

# Precalculus A

## Piecewise Functions

### Day 2

#### HW: Finish Practice Worksheet #2

D. Paulson

3.  $f(x) = \begin{cases} -2x+1 & x \leq 2 \\ 5x-4 & x > 2 \end{cases}$

Function? Yes or No

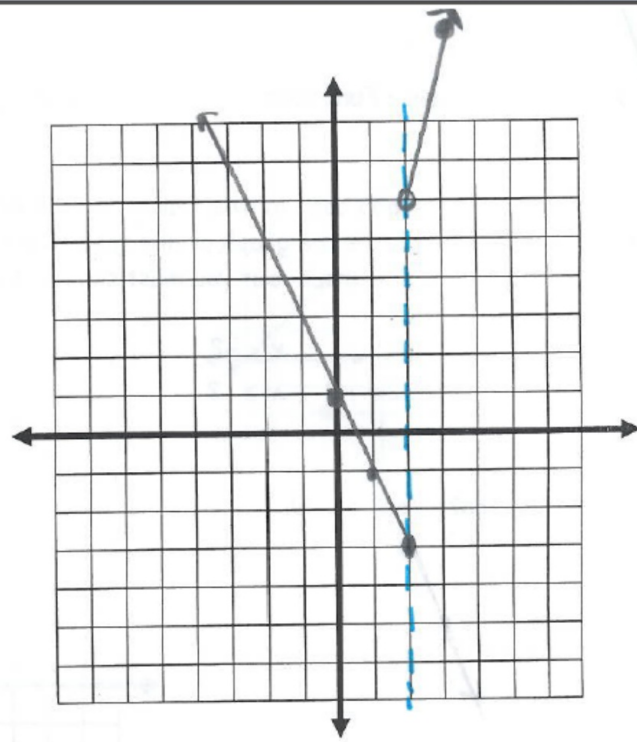
$$f(-4) = -2(-4) + 1 = \boxed{9}$$

$$f(8) = 5(8) - 4 = \boxed{36}$$

$$f(2) = -2(2) + 1 = \boxed{-3}$$

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

Range:  $[-3, \infty)$



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$$5. \quad f(x) = \begin{cases} x^2 & x \leq 0 \\ -x^2 + 4 & x > 0 \end{cases}$$

Function?  Yes or No

$$f(-4) = (-4)^2 = \boxed{16}$$

$$f(0) = (0)^2 = \boxed{0}$$

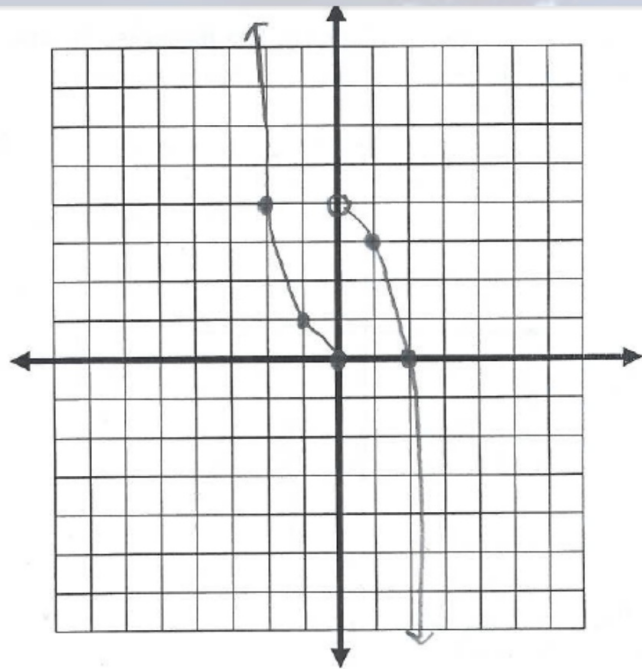
$$f(3) = -(3)^2 + 4 = \boxed{-5}$$

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

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

X	Y
0	0
-1	1
-2	4

X	Y
0	4
1	3
2	0



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$$6. \quad f(x) = \begin{cases} 5 & x \leq -3 \\ -2x - 3 & x > -3 \end{cases}$$

