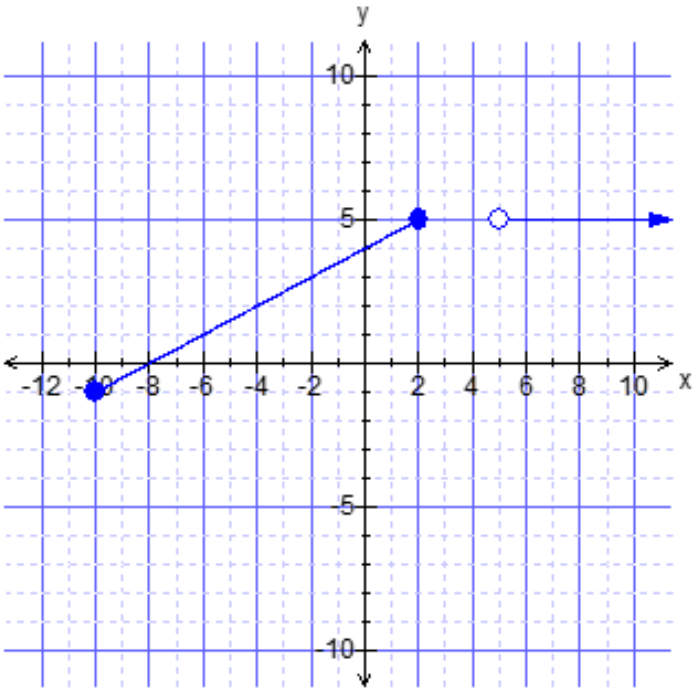
education equals

Topic: Piecewise graphs

Time: 45 mins Marks: /45 marks

Calculator Assumed

Question One: [2, 3, 4 : 9 marks]



Consider the piecewise function above.

a) For what values of x is $y = 5$?

b) What is the gradient of each section of this graph?

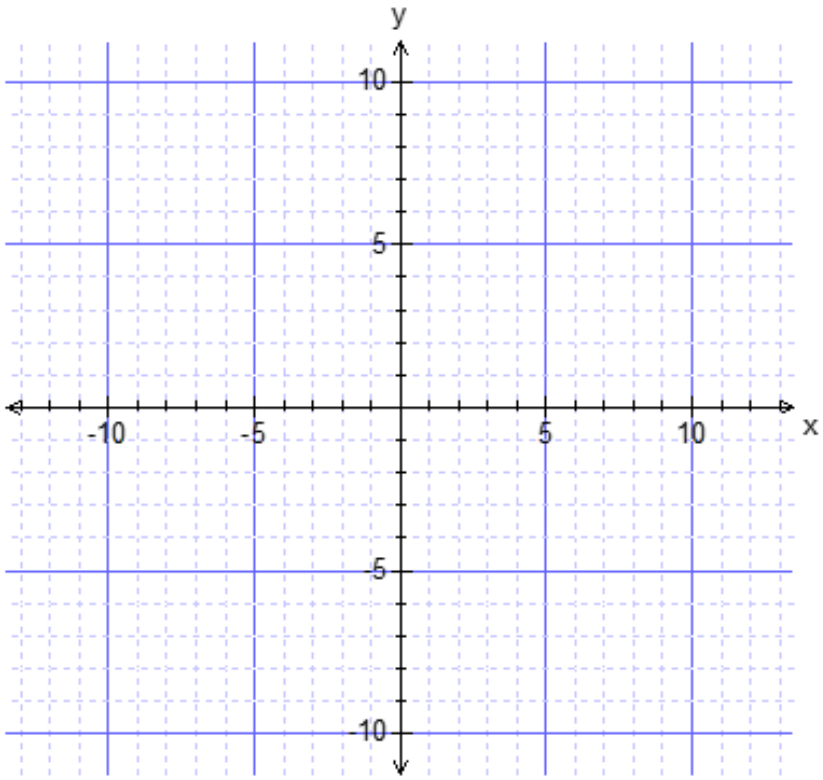
c) Write a function to define the graph above.

Question Two: [3, 2: 5 marks]

