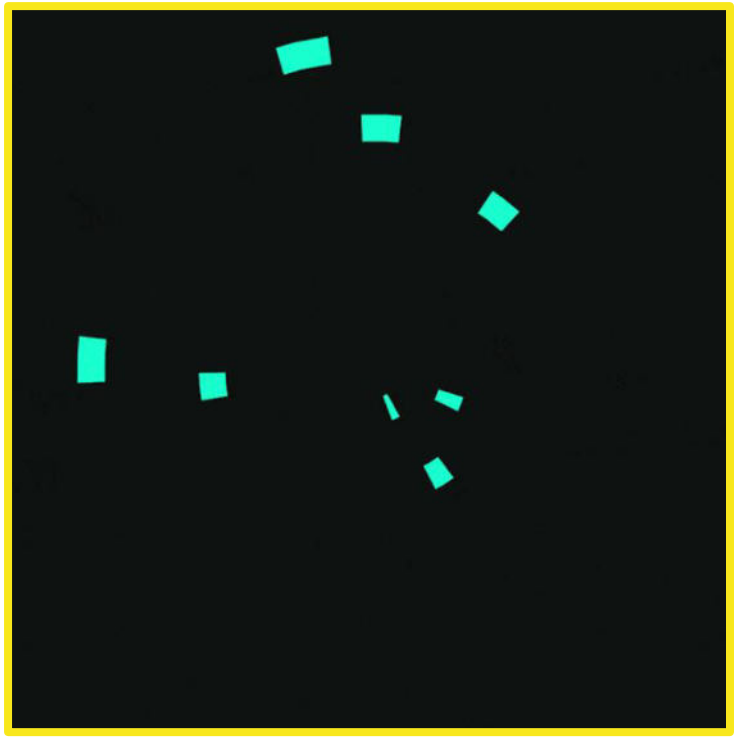
Today's Materials

- device
- calculator
- Pencil
- Packet

Today's Goals

- ❏ Interpret a graph of a piecewise function or the rules given in function notation, and explain the rules (orally and in writing) in terms of a situation.
- ❏ Sketch a graph that represents the rules of a piecewise function, paying special attention to the endpoints of each interval.
- ❏ Understand a piecewise function as a function defined by different rules for different intervals of the domain.

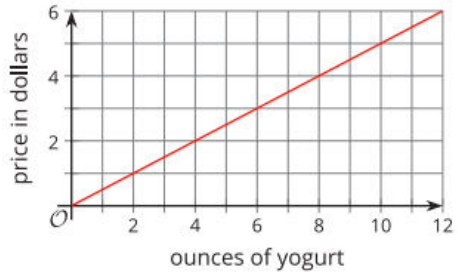


12.1 Frozen Yogurt (page)

A self-serve frozen yogurt store sells servings up to 12 ounces. It charges $0.50 per ounce for a serving between 0 and 8 ounces, and $4 for any serving greater than 8 ounces and up to 12 ounces.

Choose the graph that represents the price as a function of the weight of a serving of yogurt. Explain how you know.

A



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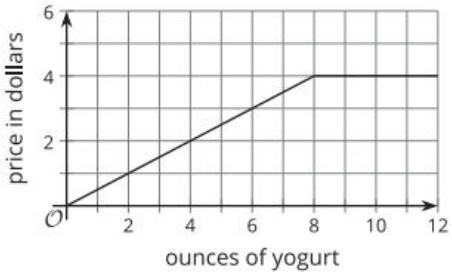

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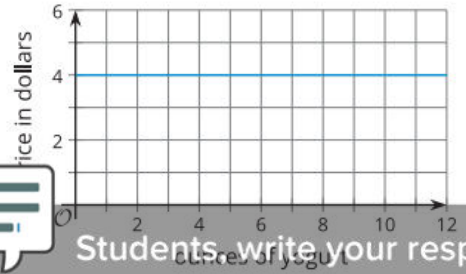

