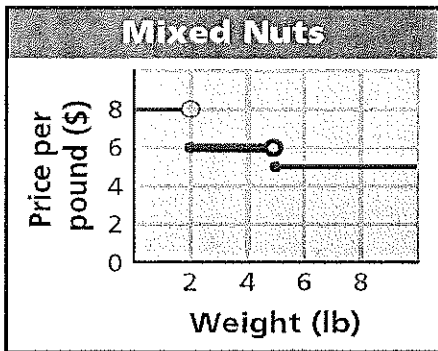


A Piecewise Function is a function that is a combination of one or more functions. The rule for a piecewise function is different for different parts, or pieces, of the domain. For instance, movie ticket prices are often different for different age groups. So the function for movie ticket prices would assign a different value (ticket price) for each domain interval (age group).

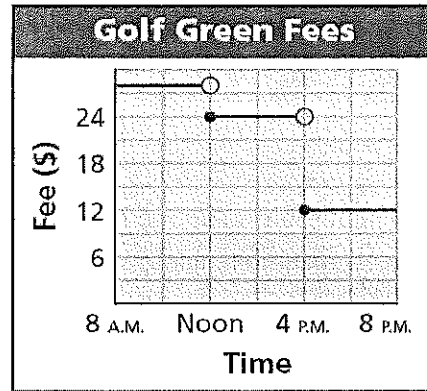
A piecewise function that is constant for each interval of its domain, such as the ticket price function, is called a step function.

When using interval notation, square brackets [] indicate an included endpoint, and parentheses () indicate an excluded endpoint.

1. Create a table that accurately depicts the graph.
2. Write a verbal description of the graph.



X	Y
1	8
2	6
4	6
5	5
6	5



x	y
8	28
9	28
12	24
14	24
16	12

2pm →

3. Evaluate each piecewise function for $x = -1$ and $x = 4$.

$$f(x) = \begin{cases} 2x + 1 & \text{if } x \leq 2 \\ x^2 - 4 & \text{if } x > 2 \end{cases}$$

$$f(-1) = 2(-1) + 1 = -1$$

$$f(4) = (4)^2 - 4 = 12$$

4. Evaluate each piecewise function for $x = -5$ and $x = 6$.

$$g(x) = \begin{cases} 12 & \text{if } x < -3 \\ 15 & \text{if } -3 \leq x < 6 \\ 20 & \text{if } x \geq 6 \end{cases}$$

$$g(-5) = 12$$

$$g(6) = 20$$

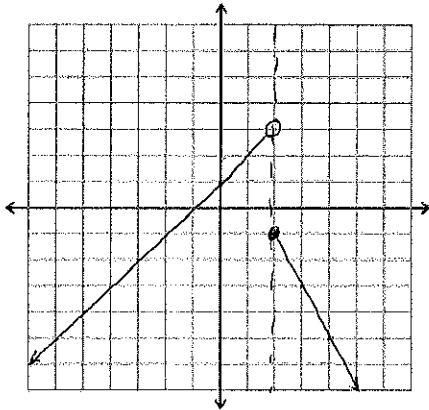
5. Evaluate each piecewise function for $x = -2$ and $x = 6$.

$$h(x) = \begin{cases} 3x^2 + 1 & \text{if } x > 0 \\ 5x - 2 & \text{if } x \geq 0 \end{cases}$$

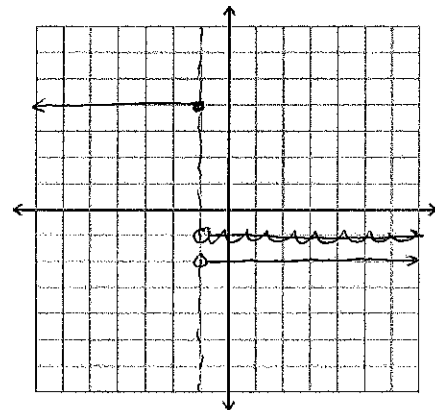
$$h(-2) = 3(-2)^2 + 1 = 13$$

$$h(6) = 5(6) - 2 = 28$$

$$6. f(x) = \begin{cases} x + 1 & \text{if } x < 2 \\ -2x + 3 & \text{if } x \geq 2 \end{cases}$$

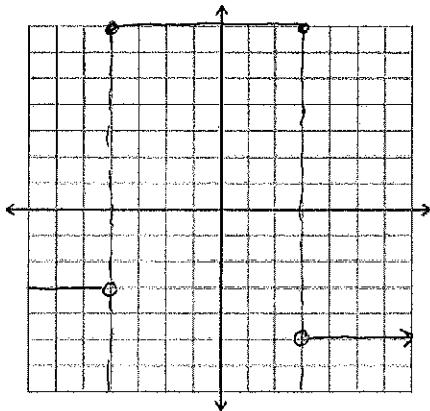


$$7. f(x) = \begin{cases} 4 & \text{if } x \leq -1 \\ -2 & \text{if } x > -1 \end{cases}$$

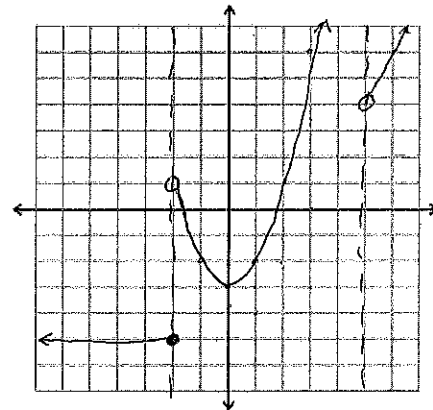


Step function

$$8. f(x) = \begin{cases} -3 & \text{if } x < -4 \\ 7 & \text{if } -4 \leq x \leq 3 \\ -5 & \text{if } x > 3 \end{cases}$$



$$9. f(x) = \begin{cases} -5 & \text{if } x \leq -2 \\ x^2 - 3 & \text{if } -2 < x \leq 5 \\ 2x - 6 & \text{if } x > 5 \end{cases}$$



10. To rent a paddle boat in Shem Creek, it cost \$50 for the first 3 hours and \$15 per hour after that. Create a piecewise function that demonstrates how much it costs to rent a paddle board then determine how much it would cost to rent 2 paddle boards for 8 hours.

$$f(x) = \begin{cases} 50 & x \leq 3 \\ 50 + 15(x-3) & x > 3 \end{cases}$$

$$x = 8$$

$$f(8) = 50 + 15(8-3)$$

$$= 50 + 15(5)$$

$$= 50 + 75$$

$$= 125 \text{ for 1 paddle board}$$

2 Paddle boards will cost \$250 for 8 hours