Math 3
Unit 1 Day 6 Notes – Graphing and Evaluating Piecewise Functions with Context

Name: Key
Date: _____

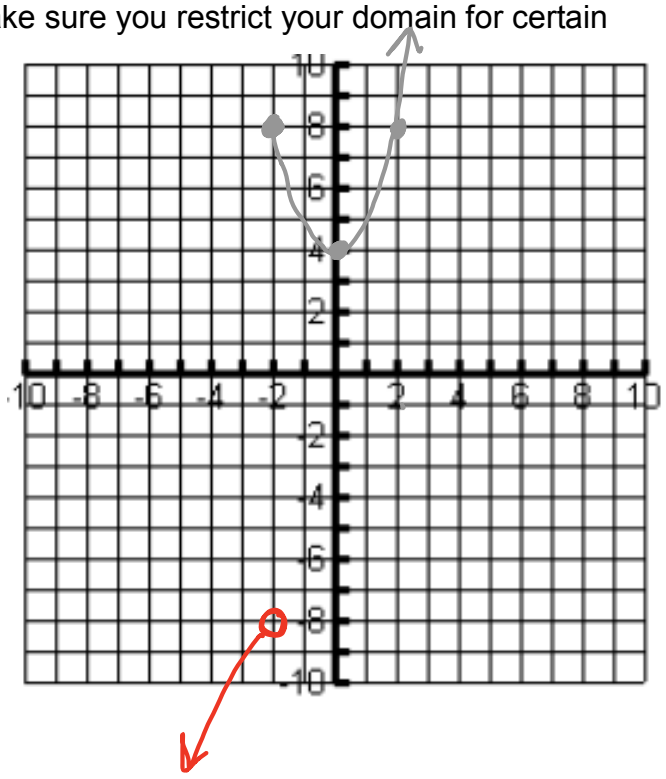
Example 1

Graph the following Piecewise Function. Make sure you restrict your domain for certain "pieces" of the function.

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

$-(-2)^2-4$ | Vertex: | O | down
$-4-4$
$(-2,-8)$ | $(0,-4)$ | | |

$(-2)^2+4$ | Vertex: | ● | up
$4+4$
$(-2,8)$ | $(0,4)$ ✓ | | |



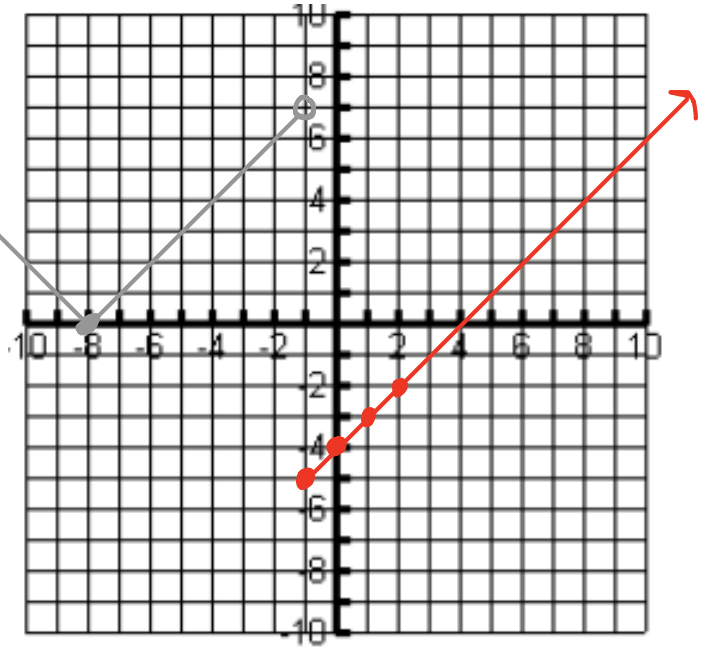
Example 2

Graph the following Piecewise Function. Make sure you restrict your domain for certain "pieces" of the function.

$$f(x)=\begin{cases} x-4, & x\geq -1 \\ |x+8|, & x<-1 \end{cases}$$

$(-1)-4$ | y-int. | ● | $\frac{1}{1}$
$(-1,-5)$ | $(0,-4)$ ✓ | | |

$|-1+8|$ | Vertex: | O | up
$|7|$
$(-1,7)$ | $(-8,0)$ ✓ | | |



Example 3

Graph the following Piecewise Function. Make sure you restrict your domain for certain "pieces" of the function.

$$f(x)=\begin{cases} -x, & x<-1 \\ 5, & -1\le x\le 1 \\ x, & x>1 \end{cases}$$

(y = 5)