Graph the following functions on the axes below

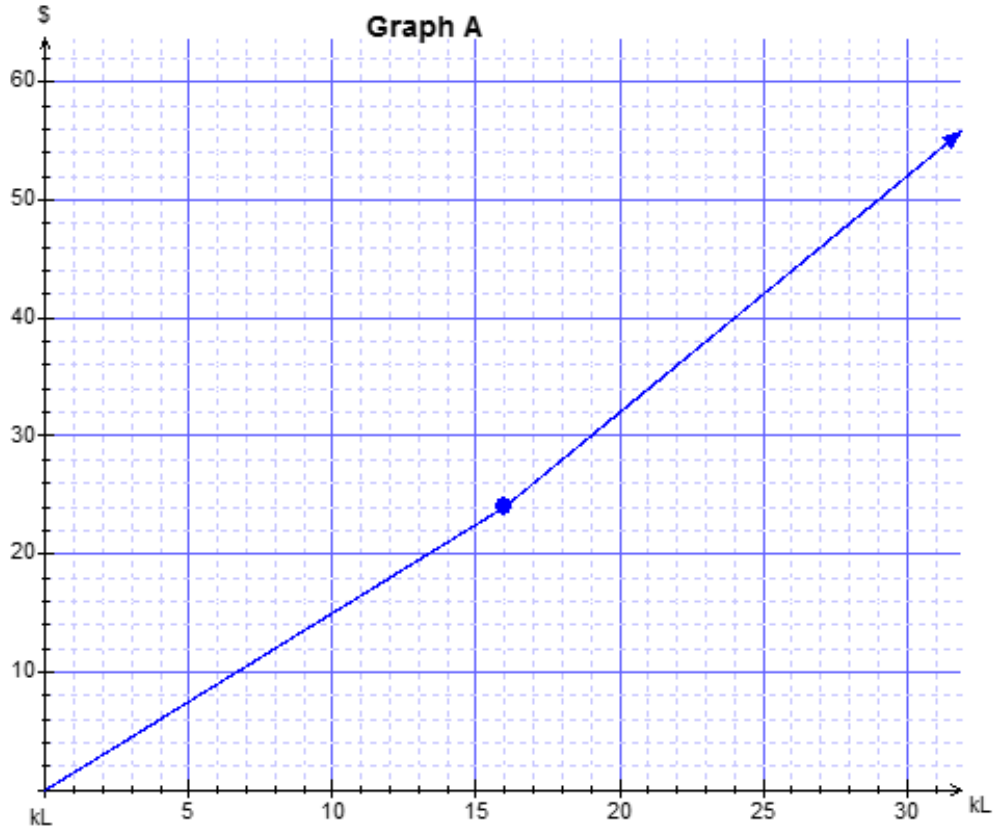
a) $4x + 5y = -10;\ -10 < x < 5$

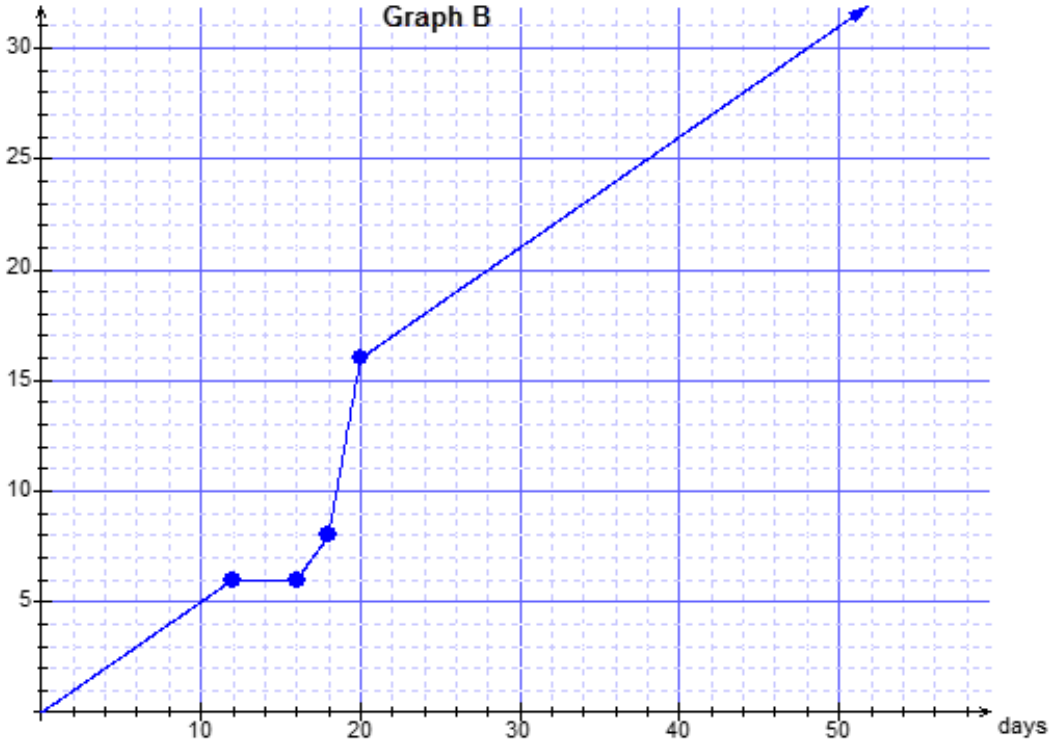
b) $x = 10\,;\, y \geq -5$



Question Three: [2, 2, 2, 2: 8 marks]

The following graphs were on Chelsey's water account.





a) Explain what information is being displayed in each graph.

b) Describe the pricing shown in Graph A.