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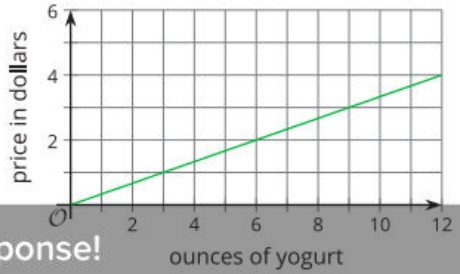
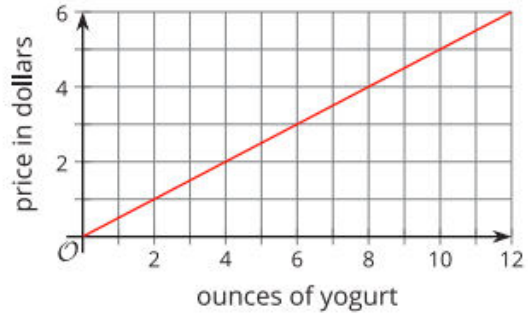


Students, write your response!

A



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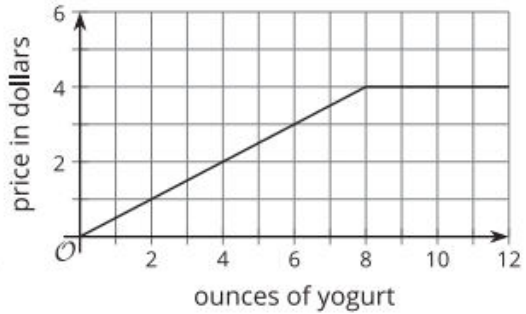

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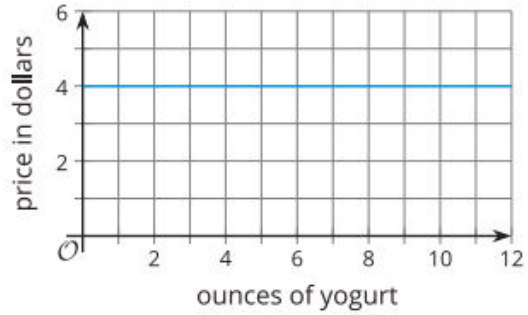

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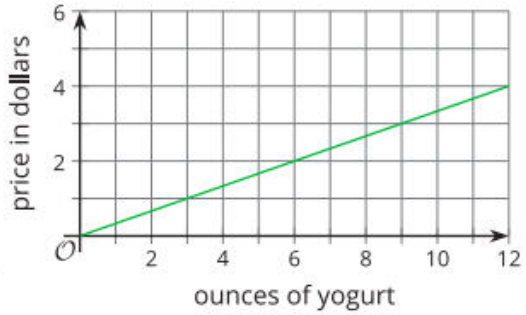
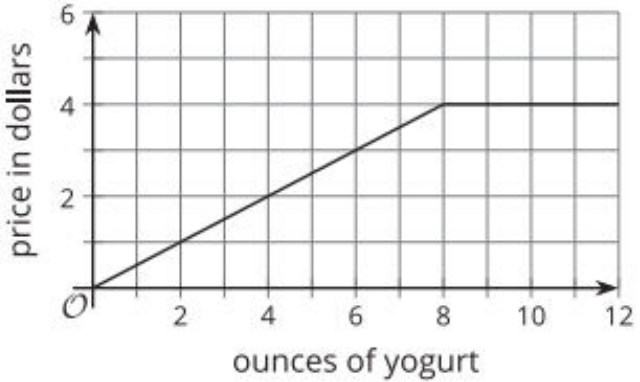


How much would it cost to get a 4-ounce serving?”

How much for a 10-ounce serving?