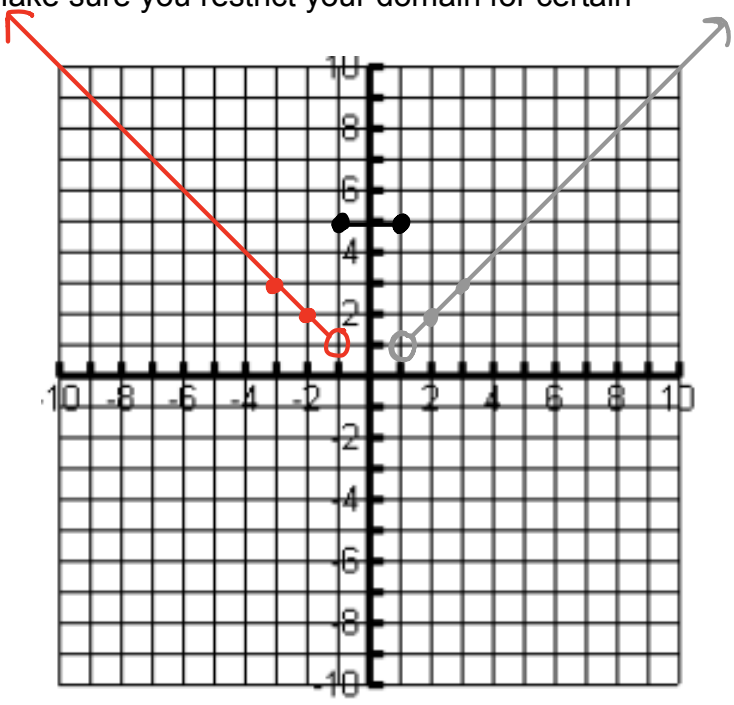
$-(-1)$ | y-int. | 0 | $\frac{-1}{1}$

$(-1,1)$ | $(0,0)$

$(-1,5)$ $(1,5)$ | ● | horizontal line

(1) | y-int. | 0 | $\frac{1}{1}$

$(1,1)$ | $(0,0)$



Evaluating Piecewise Functions

Given the following piecewise function, evaluate the following.

Hint: You can use your graph from the previous example if needed.

$$f(x)=\begin{cases} -x, & x<-1 \\ 5, & -1\le x\le 1 \\ x, & x>1 \end{cases}$$

f(-9)= $-(-9)$ $= 9$	f(-1)= 5	f(1)= 5
f(-5)= $-(-5)$ $= 5$	f(0)= 5	f(6)= (6) $= 6$

Student Try Example

Given the following piecewise function, evaluate the following.

Hint: You can use your graph from the previous example if needed.

$$f(x)=\begin{cases}|x-4|-7, & x\le -1\\ 2x-3, & -1<x<1\\ -x^2-2, & x\ge 1\end{cases}$$

f(-3)= $\lvert -3-4\rvert -7$ $=\lvert -7\rvert -7$ $=7-7=0$	f(-1)= $\lvert -1-4\rvert -7$ $=\lvert -5\rvert -7$ $=5-7=-2$	f(1)= $-(1)^2-2$ $=-1-2$ $=-3$
f(-5)= $\lvert -5-4\rvert -7$ $=\lvert -9\rvert -7$ $=9-7=2$	f(0)= $2(0)-3$ $=0-3$ $=-3$	f(4)= $-(4)^2-2$ $=-16-2$ $=-18$

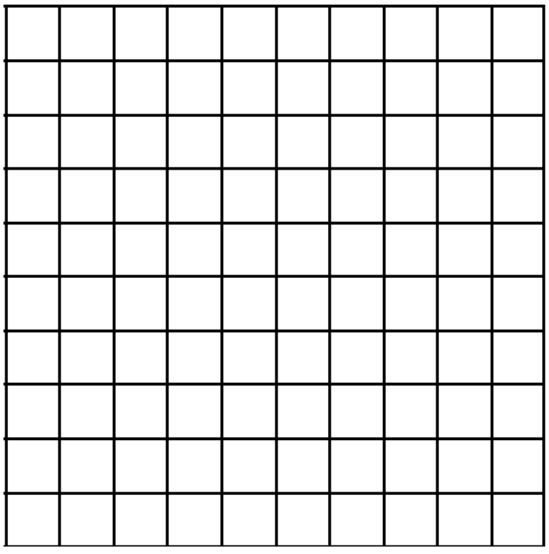
Piecewise Functions in Context

Postal charges for mailing packages depend on both weight and destination and this leads to an application of piecewise functions. For example, the rates for a certain destination are shown in the table below.

Weight in Pounds (x)	**Postage Cost (y)**
Under 1	$0.80
1 or more, but under 2	$1.00
2 or more, but under 4	$1.25
4 or more	$1.50

Create a piecewise function using the table above.

Graph the piecewise function on the following graph.



Piecewise Functions in Context

There are two parking garages to choose from when parking in Downtown Raleigh.

Parking Garage 1	**Parking Garage 2**
$6 Dollars for the First Hour $5 Dollars for the Second Hour $4 Dollars for each hour starting on the Third Hour	$5 Dollars per hour, up to 5 hours $4 Dollars per hour after that

1. What is the cost to park in both parking garages for 2.75 hours?

2. What is the cost to park in both parking garages for 5.25 hours?

3. What is the best option for parking in Downtown Raleigh?