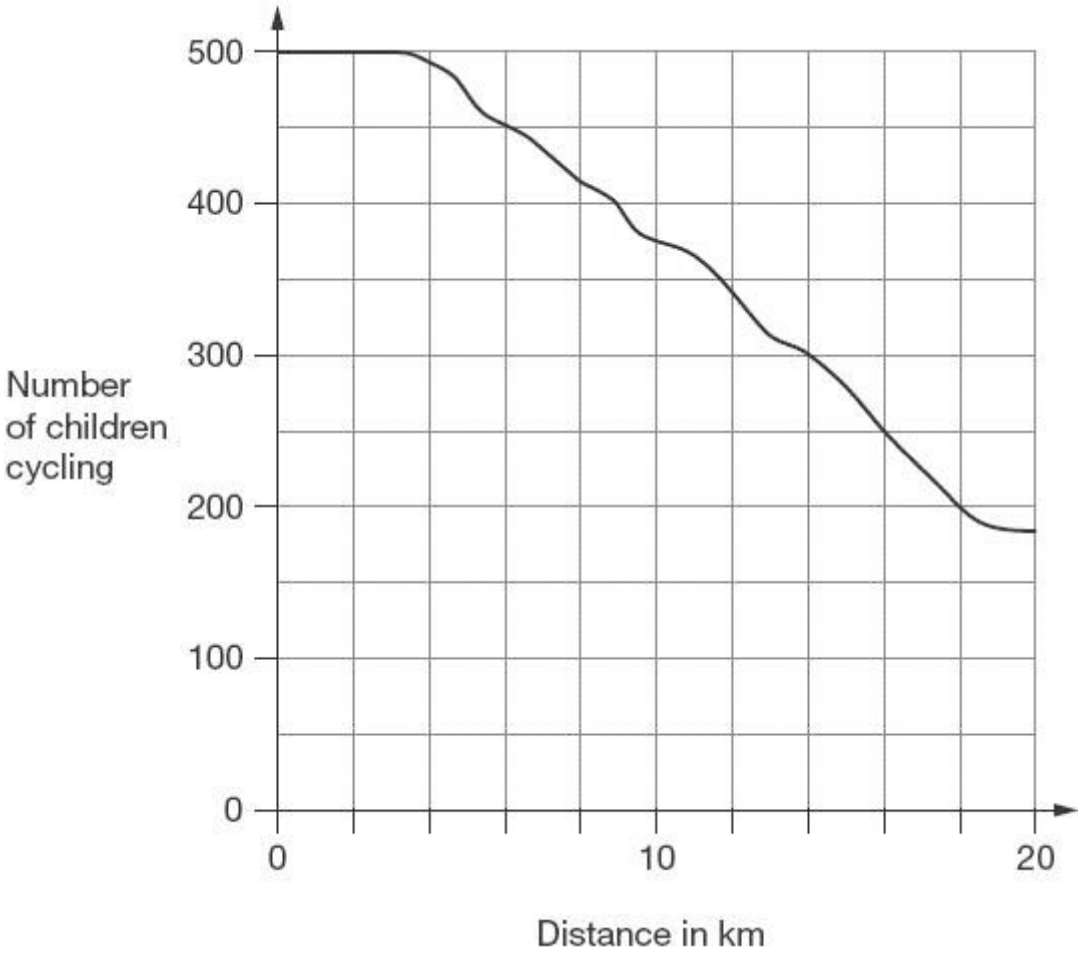
°C

1 mark

Q2.

500 children started a 20 kilometre sponsored cycle ride.

This graph shows how far they cycled.



At what distance were exactly half of the children still cycling?

km

1 mark

Estimate how many children completed the 20 kilometre cycle ride.

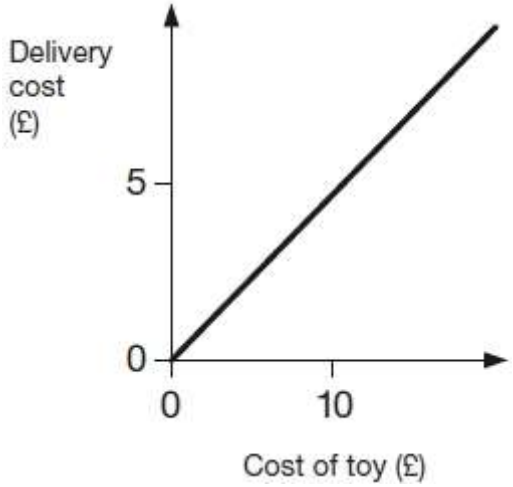
1 mark

Q3.

Two companies sell toys online. They charge to deliver.