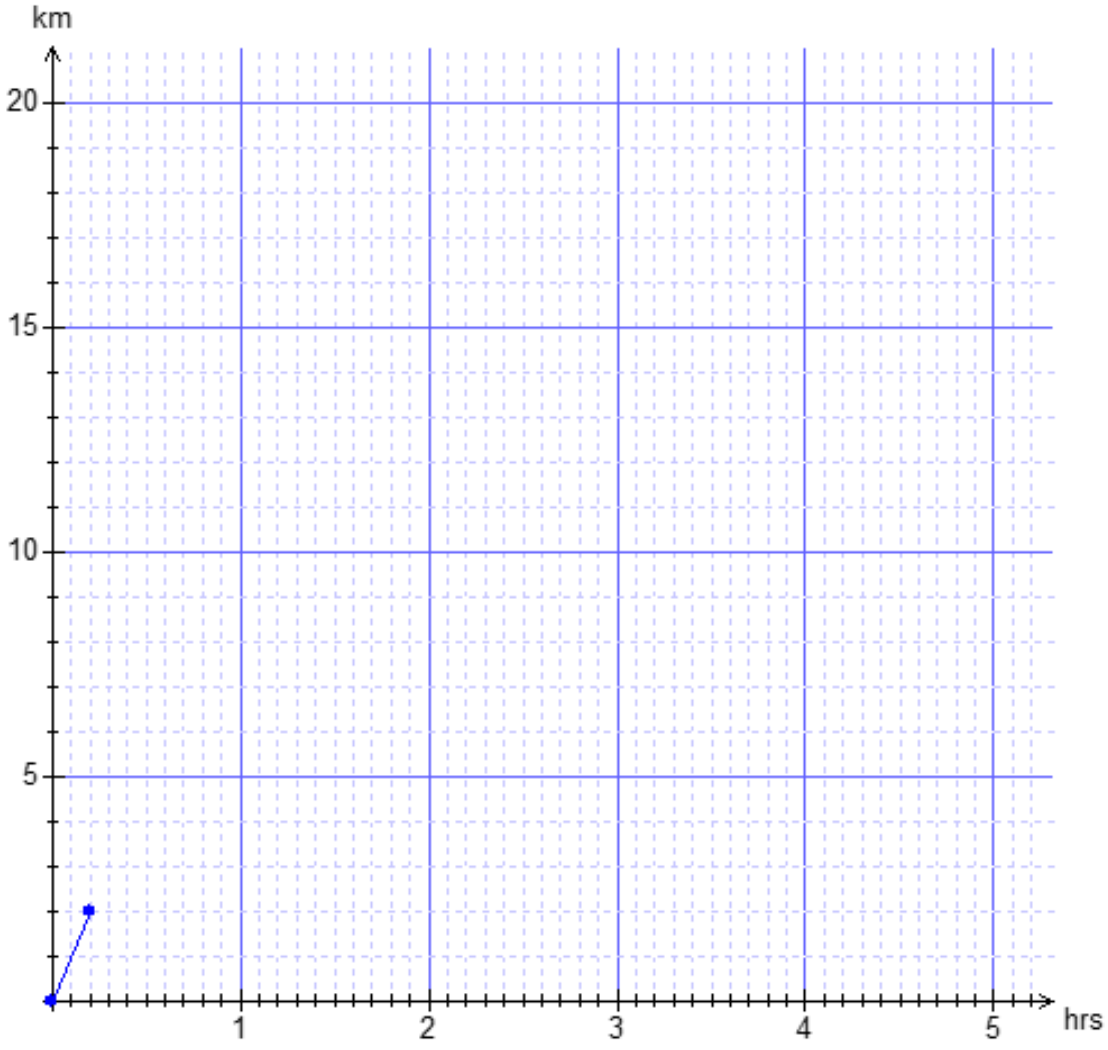
c) Chelsey goes on holiday for a few days during the time shown on the graph. Between which days was she most likely to have taken her holiday? Explain your answer.

d) Explain what may have happened between days 18 and 20 in Chelsey's water usage.

Question Four: [6, 2: 8 marks]

Cecelia goes into the city to visit her friend Marcia for coffee. She rides her bike for 12 minutes to the train station which is 2km away. She had to wait 6 minutes for the train to arrive. It was an 18 minutes and 21km train ride to the city. Cecelia then took 6 minutes to walk 500m to the café where she met Marica for coffee. The pair enjoyed coffee and cake for an hour and then Marcia drove Cecelia back to where she left her bike and she rode 12 minutes home.

