

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Graphing Piecewise Functions

1. Evaluate  $f(x) = \begin{cases} x+2 & x < 2 \\ 2x+1 & x \geq 2 \end{cases}$  when:

\*First eq. 0 is  $< 2$

a.  $x=0$   
 $f(0) = x+2$   
 $= 0+2$   
 $f(0) = 2$

$f(0) = 2$

\*second equation\*

b.  $x=2$

$f(2) = 2x+1$   
 $= 2(2)+1$   
 $f(2) = 5$

$f(2) = 5$

\*second equation  $4 \geq 2$

c.  $x=4$

$f(4) = 2(4)+1$   
 $f(4) = 9$

$f(4) = 9$

2. Graph:  $f(x) = \begin{cases} x+1 & x < -1, -2, -3 \\ -x+3 & x \geq -1, 0, 1, 2 \end{cases}$

Domain:

$(-\infty, \infty)$

Range:

$(-\infty, 4]$

Point of Discontinuity:

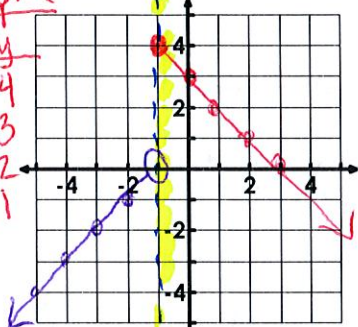
$x = -1$

Graph

x	y
-1	0
-2	-1
-3	-2

Graph

x	y
-1	4
0	3
1	2
2	1



3. Graph:  $f(x) = \begin{cases} 2x-3 & x > -1, 0, 1, 2 \\ -2x+1 & x \leq -1, -2, -3 \end{cases}$

Range:

$(-5, \infty)$

Point of Discontinuity:

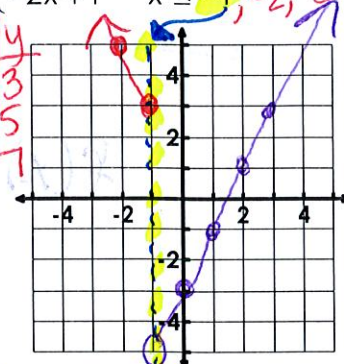
$x = -1$

Increasing:

$(-1, \infty)$

x	y
-1	-5
0	-3
1	-1
2	1

x	y
-1	3
-2	5
-3	7



4. Graph:  $f(x) = \begin{cases} x & -1 \leq x < 3 \\ x-1 & 3 \leq x < 5 \end{cases}$

Domain:

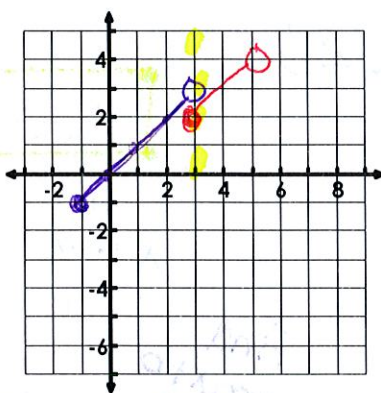
$[-1, 5)$

Range:

$[-1, 4)$

Point of Discontinuity:

$x = 3$



5. Graph:  $f(x) = \begin{cases} -x & x < -1 \\ -2 & -1 \leq x < 2 \\ 2x & x \geq 2 \end{cases}$

Domain:

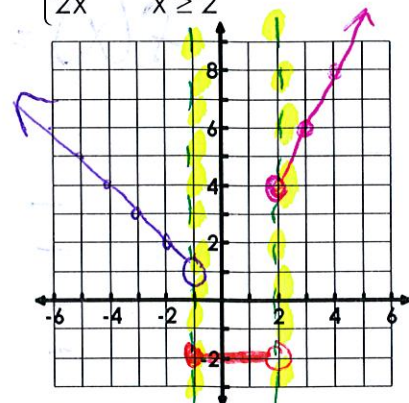
$(-\infty, \infty)$

Range:

$[-2] \cup (1, \infty)$

Point of Discontinuity:

$x = -1, 2$



6. Graph:  $f(x) = \begin{cases} -x^2 & x < 2 \\ x+3 & x \geq 2 \end{cases}$

Domain:

$(-\infty, \infty)$

Range:

$(-\infty, 0] \cup [5, \infty)$

Point of Discontinuity:

$x = 2$

Inc:

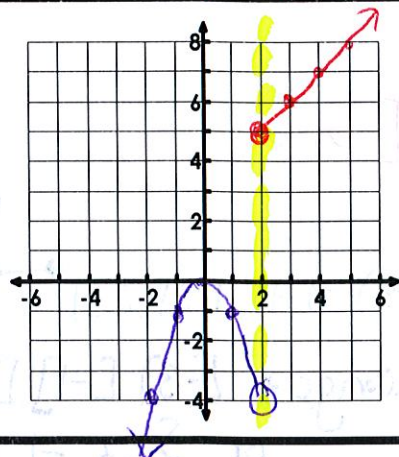
$(-\infty, 0) \cup (2, \infty)$

Dec:

$(0, 2)$

x	y
2	-4
1	-1
0	0
-1	-1

x	y
2	5
3	6
4	7



**Step Functions**

7. You are making class t-shirts. A company charges \$5 per shirt if you order less than 100 shirts, \$4 per shirt between 100-300 shirts, and \$3 per shirt for orders over 300. Write a piecewise equation to represent the situation.

$$f(x) = \begin{cases} 5x, & x < 100 \\ 4x, & 100 \leq x \leq 300 \\ 3x, & x > 300 \end{cases}$$

8. You are making class tattoos for the pep rally. There is a \$10 set up fee for the design. Tattoos cost \$1 per tattoo if you order 200 or less tattoos, \$0.50 per tattoo for orders over 200. Write a piecewise function to show the price based on the tattoo.

$$f(x) = \begin{cases} 1x + 10, & x \leq 200 \\ .5x + 10, & x > 200 \end{cases}$$

9. You start tutoring elementary students in math, and you schedule a month at a time. You charge \$20 an hour for less than 3 hours, and \$15 an hour for 3 or more hours. Write a piecewise function to show the rates based on the hours, and determine how much you would make if you tutored for 4 hours.

$$f(x) = \begin{cases} 20x, & x < 3 \\ 15x, & x \geq 3 \end{cases}$$

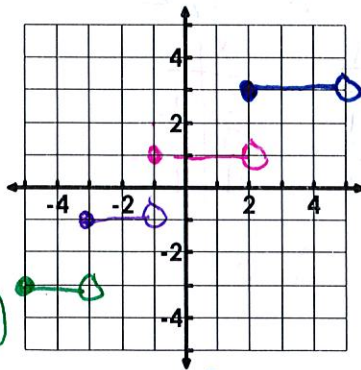
$$f(4) = 15x \\ = 15(4)$$

**\$60 for 4 hours**

10. Graph:  $f(x) = \begin{cases} -3 & -5 \leq x < -3 \\ -1 & -3 \leq x < -1 \\ 1 & -1 \leq x < 2 \\ 3 & 2 \leq x < 5 \end{cases}$

Domain:

$[-5, 5)$

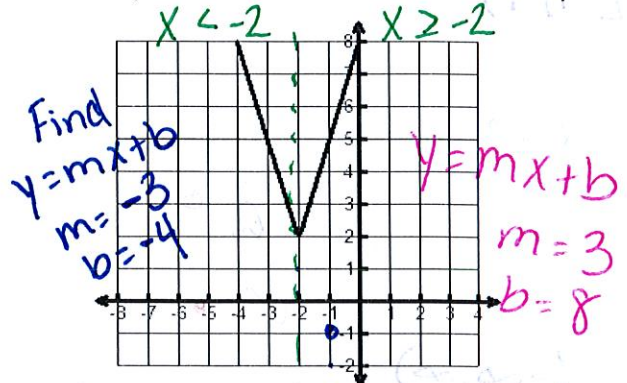


Constant:

$(-5, -3) (-3, -1) (-1, 2) (2, 5)$

\* Range \*  $[-3] [-1] [1] [3]$   
or  $\{-3, -1, 1, 3\}$

11. Given the graph, determine the piecewise function (include the domain restriction):



$$f(x) = \begin{cases} y = -3x + 4, & x < -2 \\ y = 3x + 8, & x \geq -2 \end{cases}$$