

Essential Questions: What are step functions? How are they graphed?

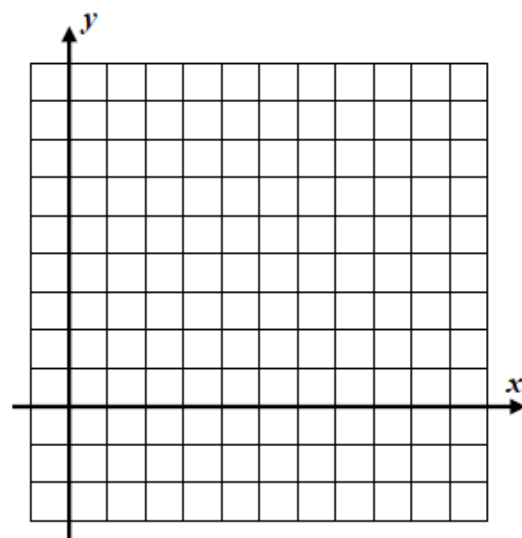
Do Now:

(1) Consider the piecewise (step) function given by $f(x) = \begin{cases} 2 & 0 \leq x < 5 \\ 6 & 5 \leq x \leq 10 \end{cases}$

(a) Evaluate each of the following. After you do your evaluation, write down what coordinate point must lie on the graph as a result of the calculation.

$$f(0) = \quad f(2) = \quad f(4) =$$

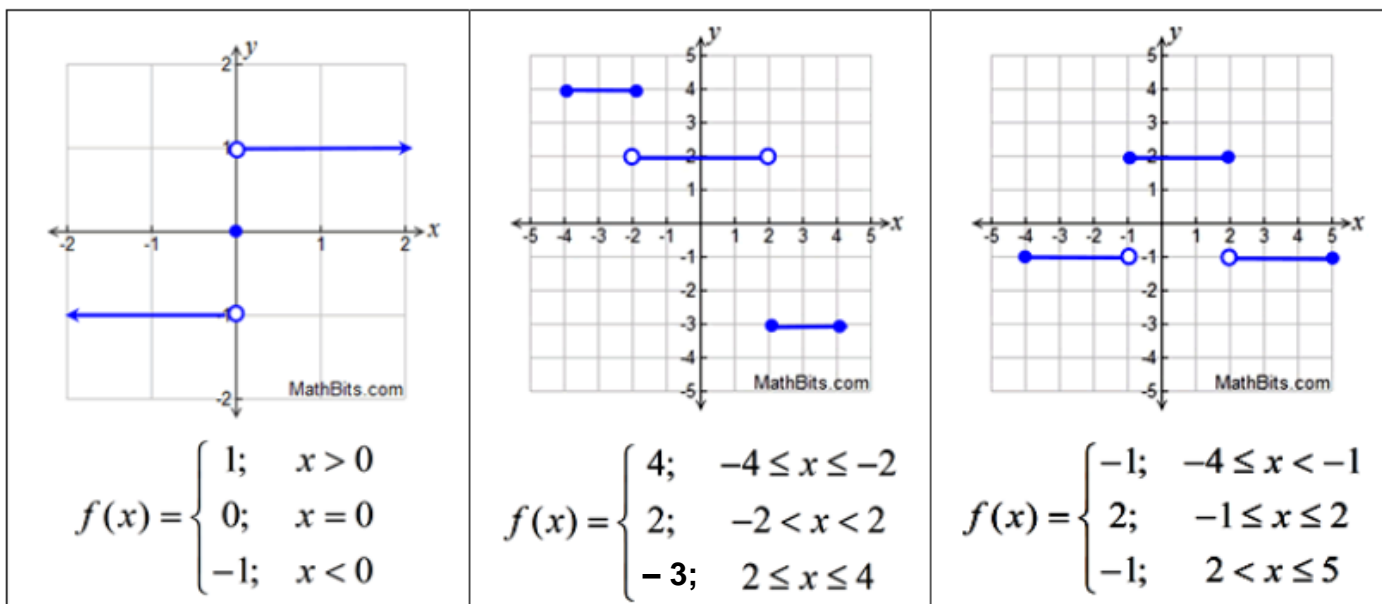
$$f(5) = \quad f(7) = \quad f(10) =$$



(b) Graph the step function on the grid to the right.

STEP FUNCTIONS

A **step function** is a piecewise function containing all horizontal "pieces". A step function resembles a set of steps and is **discontinuous** (cannot be drawn without removing your pencil from the paper).



(2) A step function is defined using the piecewise formula

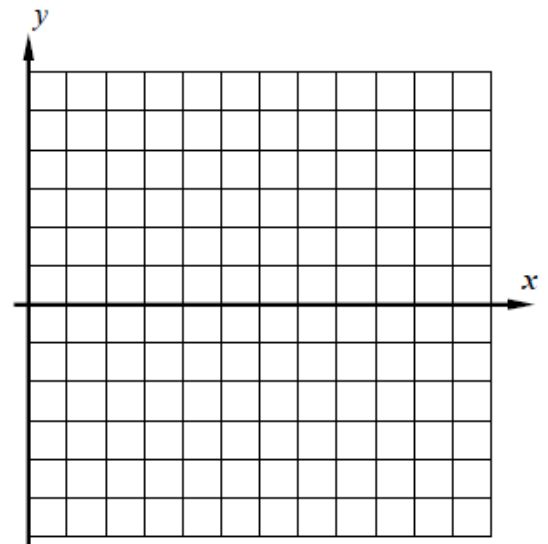
$$f(x) = \begin{cases} 2 & 0 \leq x < 3 \\ 5 & 3 \leq x < 5 \\ -4 & 5 \leq x \leq 10 \end{cases}$$