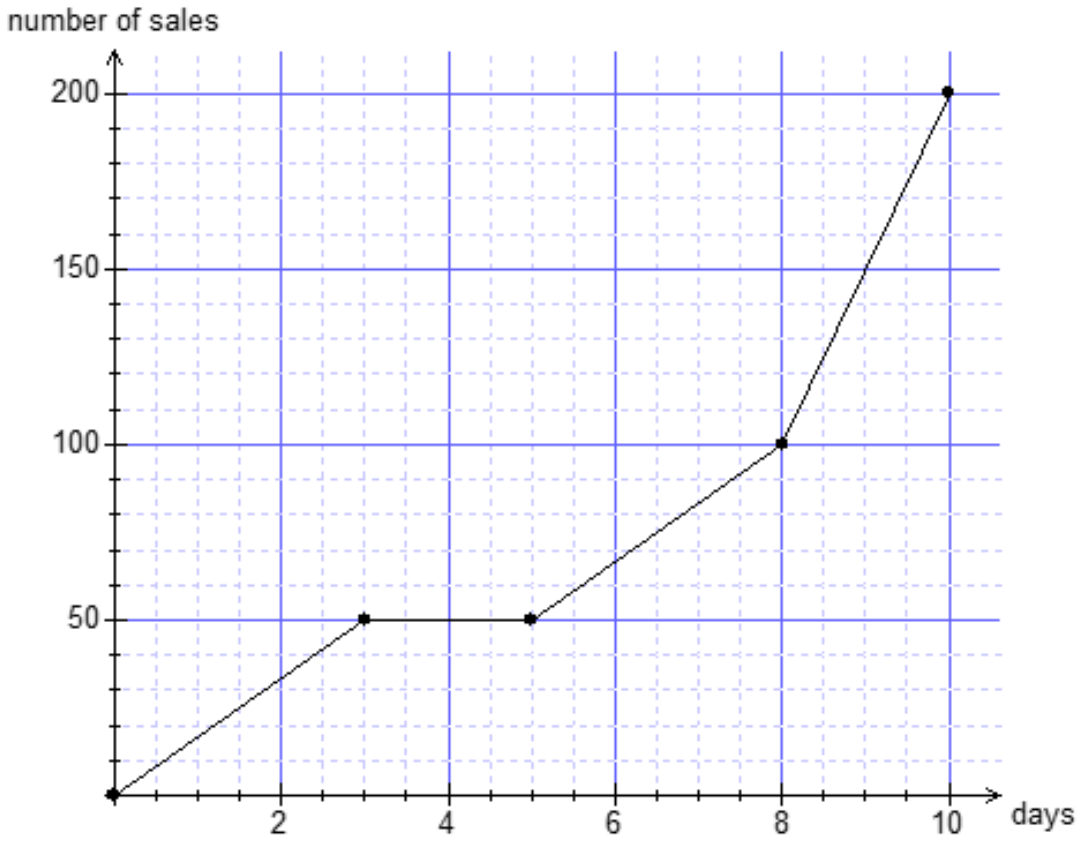
a) Complete the travel graph below.



b) If Cecelia left her home at 10 am, what time did she return home after meeting Marcia?

Question Five: [2, 2, 2: 6 marks]

For 10 days following the implementation of a new advertising campaign, a company's sale are tracked and graphed below.



a) What is the average number of sales made over the 10 days?

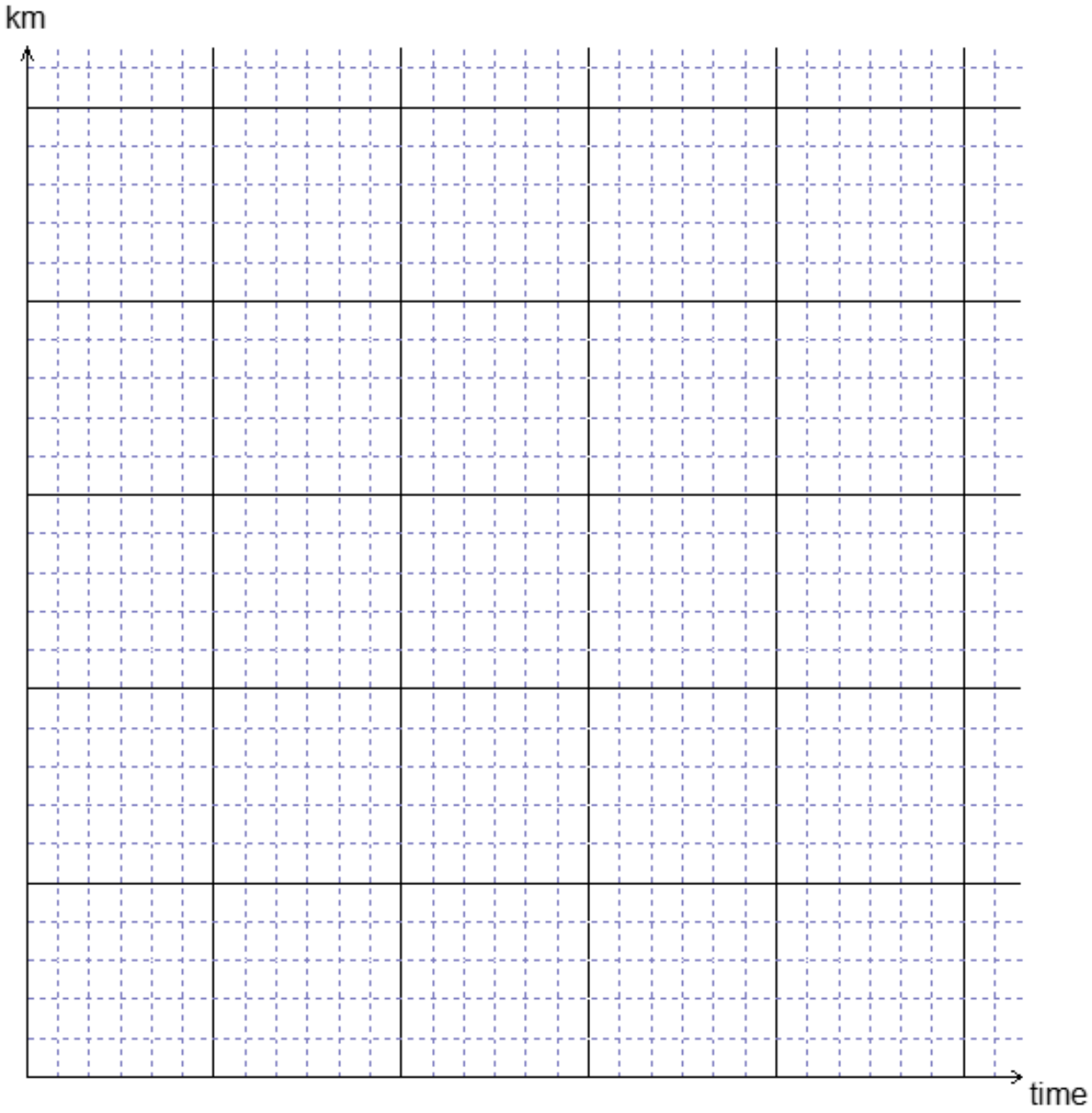
b) Between which days was the campaign most successful?

