8.3 Practice

Use the piecewise function to evaluate the following.

1.

$$f(x) = \begin{cases} -2x^2 - 1, & x \le 2 \\ \frac{4}{5}x - 4, & x > 2 \end{cases}$$

a, c, d

b

a. $f(0) = -2(0)^2 - 1$

$= 0 - 1$

$f(0) = -1$

b. $f(5) = \frac{4}{5}(5) - 4$

$= 4 - 4$

$f(5) = 0$

c. $f(2) = -2(2)^2 - 1$

$= -2(4) - 1$

$= -8 - 1$

$f(2) = -9$

d. $f(-3) = -2(-3)^2 - 1$

$= -2(9) - 1$

$= -18 - 1$

$f(-3) = -19$

2.

$$f(x) = \begin{cases} x^3 - 7x, & x \le -3 \\ 8, & -3 < x \le 3 \\ 77, & x > 3 \end{cases}$$

a, c, d

b

a. $f(-5) = (-5)^3 - 7(-5)$

$= -125 + 35$

$f(-5) = -90$

b. $f(11) = 77$

c. $f(0) = 8$

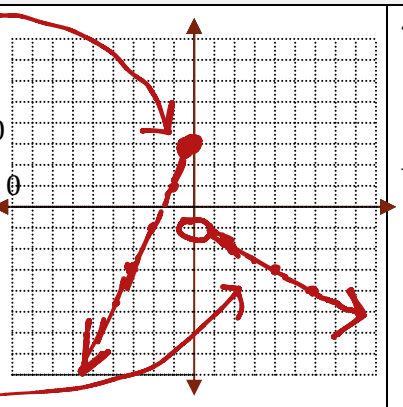
d. $f(3) = 8$

These are super easy when the functions are constant! No work!

Graph the following piecewise functions.

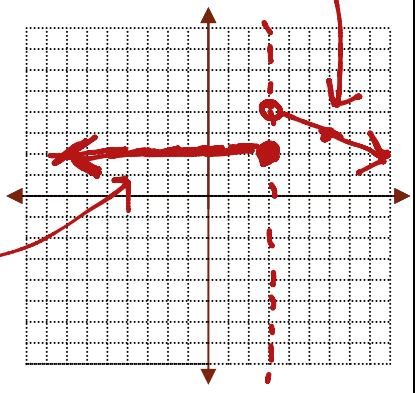
3.

$$f(x) = \begin{cases} 2x + 3, & x \le 0 \\ -\frac{1}{2}x - 1, & x > 0 \end{cases}$$



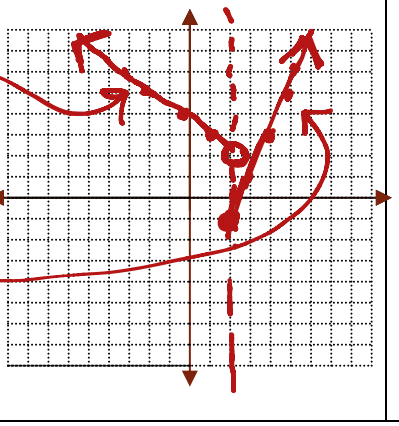
4.

$$f(x) = \begin{cases} -\frac{1}{3}x + 5, & x > 3 \\ 2, & x \le 3 \end{cases}$$



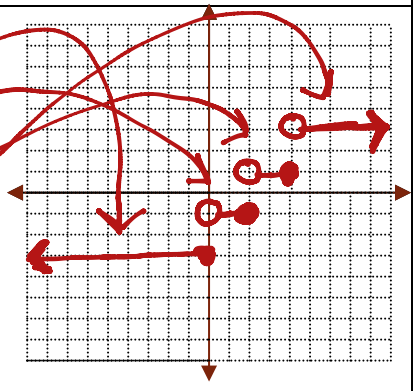
5.

$$f(x) = \begin{cases} 4 - x, & x < 2 \\ 2x - 6, & x \ge 2 \end{cases}$$



6.