B



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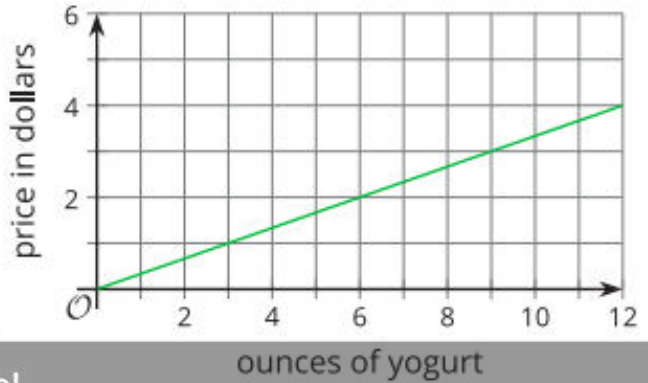
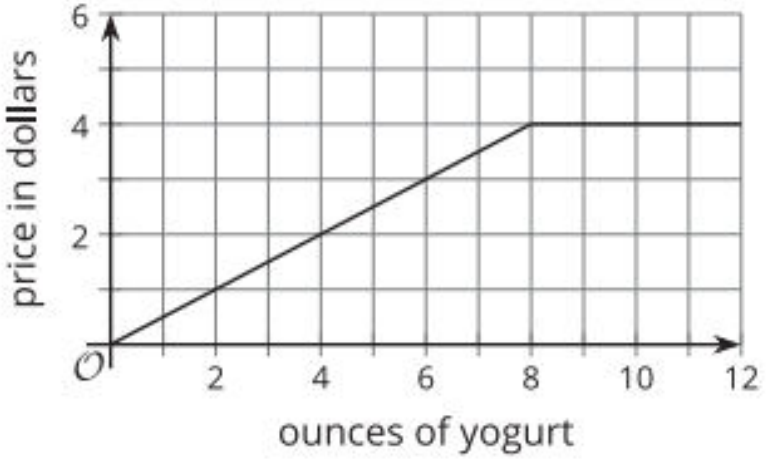


You just applied two different rules. How did you know which one to use in each case?

Students, write your response!

B



Peicewise Function: different rules are applied to different input values to find the output values.

The graph is made up of two pieces that correspond to the two rules.

Can you think of other situations that could be represented by piecewise functions?

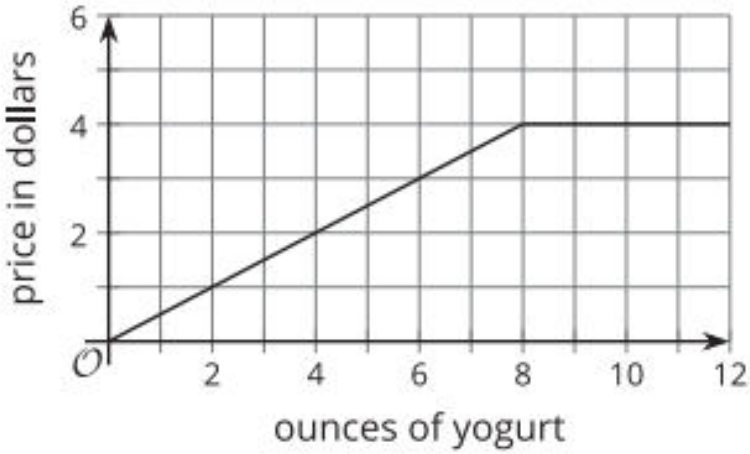
Cases Notation

If the function p represents the price of yogurt for a serving of w ounces, then the rules would be:

$$p(w) = \begin{cases} 0.50w, & 0 < w \leq 8 \\ 4, & 8 < w \leq 12 \end{cases}$$

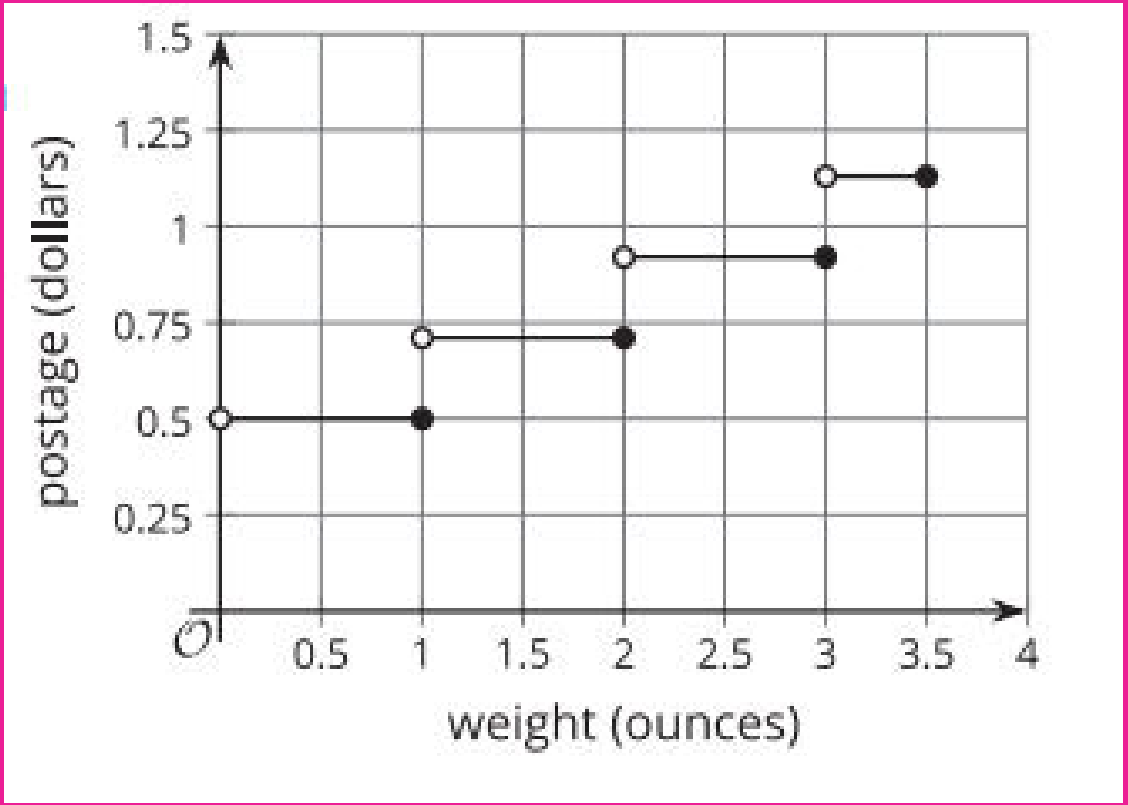
$$p(w) = \begin{cases} 0.50w & \text{if} \quad 0 < w \leq 8 \\ 4 & \text{if} \quad 8 < w \leq 12 \end{cases}$$