c) Give a reasonable explanation for the number of sales made between days 3 and 5.

Question Six: [9 marks]

Barbara leaves her house at 8:00 am to get to university in time for her exam which starts at 9:15 am. She lives 20 km from her university and she parks her car at the university at 8:55 am. She walks slowly to the examination room and arrives at 9:15 as they start the exam. She parked 1km from the examination room. She sits the exam for 1 hour. After which time she takes 10 minutes to walk to her car and only 20 minutes to drive home because there is no traffic.

Complete this situation as a travel graph on the axes below to determine what time Barbara arrives home.



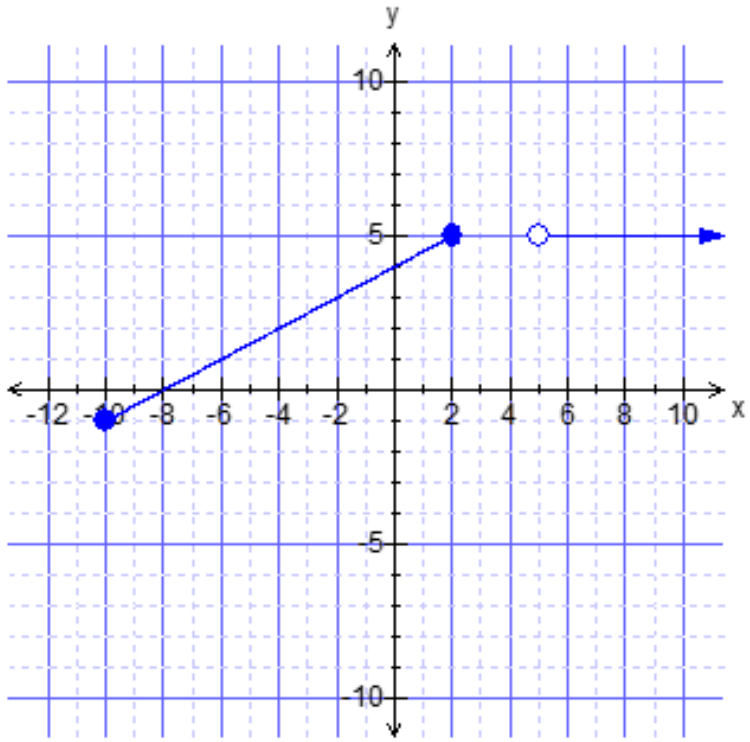
education equals

Topic: Piecewise graphs SOLUTIONS

Time: 45 mins Marks: /45 marks

Calculator Assumed

Question One: [2, 3, 4 : 9 marks]



Consider the piecewise function above.

a) For what values of x is $y = 5$?

$x = 2 \text{ and } x > 5$

b) What is the gradient of each section of this graph?

$First\ m: \frac{6}{12} = \frac{1}{2}$ $Second\ m: 0$

c) Write a function to define the graph above.

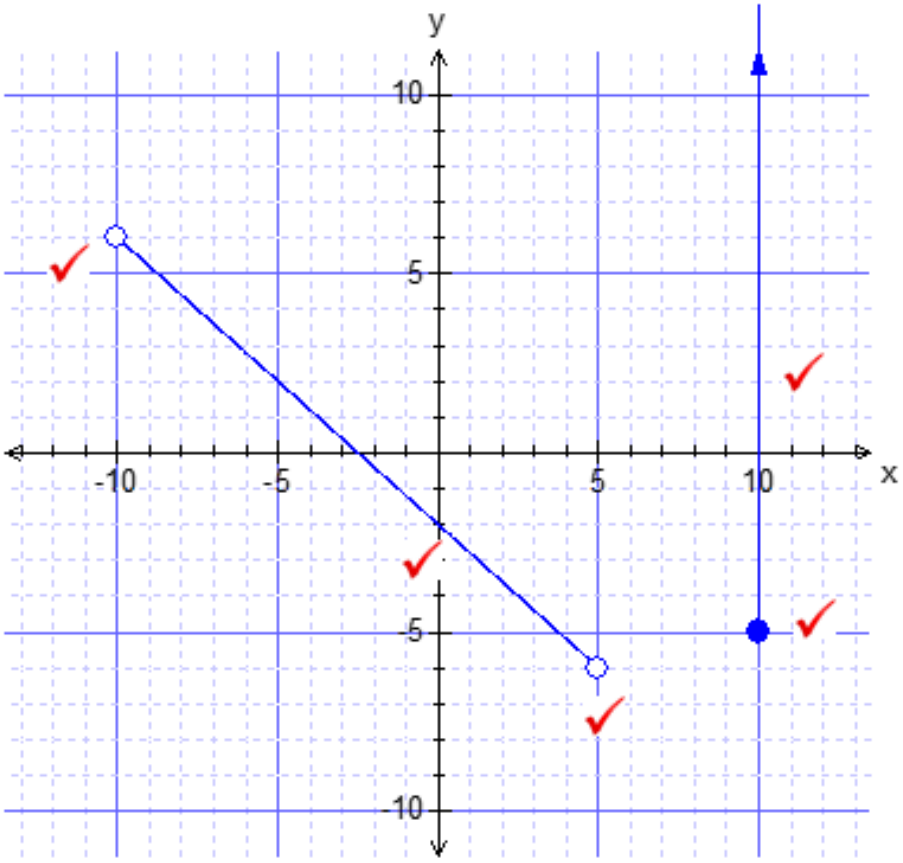
$$y = \begin{cases} \frac{1}{2}x + 4; & -10 \le x \le 2 \\ y = 5 \quad ; & x > 5 \end{cases}$$

