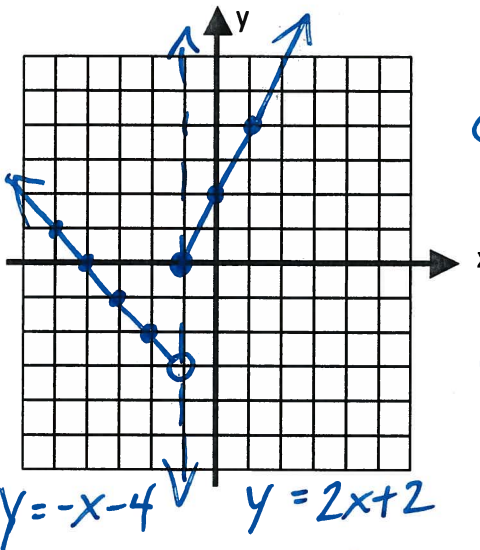


# HOMWORK: PIECEWISE FUNCTIONS

NAME: \_\_\_\_\_ DAY 4 DUE: \_\_\_\_\_

To graph, graph each "piece" of the function. Watch the inequality sign to see if you need an open dot or a closed dot!

1) Graph:  $f(x) = \begin{cases} -x-4, & x < -1 \\ 2x+2, & x \geq -1 \end{cases}$  ①  
②



$x = -1$

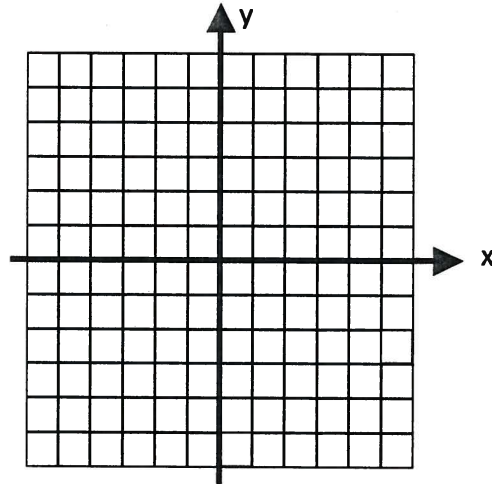
$x < -1$

x	y
-1	-3
-2	-2

$x \geq -1$

x	y
-1	0
0	2

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



a. Find  $f(-2)$ .  $\frac{-2}{-2 < -1}$  ①

b. Find  $f(1)$ .  $\frac{2}{-1 \leq 1 \leq 1}$  ②  $f(1) = 1 + 1$

c. Find  $f(4)$ .  $\frac{-1}{4 > 2}$  ③

d. Increasing on  $(-\infty, -1) \cup (-1, 1)$

e. Decreasing on  $N/A$

f. Constant on  $(2, \infty)$

h. Domain:  $(-\infty, 1] \cup (2, \infty)$

i. Range:  $(-\infty, 2)$

a. Find  $f(-3)$ .  $\frac{-1}{-3 < -1}$  ①  $\frac{-(-3)-4}{3-4}$   
 $-1$

b. Find  $f(0)$ .  $\frac{2}{0 \geq -1}$  ②  $\frac{2(0)+2}{0+2}$   
 $2$

c. Increasing on  $(-1, \infty)$

d. Decreasing on  $(-\infty, -1)$

e. Constant on  $N/A$

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

g. Range:  $(-3, \infty)$

3) Given  $f(x) = \begin{cases} \frac{1}{2}x+4, & x < -2 \\ x^2-1, & -2 \leq x \leq 2 \\ -1, & x > 2 \end{cases}$  ①  
 ②  
 ③