B



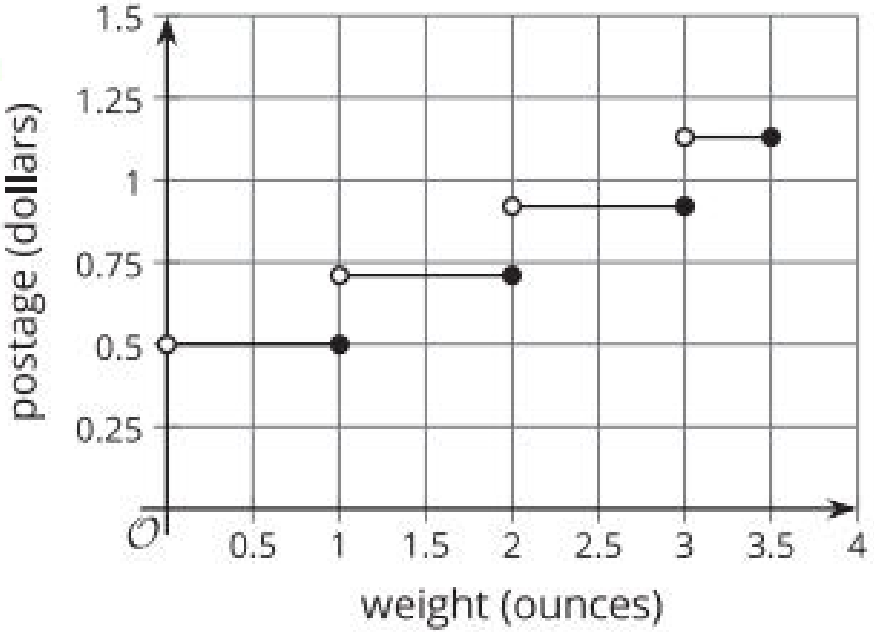
12.2 Postage Stamps Page

What do you Notice? What do you wonder?



The relationship between the postage rate and the weight of a letter can be defined by a **piecewise function.**

The graph shows the 2018 postage rates for using regular service to mail a letter.



1. What is the price of a letter that has the following weight?

a. 1 ounce

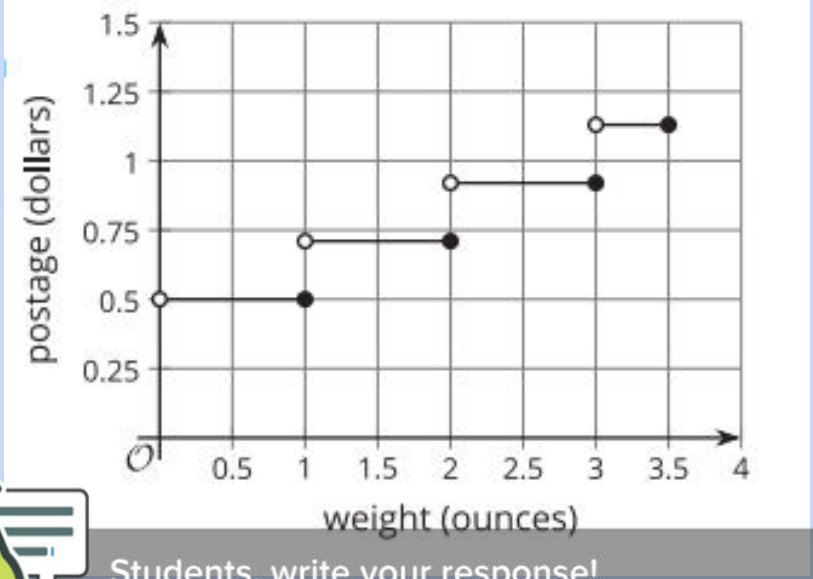
b. 1.1 ounces

c. 0.9 ounce

2. A letter costs $0.92 to mail. How much did the letter weigh?

3. Kiran and Mai wrote some rules to represent the postage function, but each of them made some errors.

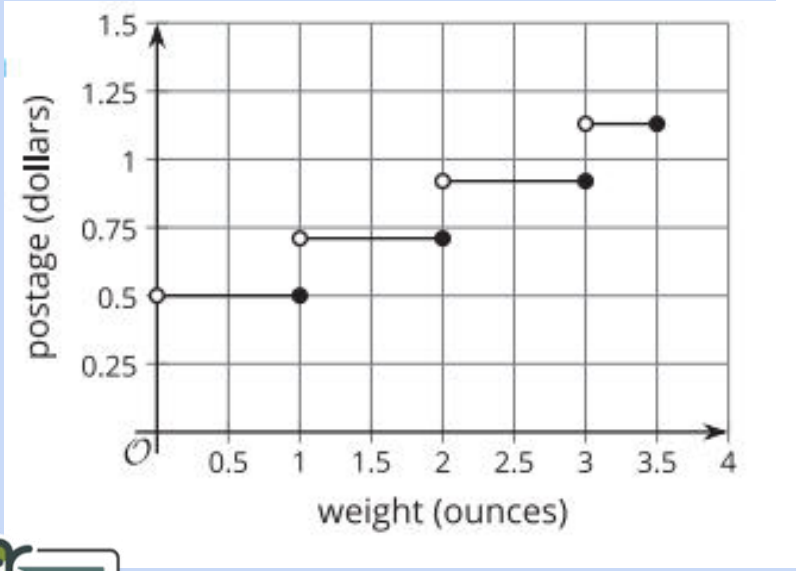
What are Errors in Mai's Rules?