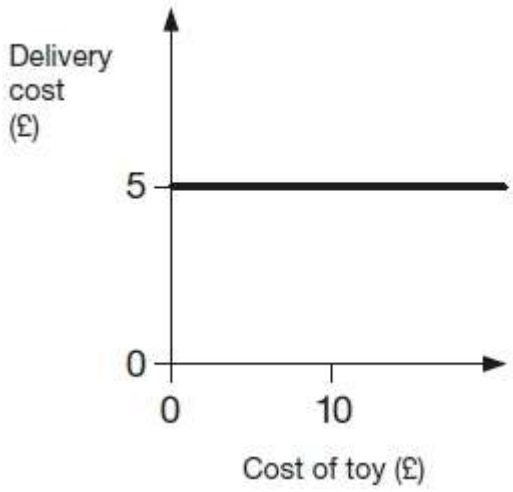
Describe the delivery cost of the second company.

The first company is done for you.



The more a toy costs, the more

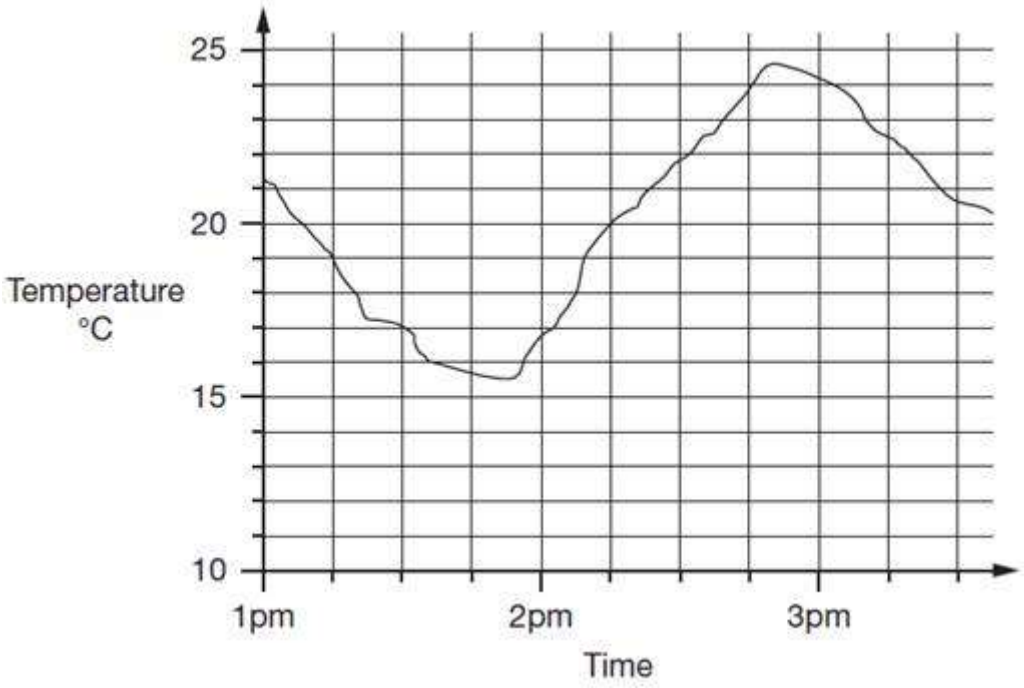
the delivery costs.



1 mark

Q4.

This graph shows how the temperature changed in Liam's room one afternoon.



Estimate the temperature at 3:15pm.

°C

1 mark

Estimate the time when the temperature was highest.

pm

1 mark

How much did the temperature change from 2pm to 2:30pm? Give your answer to the **nearest degree**.