Function?  Yes or No

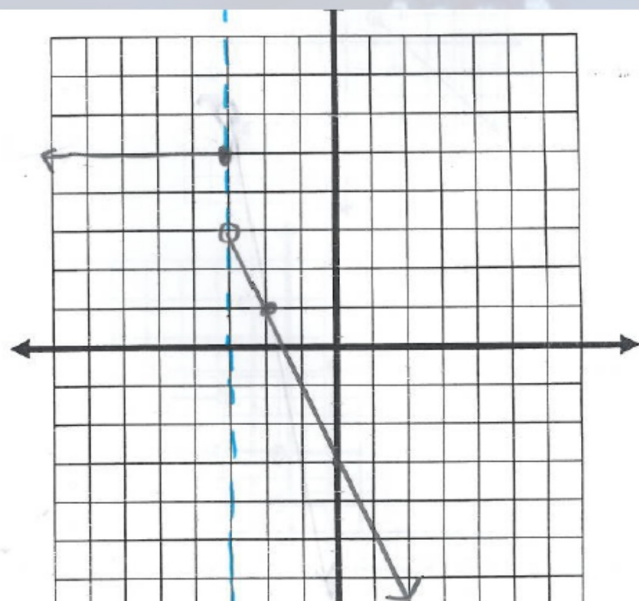
$$f(-4) = \boxed{5}$$

$$f(0) = -2(0) - 3 = \boxed{-3}$$

$$f(3) = -2(3) - 3 = \boxed{-9}$$

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

Range:  $\boxed{5} \cup (-\infty, 3)$



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## Continuity

**Continuous** - a graph is continuous if it has no breaks in it throughout the domain.

**Removable Discontinuity** - a graph with a hole in it.

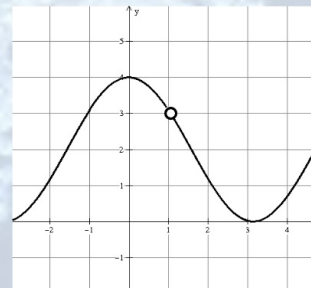
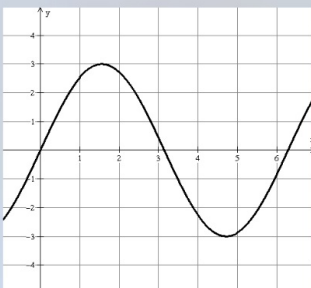
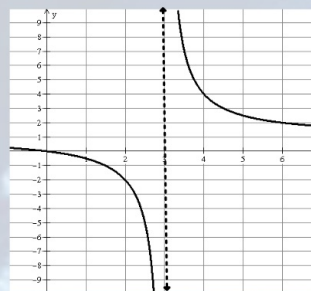
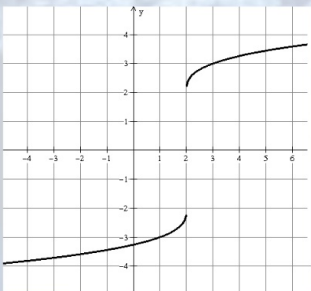
**Jump Discontinuity** - a graph with more than a hole, there is a jump to the next part of the graph.

**Infinite Discontinuity** - graph goes up/down to  $\infty$ .

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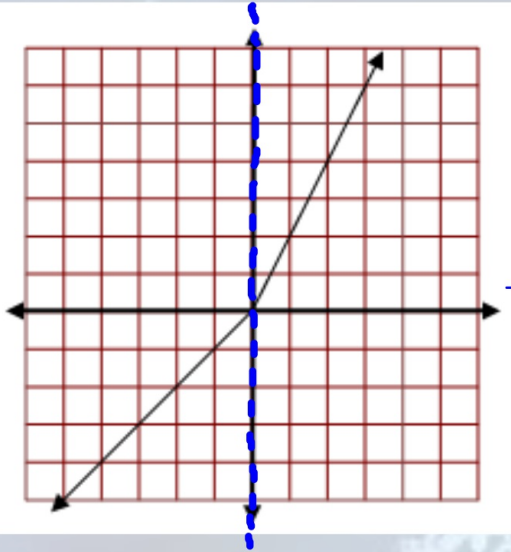
## Match the type of continuity with each graph

continuous, removable discontinuity, jump discontinuity, infinite discontinuity



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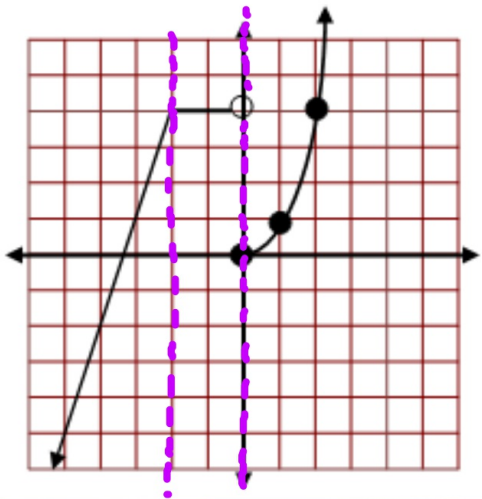
7.



$$f(x) = \begin{cases} 2x, & \text{if } x \geq 0 \\ x, & \text{if } x < 0 \end{cases}$$

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10.