$$M(w) = \begin{cases} 0.50, & 0 < w < 1 \\ 0.71, & 1 < w < 2 \\ 0.92, & 2 < w < 3 \\ 1.13, & 3 < w < 3.5 \end{cases}$$

Students, write your response!

What are errors in Kiran's Rules?



$$K(w) = \begin{cases} 0.50, & 0 \leq w \leq 1 \\ 0.71, & 1 \leq w \leq 2 \\ 0.92, & 2 \leq w \leq 3 \\ 1.13, & 3 \leq w \leq 3.5 \end{cases}$$

$$K(w) = \begin{cases} 0.50, & 0 \le w \le 1 \\ 0.71, & 1 \le w \le 2 \\ 0.92, & 2 \le w \le 3 \\ 1.13, & 3 \le w \le 3.5 \end{cases}$$

$$M(w) = \begin{cases} 0.50, & 0 < w < 1 \\ 0.71, & 1 < w < 2 \\ 0.92, & 2 < w < 3 \\ 1.13, & 3 < w < 3.5 \end{cases}$$

Identify the error in each person's work and write a corrected set of rules.

Bike Sharing Page

Function C represents the dollar cost of renting a bike from a bike-sharing service for t minutes. Here are the rules describing the function:

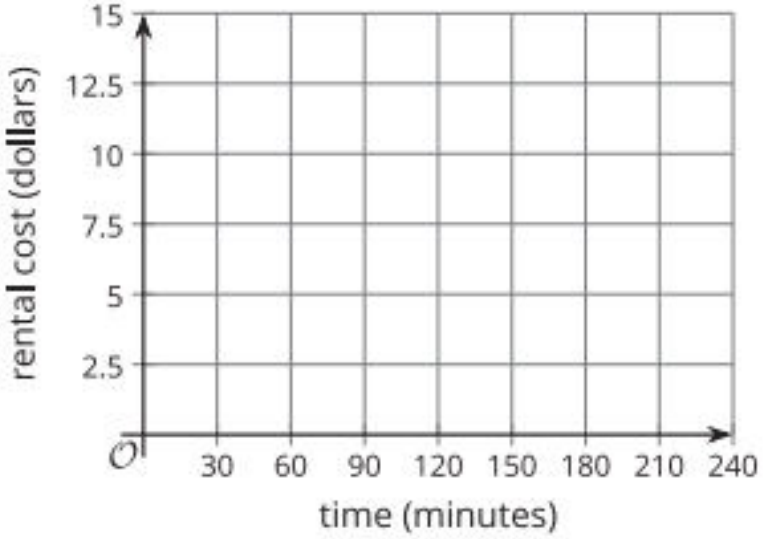
$$C(t) = \begin{cases} 2.50, & 0 < t \leq 30 \\ 5.00, & 30 < t \leq 60 \\ 7.50, & 60 < t \leq 90 \\ 10.00, & 90 < t \leq 120 \\ 12.50, & 120 < t \leq 150 \\ 15.00, & 150 < t \leq 720 \end{cases}$$