Question Two: [3, 2: 5 marks]

Graph the following functions on the axes below

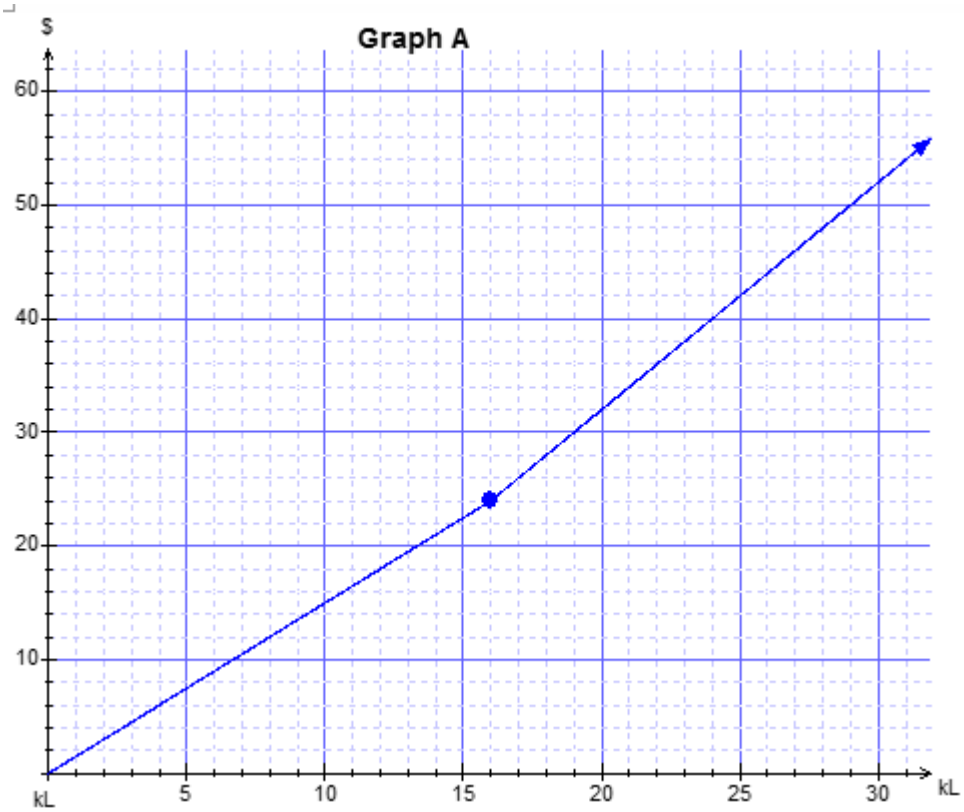
a) $4x + 5y = -10;\ -10 < x < 5$

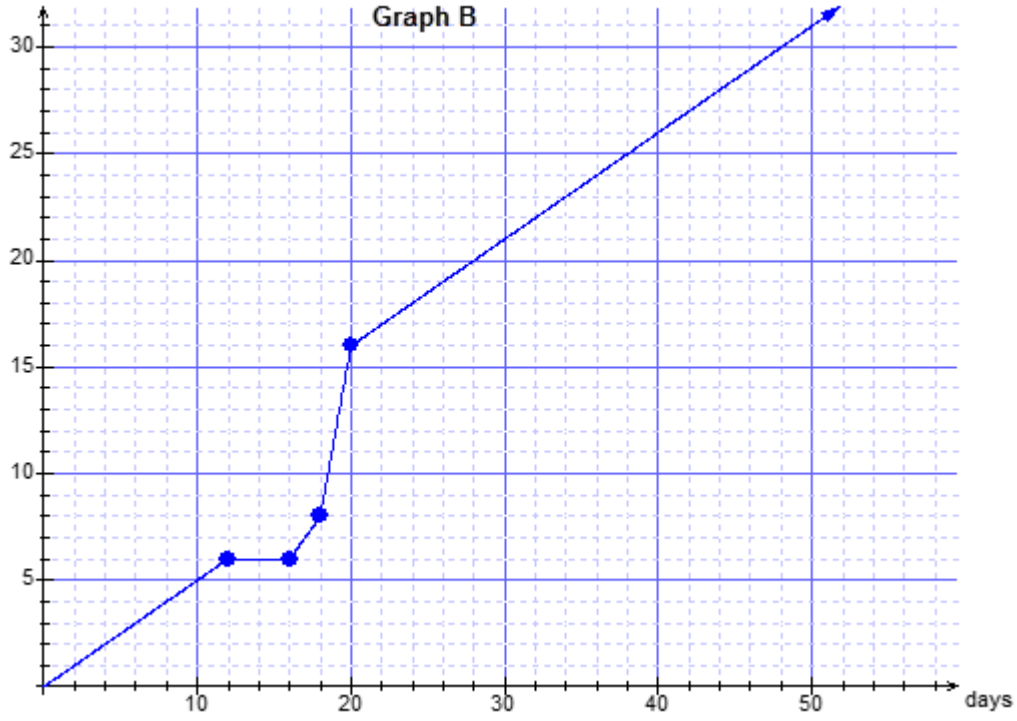
b) $x = 10\ ;\ y \geq -5$



Question Three: [2, 2, 2, 2: 8 marks]

The following graphs were on Chelsey's water account.





a) Explain what information is being displayed in each graph.

A: The pricing for water use. ✓

B: The usage over time ✓

b) Describe the pricing shown in Graph A.

✓ ✓

Pricing is more expensive after 16kL of consumption.