(a) Evaluate the following:

$f(2.7) = \qquad f(5) =$

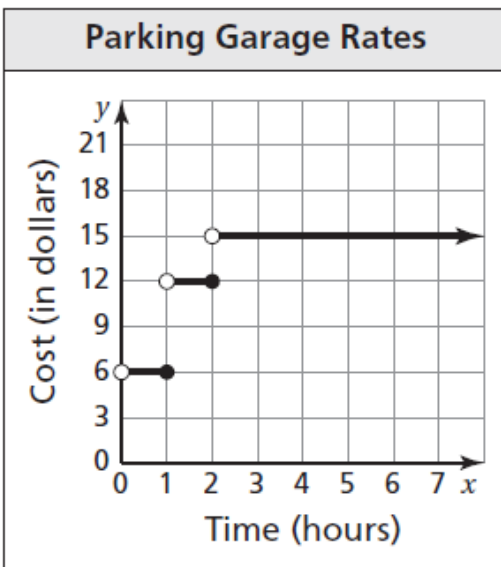
$f(3.5) = \qquad f(0) =$

(b) Graph $f(x)$ on the grid to the right.



Let's take a look at these functions in the context of a situation.

The graph shows the rates for parking in a city parking garage.



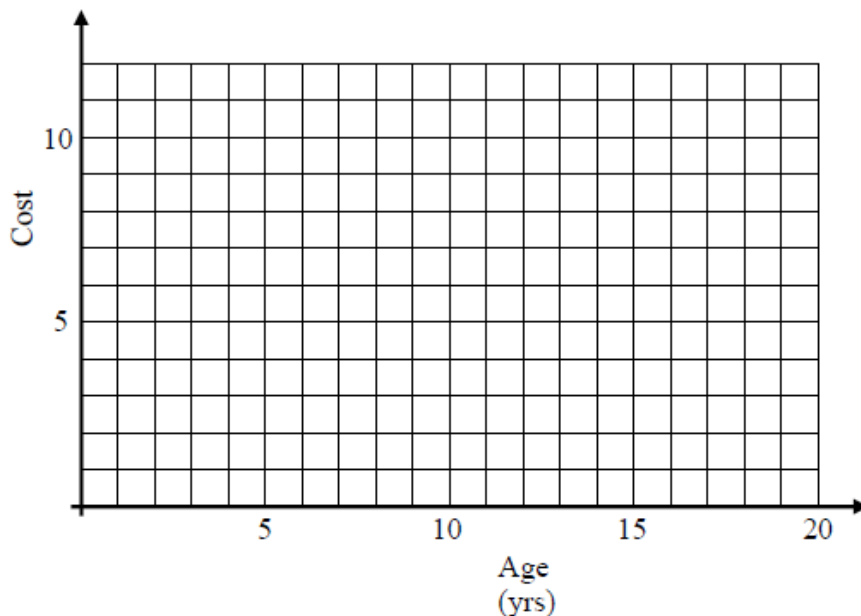
- A) How much does it cost to park for 30 minutes?
- B) How much will it cost if someone is planning to park for 4 hours?
- C) If a person pays \$15 for parking, how many hours has he/she parked?
- D) Create a sign for the parking rates based on this graph.

Parking Rates	
•	_____ \$6.00
•	_____ \$12.00
•	_____ \$15.00

Applications with Piecewise Functions

- (1) At a local amusement park, the park charges an admission based on age. Graph the amount of money a person would have to pay for admission based on their age. Remember that someone who is one day short of 4 years old can consider themselves three and under.

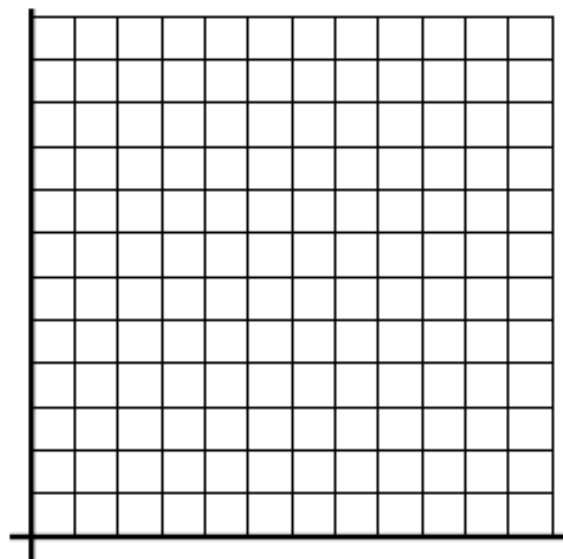
Age Range	Price
3 and under	Free
8 and under	\$4.00
16 and under	\$8.00
17 and older	\$12.00



- (2) Erin buys gas at a self-service station for \$2.75 a gallon. The gas station has a promotion going on that anyone who buys more than 10 gallons of gas, only has to pay \$2.50 per gallon. Erin's tank will hold 12 gallons of gas.

a) Write a rule for the total cost, $C(g)$, as a function of g gallons of gas.

b) Graph the piecewise function.



c) What is the domain and range of the function?