degrees

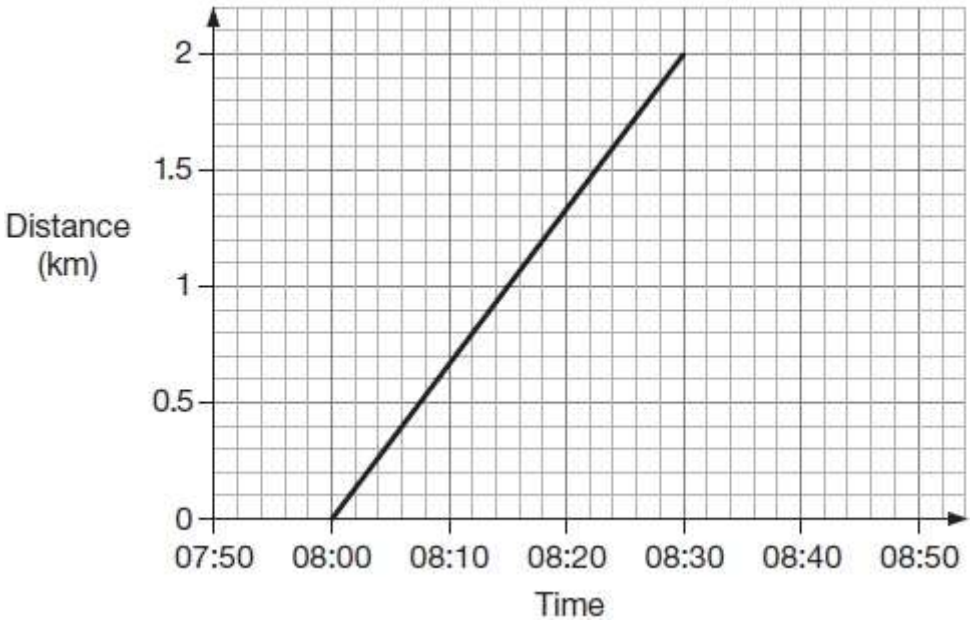
1 mark

Q5.

Alfie and his brother walked from home to their school.

Their school is 2 kilometres from home.

The graph shows information about **Alfie's** journey.



(a) How does the graph show that Alfie walked at a **constant speed** for all of his journey?

_____

1 mark

(b) Alfie's brother left home **10** minutes **before** Alfie.

He arrived at school **20** minutes **after** Alfie.

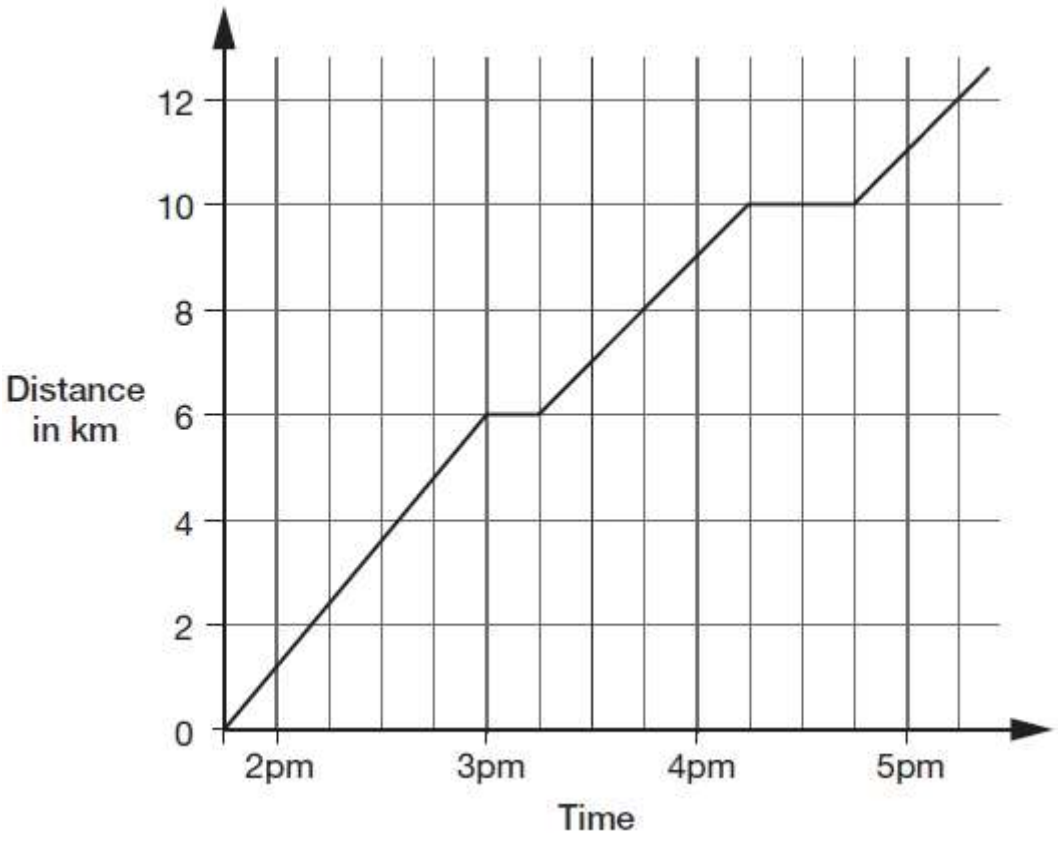
He walked at a **constant speed** for all of his journey.

At what time did Alfie overtake his brother?

1 mark

Q6.

This graph shows the distance Alfie and Chen walked in an afternoon. They started at 1:45pm and had two breaks.