c) Chelsey goes on holiday for a few days during the time shown on the graph. Between which days was she most likely to have taken her holiday? Explain your answer.

Between day 12 and 16 because no water is consumed during that time.

✓ ✓

d) Explain what may have happened between days 18 and 20 in Chelsey's water usage.

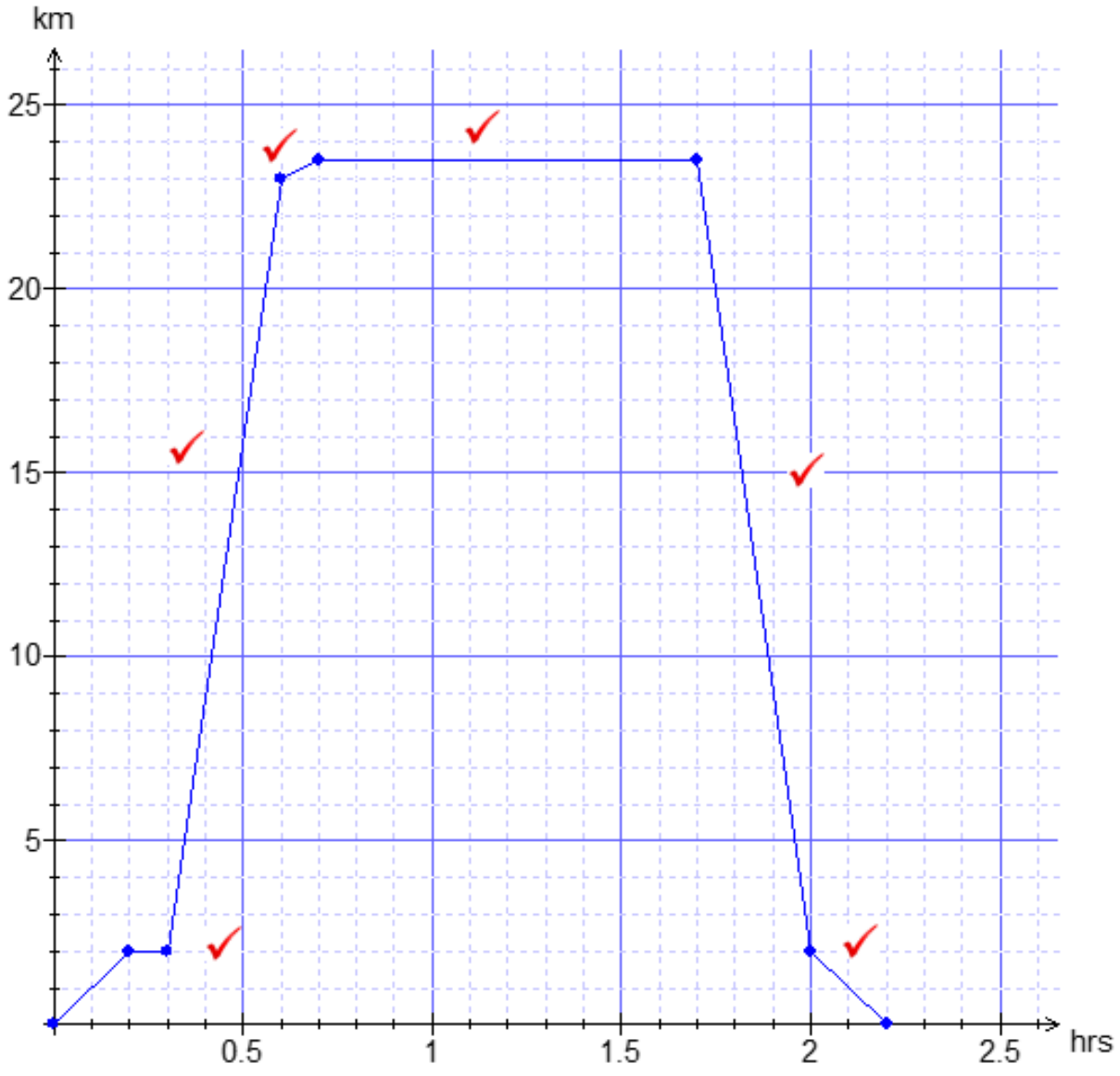
Any reasonable explanation is acceptable. Some possible answers include, a pipe burst, there was a water leak, she installed a swimming pool and had to fill it up etc.

