Section 3 – Topic 2
Introduction to Piecewise-Defined Functions – Part 2

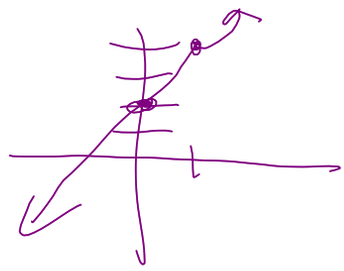
Let's Practice!

Consider the piecewise function $f(x)$ below:

$$f(x) = \begin{cases} -x + 5, & 0 < x < 6 \\ x^2 + 2, & x \geq 6 \end{cases}$$

1. Evaluate $f(2)$. $f(2) = -2 + 5 \Rightarrow f(2) = 3$
2. Evaluate $f(6)$. $f(6) = (6)^2 + 2 \Rightarrow f(6) = 38$
3. Evaluate $f(8)$. $f(8) = (8)^2 + 2 \Rightarrow f(8) = 66$

Try It!



4. The piecewise function $f(x)$ is defined below.

2x+2

$$f(x) = \begin{cases} kx + 2, & x \leq 1 \\ x^2 + 3, & x > 1 \end{cases}$$

For what value of k, if any, is $f(x)$ continuous at $x = 1$.

$f(1) = k(1) + 2$ $\quad$ $f(1) = (1)^2 + 3$

$f(1) = k + 2$ $\quad$ $f(1) = 4$

$k + 2 = 4$

$k = 2$

5. Consider the following piecewise function.

$$f(x) = \begin{cases} -3x + 2, & x < 3 \\ 4, & 3 \le x < 7 \\ 2x + 10, & x \ge 7 \end{cases}$$

a. Evaluate $f(-7)$. $f(-7) = -3(-7) + 2$
$f(-7) = 23$

b. Evaluate $f(3)$. $f(3) = 4$

BEAT THE TEST!

1. Evaluate the piecewise-defined function for the given values of x by matching the domain values with the range values.

$$f(x) = \begin{cases} x^3 - 1, & x \leq 2 \\ 6, & 2 < x < 5 \\ 3 - 4x, & x \geq 5 \end{cases}$$

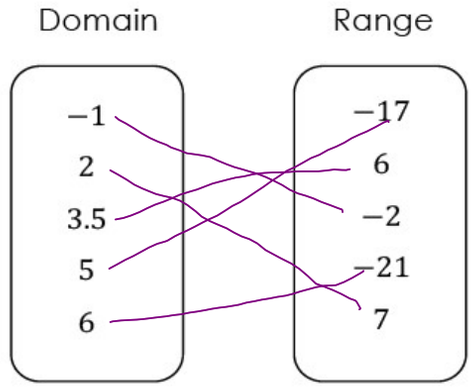
$(-1)^3 - 1$

$-1 - 1 = -2$

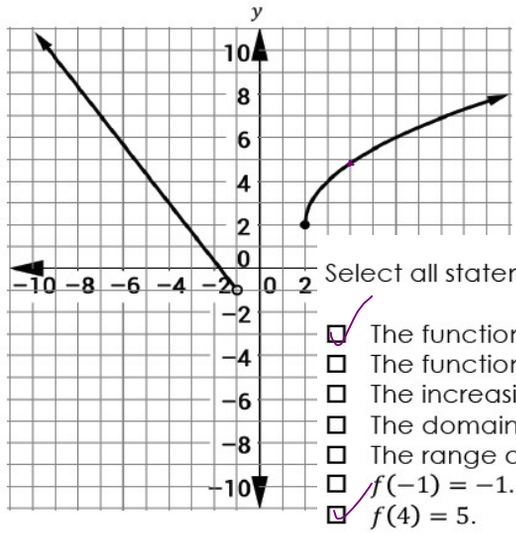
$(2)^3 - 1$

$8 - 1 = 7$

$3 - 4(5)$



2. Consider the following graph of a piecewise-defined function.



Select all statements that are true for this function.

- ☑ The function is decreasing over the interval $(-\infty, -1)$.
- ☐ The function is continuous.
- ☐ The increasing interval is linear.
- ☐ The domain of the increasing piece is $\{x | x \geq 1\}$.
- ☐ The range of the function is $(-\infty, -1) \cup [1, \infty)$.
- ☐ $f(-1) = -1$.
- ☑ $f(4) = 5$.