How many kilometres did they walk **between** the first and second breaks?

km

1 mark

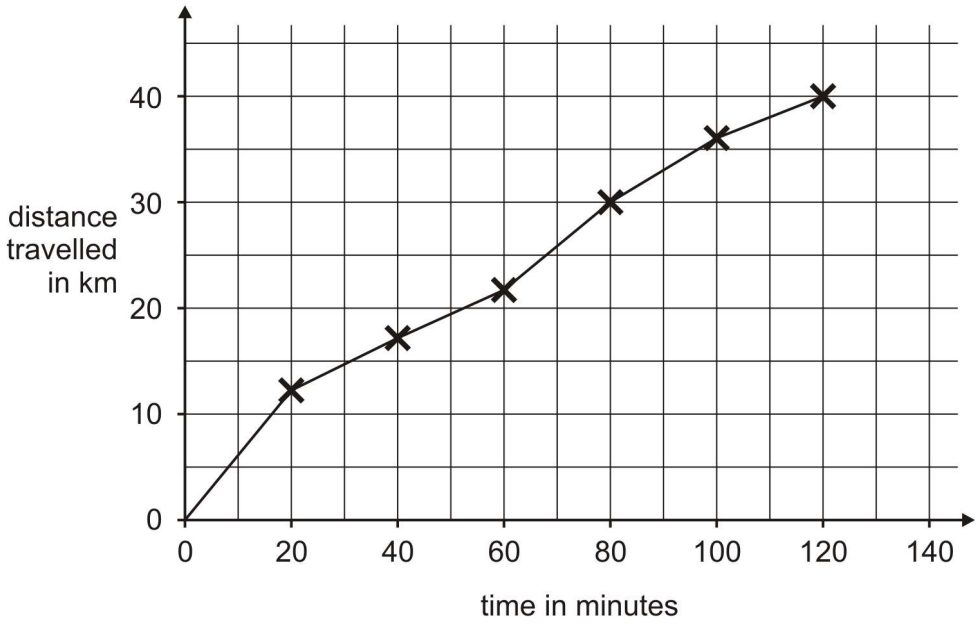
At what time did Alfie and Chen start their second break?

1 mark

Q7.

Carol went on a **40-kilometre** cycle ride.

This is a graph of how far she had gone at different times.



How many minutes did Carol take to travel the **last 10 kilometres** of the ride?

minutes

1 mark

Use the graph to estimate the distance travelled in the **first 20 minutes** of the ride.

km

1 mark

Carol says,

'I travelled further in the first hour than in the second hour'.

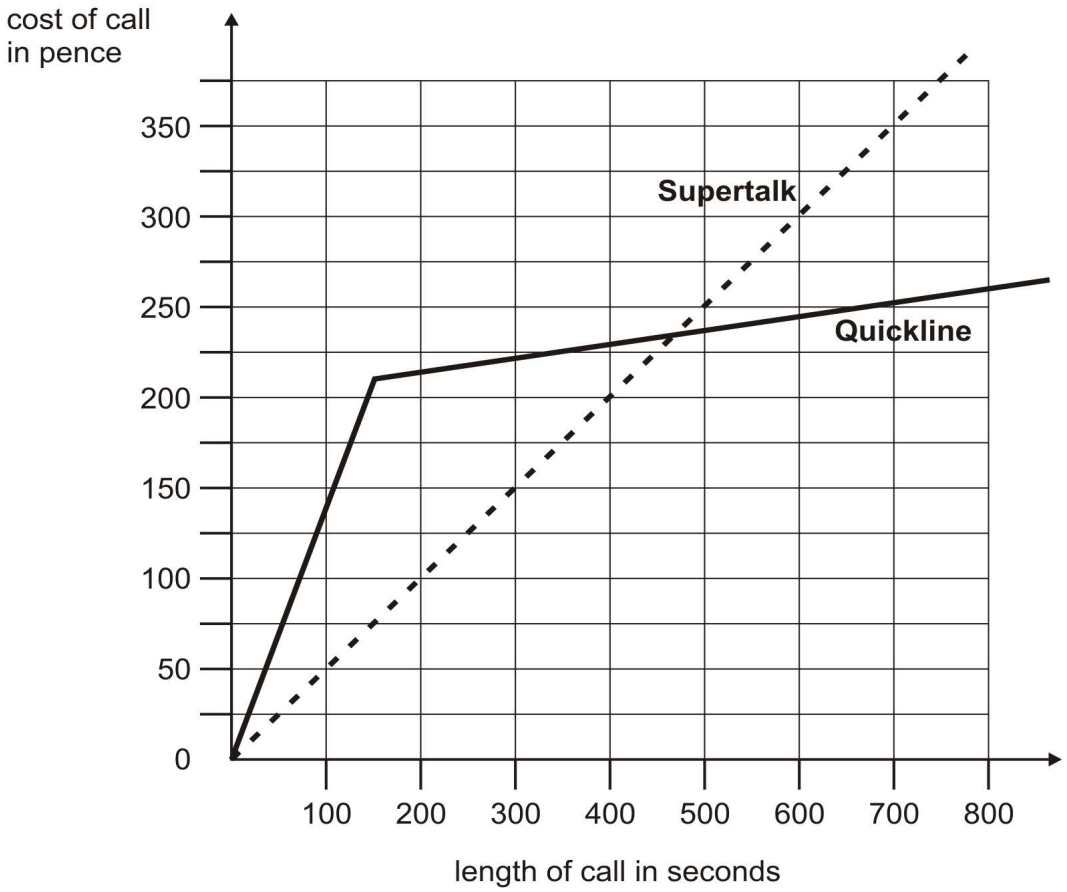
Explain how the graph shows this.

