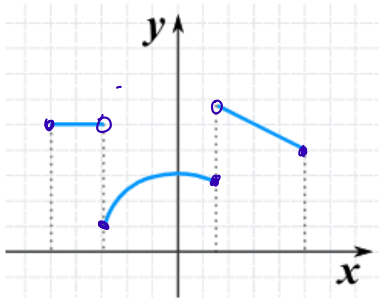
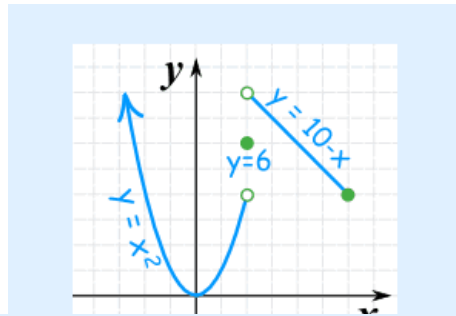


# Definition:

Piecewise Function - a function defined by multiple sub-functions, each sub-function applying to a certain interval of the main function's domain, a sub-domain.



A function made up of 3 pieces



$$f(x) = \begin{cases} x^2 & \text{if } x < 2 \\ 6 & \text{if } x = 2 \\ 10 - x & \text{if } x > 2 \text{ and } x \leq 6 \end{cases}$$

if  $2 < x \leq 6$

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# Piecewise Functions

**EVALUATING FUNCTIONS** Evaluate the function for the given value of  $x$ .

$$f(x) = \begin{cases} 5x - 1, & \text{if } x < -2 \\ x - 9, & \text{if } x \geq -2 \end{cases}$$

13.  $f(-4) = -21$

14.  $f(-2) = -11$

15.  $f(0) = -9$

16.  $f(5) = -4$

$$h(x) = \begin{cases} \frac{1}{2}x - 10, & \text{if } x \leq 6 \\ -x - 1, & \text{if } x > 6 \end{cases}$$

17.  $h(1) = -9.5$

18.  $h(-10) = -15$

19.  $h(6) = -7$

20.  $h(0) = -10$

$(6, -7)$

$(0, -10)$

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**GRAPHING FUNCTIONS** Graph the function.

1.  $f(x) = \begin{cases} 2x, & \text{if } x \geq 1 \\ -x + 3, & \text{if } x < 1 \end{cases}$   $2(-5) = -10$

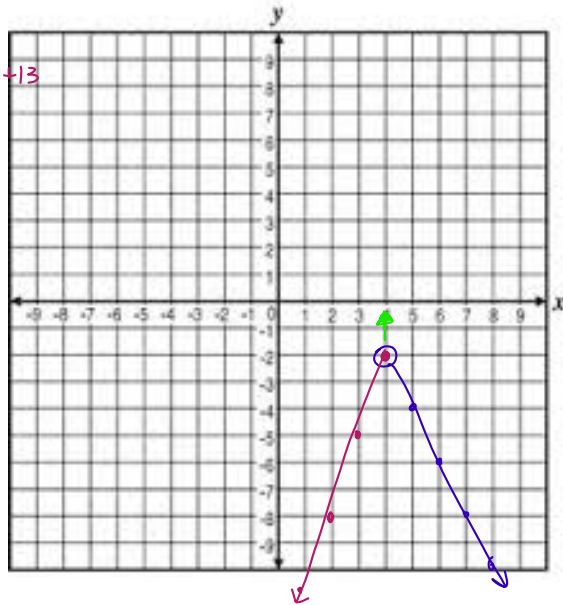
2.  $f(x) = \begin{cases} 2x + 13, & \text{if } x \geq -5 \\ x + \frac{1}{2}, & \text{if } x < -5 \end{cases}$

3.  $f(x) = \begin{cases} 3x - 14, & \text{if } x \leq 4 \\ -2x + 6, & \text{if } x > 4 \end{cases}$

$D: \mathbb{R}$

$R: (-\infty, -2]$

$y \leq -2$



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**Example: A Doctor's fee is based on the length of time.**

- Up to 6 minutes costs \$50
- Over 6 and up to 15 minutes costs \$80
- Over 15 minutes costs \$80 plus \$5 per minute above 15 minutes

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function.

$$4. f(x) = \begin{cases} x + 6, & \text{if } x \leq -3 \\ -\frac{2}{3}x - 3, & \text{if } x > -3 \end{cases}$$

$$5. f(x) = \begin{cases} -x, & \text{if } x > 2 \\ x - 4, & \text{if } x \leq 2 \end{cases}$$

$$6. f(x) = \begin{cases} x - 8, & \text{if } x < 9 \\ \frac{1}{3}x - 2, & \text{if } x \geq 9 \end{cases}$$

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