✓ ✓

Question Four: [6, 2: 8 marks]

Cecelia goes into the city to visit her friend Marcia for coffee. She rides her bike for 12 mins to the train station which is 2km away. She had to wait 6 mins for the train to arrive. It was an 18 min and 21km train ride to the city. Cecelia then took 6 mins to walk 500m to the café where she met Marica for coffee. The pair enjoyed coffee and cake for an hour and then Marcia drove Cecelia back to where she left her bike in 12 mins. Finally Cecelia then rode her bike for 12 mins home.

a) Complete the travel graph below.

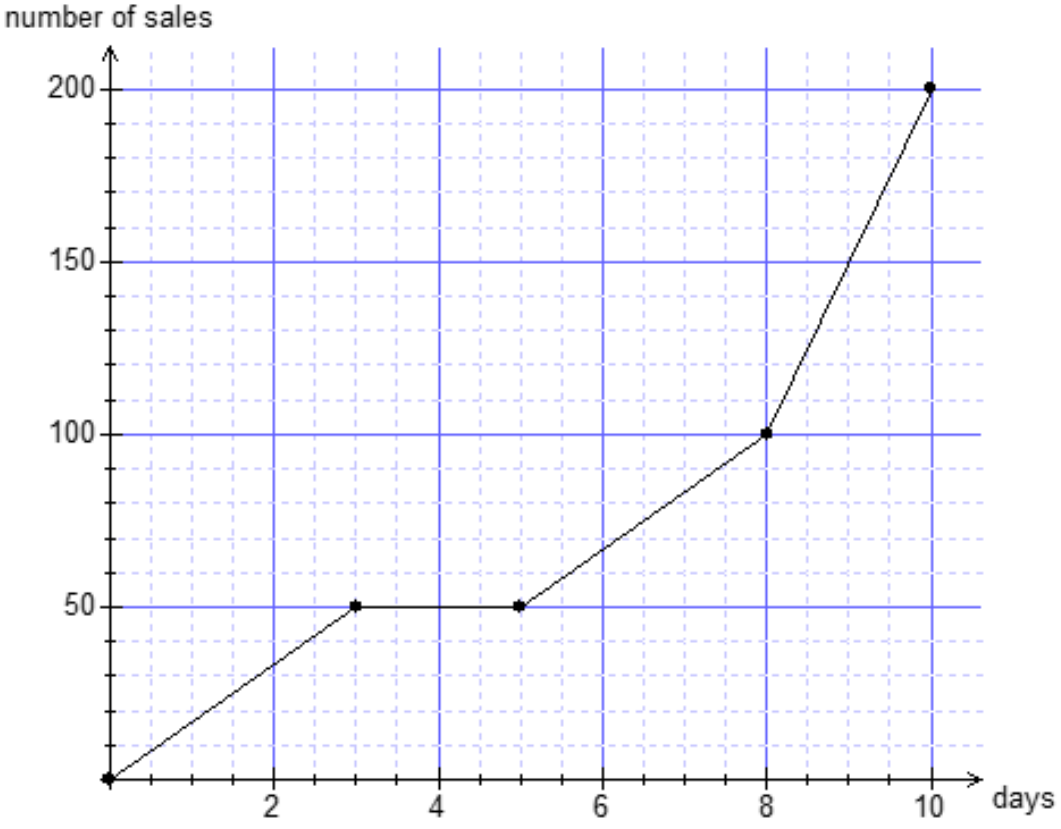


b) If Cecelia left her home at 10 am, what time did she return home after meeting Marcia?

12: 12 *pm* ✓✓

Question Five: [2, 2, 2: 6 marks]

For 10 days following the implementation of a new advertising campaign, a company's sale are tracked and graphed below.



a) What is the average number of sales made over the 10 days?

$$\frac{200}{10} = 20 \; sales$$

b) Between which days was the campaign most successful?

Between days 8 and 10.

c) Give a reasonable explanation for the number of sales made between days 3 and 5.

Any reasonable explanation is acceptable. One possible answer is that it was the weekend and the business was closed.

Question Six: [9 marks]

Barbara leaves her house at 8:00 am to get to university in time for her exam which starts at 9:15 am. She lives 20km from her university and she parks her car at the university at 8:55 am. She walks slowly to the examination room and arrives at 9:15 as they start the exam. She parked 1km from the examination room. She sits the exam for 1 hour. After which time she takes 10 mins to walk to her car and only 20 mins to drive home because there is no traffic.

Complete this situation as a travel graph on the axes below to determine what time Barbara arrives home.