① a) Find  $f(-4)$ . 2  $f(-4) = \frac{1}{2}(-4)+4$   
 $= -2+4$

② b) Find  $f(2)$ . 3  $f(2) = 2^2-1$   
 $= 3$

③ c) Find  $f(3)$ . -1  $f(3) = -1$

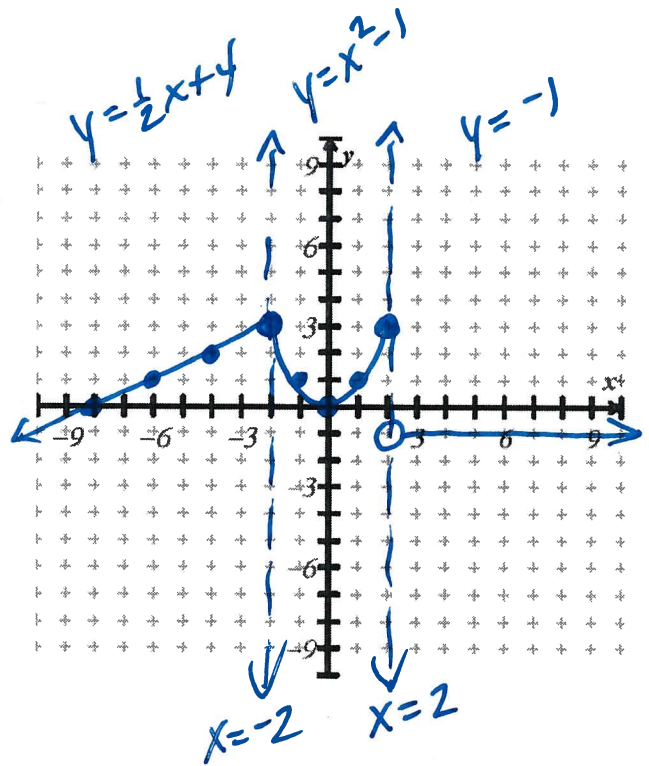
d) Graph the function.

$x < -2$

x	y
-2	3
-4	2

$-2 \leq x \leq 2$

x	y
-2	3
0	-1
2	3



4) Given  $f(x) = \begin{cases} |x+2|, & -6 \leq x \leq 0 \\ \sqrt{x}, & 0 < x \leq 1 \\ -2x+5, & 1 < x < 5 \end{cases}$

① a) Find  $f(-3)$ . 1  $= |-3+2| = |-1| = 1$

① b) Find  $f(0)$ . 2  $= |0+2| = 2$

③ c) Find  $f(3)$ . -1  $= (-2)(3)+5 = -1$

d) Graph the function.

$-6 \leq x \leq 0$

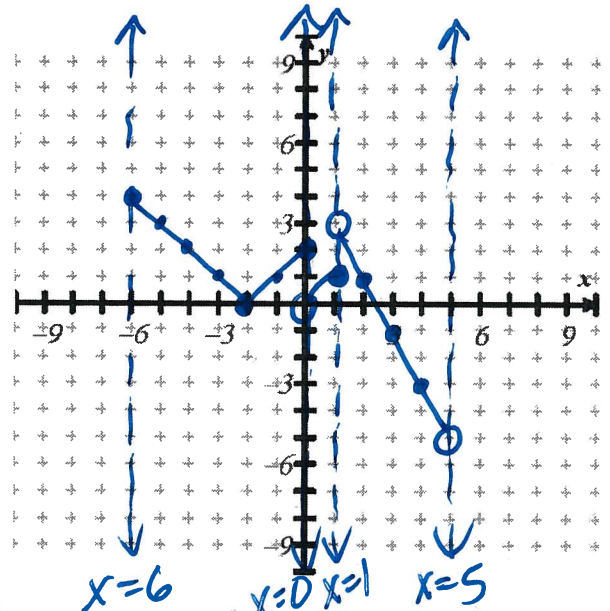
x	y
-6	4
-2	0
0	2

$0 < x \leq 1$

x	y
0	0
1	1

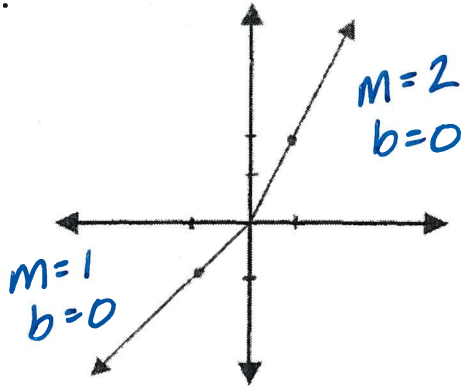
$1 < x < 5$

x	y
1	3
5	-5



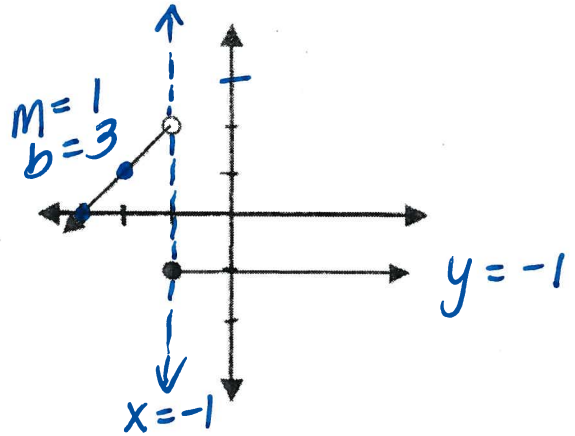
Write the piecewise function given by the graph.