In groups complete questions 1 and 2

1. Complete the table with the costs for the given lengths of rental.

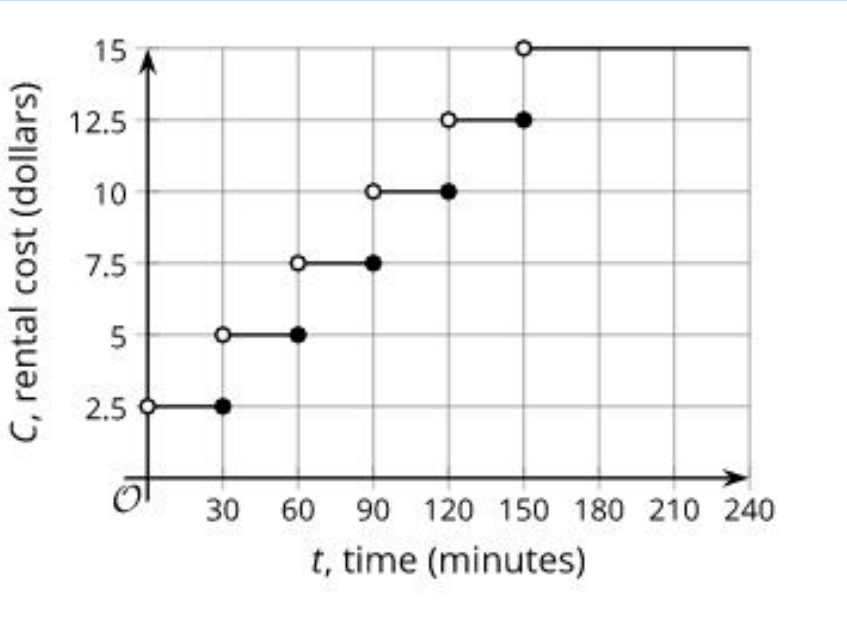
t (minutes)	C (dollars)
0	
10	
25	
60	
75	
130	
180	

Sketch a graph of the function for all values of t that are at least 0 minutes and at most 240 minutes.



2. Describe in words the pricing rules for renting a bike from this bike sharing service.

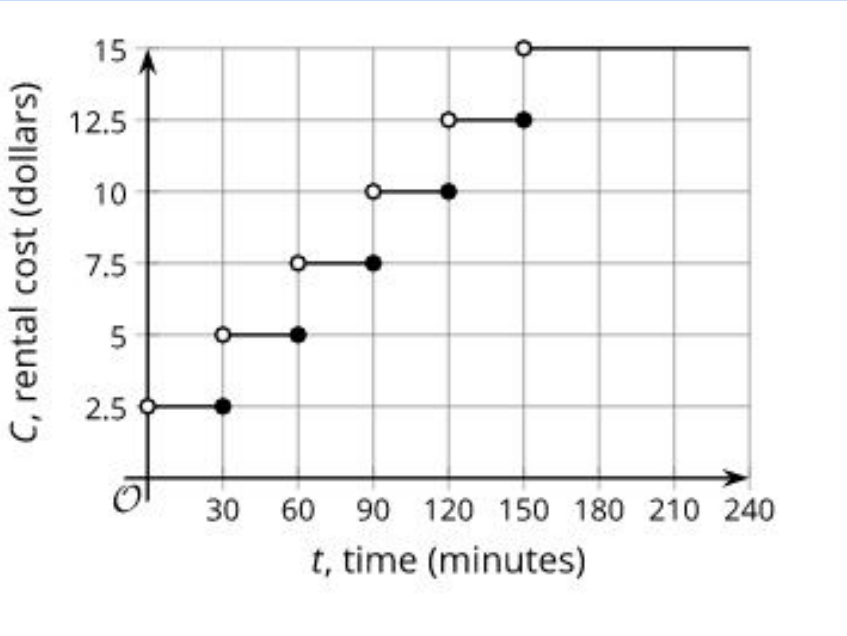
How did it go?



t (minutes)	$C(t)$ (dollars)
0	0
10	2.50
25	2.50
60	5.00
75	7.50
130	12.50
180	15.00

2. Sample: It charges $2.50 for each half hour (or a fraction of half an hour), up to a maximum of $15.00. A bike can only be rented up to 10 hours at a time.

How did it go?



t (minutes)	$C(t)$ (dollars)
0	0
10	2.50
25	2.50
60	5.00
75	7.50
130	12.50
180	15.00

3. What is the Domain and Range?

12.4 Cool Down International Postage