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 $f(2)$. $-(2)+5 = -2+5 = 3$ $f(2)=3$
2. Evaluate $f(6)$. $(6)^2+2 = 36+2=38$ $f(6)=38$
3. Evaluate $f(8)$. $(8)^2+2 = 64+2=66$ $f(8)=66$

Try It!

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

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

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

① $(1)^2 + 3 = f(1)$

$4 = f(1)$

$k(1) + 2 = 4$

$k + 2 = 4$

$k = 2$

5. Consider the following piecewise function.

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

a. Evaluate $f(-7)$. $-3(-7)+2 = 21+2 = 23$

b. Evaluate $f(3)$. 4

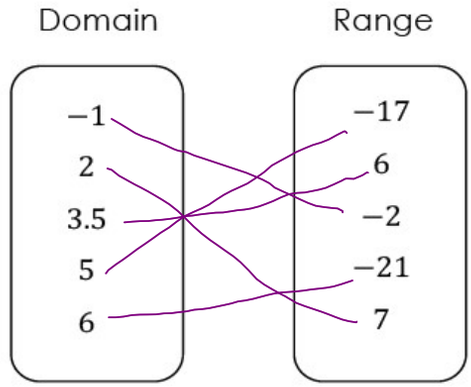
c) $f(4) = 4$

d) $f(7) = 2(7)+10 = 14+10 = 24$

BEAT THE TEST!

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

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



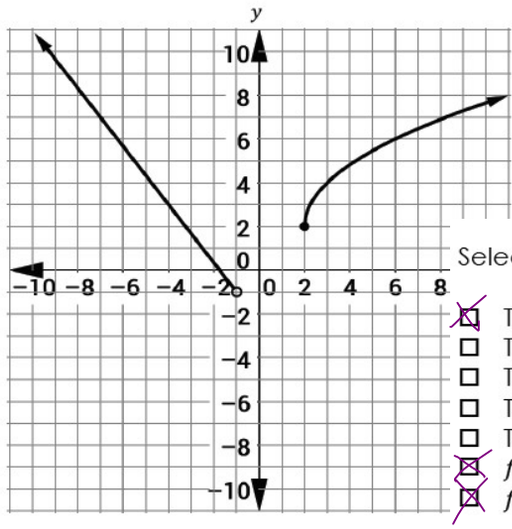
$(-1)^3 - 1 = -1 - 1 = -2$

$(2)^3 - 1 = 8 - 1 = 7$

$3 - 5(4)$

$3 - 20 = -17$

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 $(-\infty, -1) \cup [1, \infty)$.
- ☒ $f(-1) = -1$.
- ☒ $f(4) = 5$.