1 mark

Q8.

Two telephone companies, **Supertalk** and **Quickline**, have different charges for long distance calls.

This graph shows the charges for different lengths of calls.



Estimate from the graph how many seconds longer a **£2** call lasts with **Supertalk** compared to **Quickline**.

seconds

1 mark

Estimate from the graph the length of a call when **Quickline** becomes cheaper to use than **Supertalk**.

Give your answer to the nearest 10 seconds.

seconds

1 mark

Q1.

(a) 7

1

Do not *accept −7 or 7−*

(b) −2

1

Do not *accept 2−*

[2]

Q2.

(a) 16

1

(b) A whole number in the range 180 to 190 inclusive

1

[2]

Q3.

Gives a correct description that indicates the delivery cost is constant, eg:

- The delivery cost is always £5
- The cost is always £5 no matter how much the toy costs
- Delivery stays the same as the cost of toy increases

Accept minimally acceptable explanation, eg:

- *It is £5*

Accept omission of the actual delivery cost, eg:

- *It always costs the same*
- *The cost is the same*
- *The cost of the toy does not affect the delivery cost*

! Condone correct response with the pound sign omitted, eg:

- *It is always 5*

! Condone explanations which refer to toys costing up to £20

Do not accept *incomplete or ambiguous explanation, eg:*

- *They are equal amounts*

[1]

Q4.

(a) Accept answers in the range 22.2 to 22.8 exclusive.

Do not *accept 22.2 or 22.8*

1

(b) Accept answers in the range 2:48pm to 2:52pm inclusive.

The answer is a specific time.

1

(c) 5

1

[3]

Q5.

Gives a correct interpretation of the graph, eg:

- It is a straight line
- It goes up steadily
- The angle of the line stays the same
- The gradient of the line is constant

Accept minimally acceptable explanation, eg:

- *It is straight*
- *It doesn't bend*
- *It is a diagonal*

***Do not accept** incomplete or ambiguous explanations that do not sufficiently imply a constant speed and / or do not demonstrate the relationship holds for the entire graph, eg:*

- *The line goes straight up*
- *It is not wobbly*
- *It is level*
- *Every 5 mins he walks the same distance*
- *He walks 1km in the first 15 mins and 1km in the second 15 mins*

! Values read from graph

Accept, provided it is clear the relationship holds for the entire graph.

Values should be accurate within +/− 0.1km and / or +/− 2 minutes, eg:

- *0.7km every 10 minutes*
- *Every 7.5 minutes he walks about half a km*

! Calculation of kilometres per hour

Accept values in the range 3.7 to 4.3km per hour inclusive.

1

(b) 08:10

! Accept values between 08:09 and 08:11 inclusive

! Time

1

[2]

Q6.

(a) 4 km

1

(b) 4:15pm

The answer is a specific time

1

[2]

Q7.

(a) 40

1

(b) Answer in the range 12 to 13km inclusive.

1

(c) An explanation which indicates that after 1 hour she has travelled more than 20km and/or she has travelled less than 20km in the second hour, eg

- 'She did about 40 km and it was about 22 in the first hour';
- 'Half and half would be 20-20, but she does more than 20 then less than 20';
- 'It goes to 23 in the first hour'.

***Do not** accept vague or arbitrary explanations, eg*

- *'She got tired in the second half';*
- *'It's marked on the graph';*
- *'There's more crosses in the first hour than the second';*
- *'The gaps are further apart'.*

1

[3]

Q8.

(a) Answer in the range 250 to 270 inclusive.

1

(b) Answer in the range 460 to 480 inclusive.

1

[2]