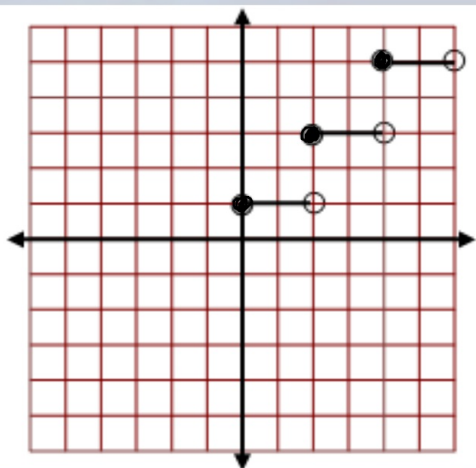
$$\begin{array}{l} 0, 10 \\ -1, 7 \\ -2, 4 \\ -3, 1 \end{array}$$

$$f(x) = \begin{cases} 3x+10, & \text{if } x \leq -2 \\ 4, & \text{if } -2 < x < 0 \\ x^2, & \text{if } x \geq 0 \end{cases}$$

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11.

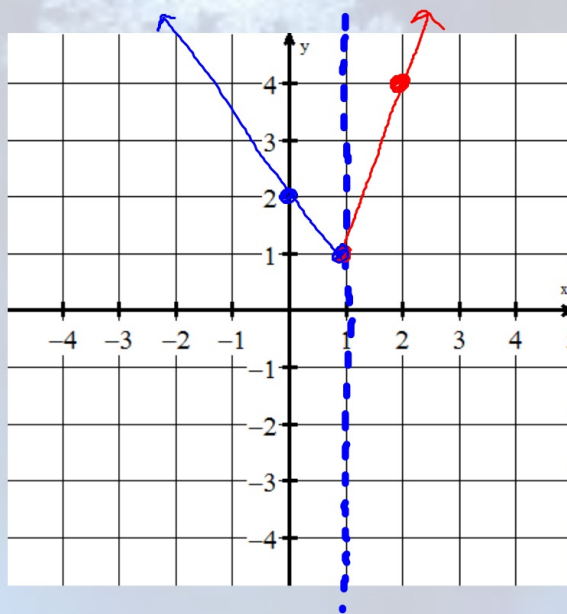


$$f(x) = \begin{cases} 1, & \text{if } 0 \leq x < 2 \\ 3, & \text{if } 2 \leq x < 4 \\ 5, & \text{if } 4 \leq x < 6 \end{cases}$$

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What is the value of  $c$  that will make  $f(x)$  continuous at  $x = 1$ ?

$$f(x) = \begin{cases} -x + c, & x < 1 \\ 3x - 2, & x \geq 1 \end{cases}$$



x	y
1	1
2	4

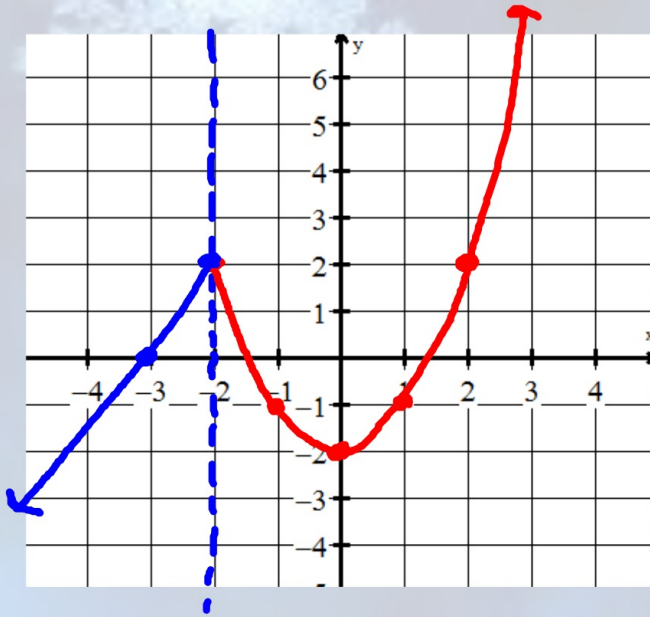
$$\begin{aligned} -x + c &= 3x - 2 \\ -1 + c &= 3(1) - 2 \\ -1 + c &= 3 - 2 \\ -1 + c &= 1 \\ +1 & \quad +1 \\ \hline c &= 2 \end{aligned}$$

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What is the value of  $c$  that will make  $f(x)$  continuous at  $x = -2$ ?

$$f(x) = \begin{cases} cx + 6, & x \leq -2 \\ x^2 - 2, & x > -2 \end{cases}$$

$$c = 2$$



$$\begin{aligned} cx + 6 &= x^2 - 2 \\ -2c + 6 &= (-2)^2 - 2 \\ -2c + 6 &= 4 - 2 \\ -2c + 6 &= 2 \\ -2c &= -4 \\ \boxed{c = 2} \end{aligned}$$