

7.2 Piecewise Functions

WARM-Up Tuesday

Find the domain of the functions.

$$f(x) = \frac{3x}{4x - 1}$$

$$(-\infty, \frac{1}{4}) \cup (\frac{1}{4}, \infty)$$

$$f(x) = \frac{1}{\sqrt{2x + 2}}$$

$$2x + 2 > 0$$

$$(-1, \infty)$$

About Me

1. Do you watch the Super Bowl for the game or the commercials?

2. Do you think we will get a SNOW day this semester?

7.2 Piecewise Functions

EQ: How do I graph a piecewise function?

domain Input	range Output	Function Rule
x	$f(x)$	$f(x) = x^2 - 3x + 5$

Example 1: For $f(x)$ above, find the following:

- a) the value of f when x is 2.

$$x=2$$

$$f(2) = 2^2 - 3(2) + 5$$

$$\boxed{3}$$

$$\begin{aligned}
 & f(x) = 4 \\
 & b) f(a) \\
 & \boxed{a^2 - 3a + 5} \\
 & c) f(x-2) \\
 & (x-2)^2 - 3(x-2) + 5 \\
 & (x-2)(x-2) \\
 & x^2 - 2x - 2x + 4 - 3x + 6 + 5 \\
 & \boxed{x^2 - 7x + 15}
 \end{aligned}$$

7.2 Piecewise Functions

EQ: How do I graph a piecewise function?

Piecewise Functions: a function defined by parts

Example 2: Graph the following piecewise functions and determine the domain and range of each.

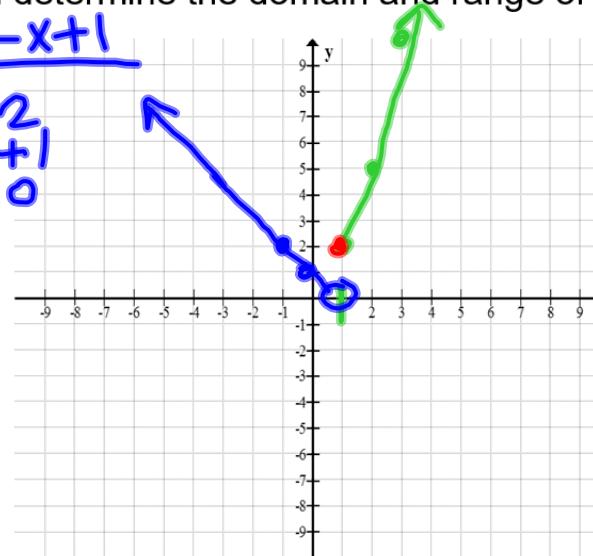
a) $f(x) = \begin{cases} x^2 + 1, & x \geq 1 \\ -x + 1 & x < 1 \end{cases}$

$$\begin{array}{c|c} x & x^2 + 1 \\ \hline -1 & 2 \\ 0 & 1 \\ 1 & 2 \\ 2 & 5 \\ 3 & 10 \end{array}$$

$$\begin{array}{c|c} x & -x + 1 \\ \hline -1 & 2 \\ 0 & 1 \\ 1 & 0 \end{array}$$

D: $(-\infty, \infty)$

R: $(0, \infty)$



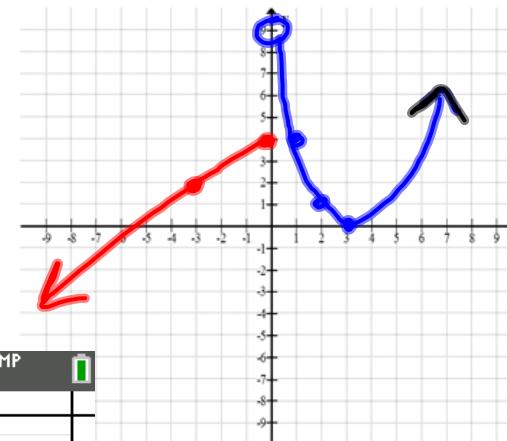
7.2 Piecewise Functions

EQ: How do I graph a piecewise function?

b) $f(x) = \begin{cases} (x-3)^2, & x > 0 \\ 2x+4, & x \leq 0 \end{cases}$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$



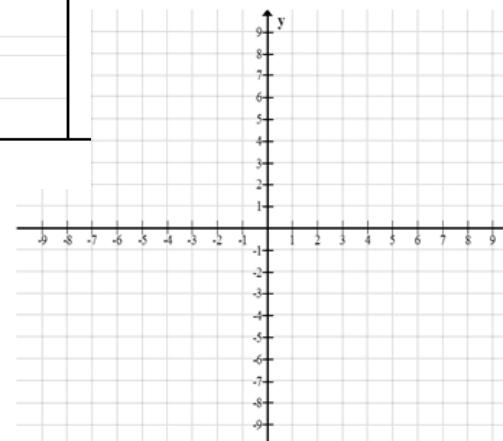
X	Y ₁	Y ₂
-3	36	2
-2	25	$\frac{8}{3}$
-1	16	$\frac{10}{3}$
0	9	4
1	4	$\frac{14}{3}$

X = -3

c) $f(x) = \begin{cases} (x+1)^2 - 2, & x \leq 2 \\ -(x-2)^2 + 5, & x > 2 \end{cases}$

D:

R:



OMIT # 13
 7.2 – Evaluating & Piece-wise Functions Name _____

In questions 1-10, use the functions $f(x) = x^2 - 1$ and $g(x) = \frac{1}{(x+1)}$ to find the following function values.

1. $f(0)$

2. $f(1)$

3. $f(3)$

4. $f(-5)$

5. $g(0)$

6. $g(1)$

7. $g(3)$

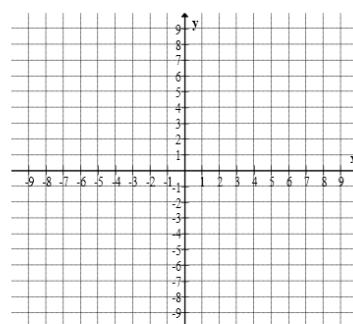
8. $g(-5)$

9. $g\left(\frac{2}{t}\right)$

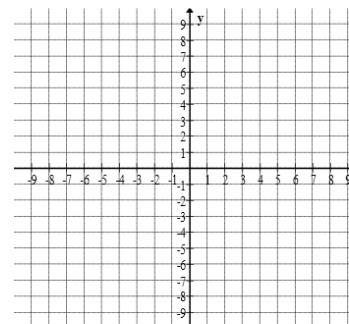
10. $f(x+2)$

Sketch the graph of each function:

11.
$$f(x) = \begin{cases} (x+2)^2 + 1, & x \leq 0 \\ \frac{1}{2}x + 3, & x > 0 \end{cases}$$



12.
$$f(x) = \begin{cases} -x^2 + 4, & x < 1 \\ \frac{3}{2}x - 3, & x \geq 1 \end{cases}$$



Use the following information on #13 – 15.

Given: $f(x) = 3x^2 - x - 1$

$$g(x) = -\frac{2}{3}x^2 - x + 5$$

$$h(x) = -x^2 + 3$$

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Find:

13. ~~$\frac{f(a+k) - f(a)}{k}$~~

14. $h(-1)$

15. $h(2x+1)$

16. Graph: $f(x) = \begin{cases} x+5, & x \leq -2 \\ -2x-1, & -2 < x \leq 2 \\ 2x-9, & x > 2 \end{cases}$