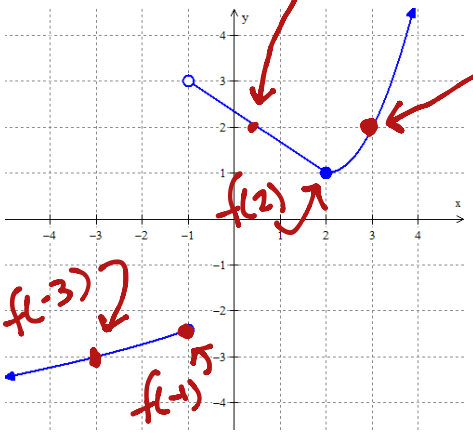
$$f(x) = \begin{cases} -3, & x \le 0 \\ -1, & 0 < x \le 2 \\ 1, & 2 < x \le 4 \\ 3, & x \ge 4 \end{cases}$$



7. Explain why you think the piecewise function in number 6 is frequently called a "step-function".

Step Functions look like stairs... pieces of horizontal lines.

8.



a. $f(3) =$ 2

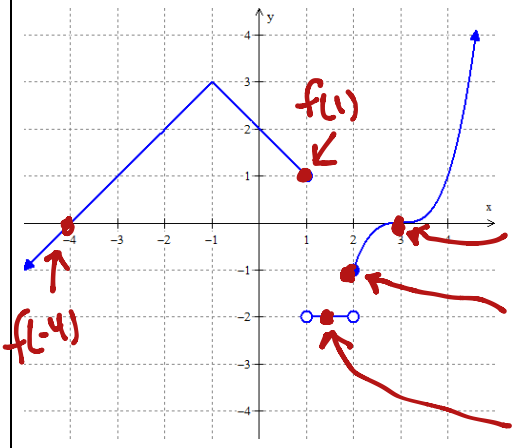
b. $f(-1) =$ ABOUT −2.4

c. $f(-3) =$ −3

d. $f(2) =$ 1

e. $f(0.5) =$ 2

9.



a. $f(-4) =$ 0

b. $f(1) =$ 1

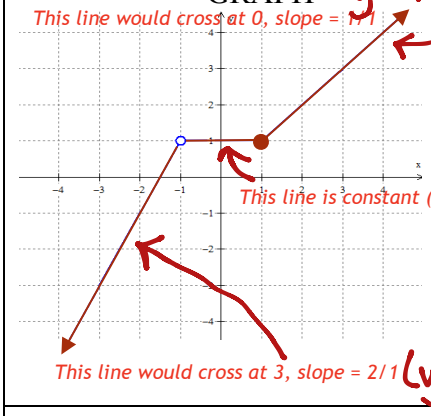
c. $f(3) =$ 0

d. $f(2) =$ −1

e. $f(1.5) =$ 2

10. **Writing Equations From Graphs** Use the picture of the piecewise function to answer the following.

GRAPH



Write the equation for each of the 3 pieces

$2x+3$,

1,

$1x+0$,

Domain for each piece

$x < -1$

$-1 < x \leq 1$

$x > 1$

Now write the piecewise function Using the information above!!

$$f = \begin{cases} 2x+3 & x < -1 \\ 1 & -1 < x \leq 1 \\ 1x & x > 1 \end{cases}$$

10. Solve the following system: SUBSTITUTION!

$2x - 4y = 38$

$23 - 2y = x$

$2(23-2y) - 4y = 38$

$46 - 4y - 4y = 38$

$-8y = -8$

$y = 1$

$x = 21$

$(21, 1)$

11. Solve for y:

$-x - 4y = 0$

$+x \quad +x$

$-4y = x$

$y = \frac{1}{-4}x$

12. Find the initial value and percent decrease for the following model:

$1 - .73 = .27$

$y = 42(.73)^x$

I.V. 42 % Dec 27

30. ~~Multiply:~~ $(9x-1)^2$

$(9x-1)(9x-1)$

$81x^2 - 18x + 1$

32. Solve for x:

$$\frac{2x-1}{3} - 13 = 0$$

ADD 13

MULT 3

ADD 1

$2x = 40$

$x = 20$

31. Find the best fit LINEAR regression equation for the following: $y = .04x - 6.39$

x	-30	-10	-50	40	70	160	110	100
y	-8.5	-6.5	-8.5	-4	-3.5	-1	-1.5	-2

$r = .9768$