5.



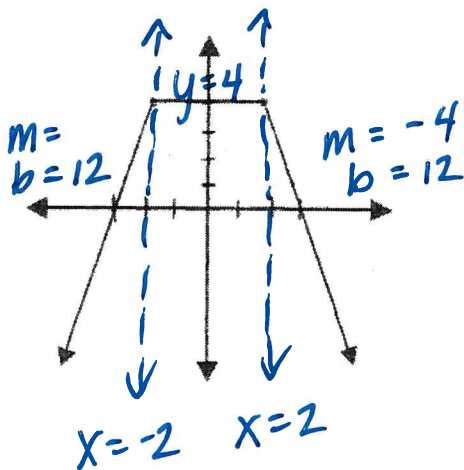
$$f(x) = \begin{cases} x, & x \leq 0 \\ 2x, & x > 0 \end{cases}$$

6.



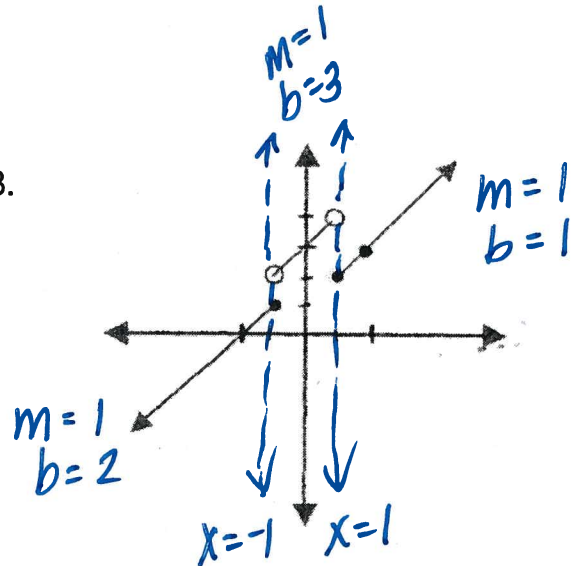
$$f(x) = \begin{cases} x+3, & x < -1 \\ 1, & x \geq -1 \end{cases}$$

7.



$$f(x) = \begin{cases} 4x+12, & x < -2 \\ 4, & -2 \leq x \leq 2 \\ -4x+12, & x > 2 \end{cases}$$

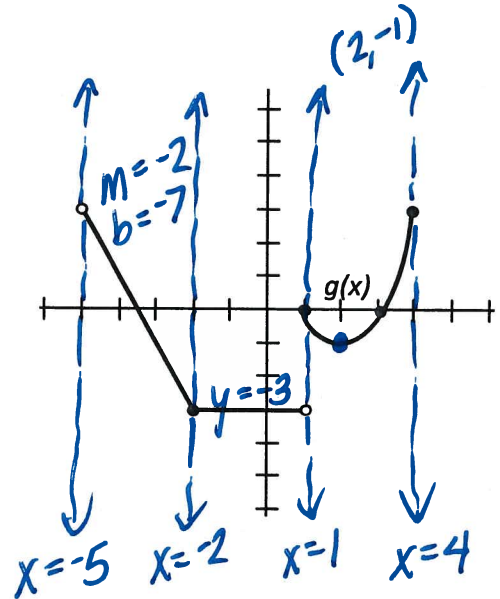
8.



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

9. The graph of a piecewise-defined function is given. Write a definition the function.

$$f(x) = \begin{cases} -2x - 7, & -5 < x < -2 \\ -3, & -2 \leq x < 1 \\ (x-2)^2 - 1, & 1 \leq x \leq 4 \end{cases}$$



10. Sprint PCS offers a monthly cellular phone plan for \$39.99. It includes 350 anytime minutes plus \$0.25 per minute for additional minutes. The following function is used to compute the monthly cost for a subscriber:

$$C(x) = \begin{cases} 39.99, & 0 < x \leq 350 \\ 0.25x - 47.5, & x > 350 \end{cases}$$

where  $x$  is the number of additional minutes used

- a) Find the monthly cost for 200 anytime minutes.

Use equation 1, since  $0 < 200 \leq 350$ .

$$C(200) = 39.99$$

- b) Find the monthly cost for 365 anytime minutes.

Use equation 2, since  $365 > 350$ .

$$\begin{aligned} C(365) &= 0.25(365) - 47.51 \\ &= \$43.74 \end{aligned}$$