

# Homework 2.3: Piecewise Functions

Name: Key!

Math 3

Directions: Use piecewise functions to evaluate the following.

1.

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

a.  $f(0) =$

$$-2(0)^2 - 1 = -1$$

$$(0, -1)$$

b.  $f(5) =$

$$\frac{4}{5}(5) - 4 = 0$$

$$(5, 0)$$

c.  $f(2) =$

$$-2(2)^2 - 1 = -9$$

$$(2, -9)$$

d.  $f(-3) =$

$$-2(-3)^2 - 1 = -19$$

$$(-3, -19)$$

2.

$$f(x) = \begin{cases} x^3 - 7x, & x \leq -3 \\ 8, & -3 < x \leq 3 \\ \sqrt{2x+3}, & x > 3 \end{cases}$$

a.  $f(-5) =$

$$(-5)^3 - 7(-5) = -90$$

$$(-5, -90)$$

b.  $f(11) =$

$$\sqrt{2(11)+3} = \sqrt{25}$$

$$(11, 5)$$

c.  $f(0) =$

$$(0, 8)$$

d.  $f(3) =$

$$(3, 8)$$

3.

$$f(x) = \begin{cases} \frac{3}{x+4}, & x < -5 \\ x^2 - 3x, & -5 < x \leq 0 \\ x^4 - 7, & x > 0 \end{cases}$$

a.  $f(-1) =$

$$(-1)^2 - 3(-1) = 4$$

$$(-1, 4)$$

b.  $f(4) =$

$$(4)^4 - 7 = 249$$

$$(4, 249)$$

c.  $f(-10) =$

$$\frac{3}{-10+4} = \frac{3}{-6} = -\frac{1}{2}$$

$$(-10, -1/2)$$

d.  $f(0) =$

$$0^2 - 3(0) = 0$$

$$(0, 0)$$

4.

$$f(x) = \begin{cases} |2x+7|, & x \leq -4 \\ 1+x^2, & -4 < x \leq 1 \\ 6, & 1 < x < 3 \\ \frac{1}{3}x+8, & x \geq 3 \end{cases}$$

a.  $f(5) =$

$$\frac{1}{3}(5)+8 = \frac{29}{3}$$

$$(5, 29/3)$$

b.  $f(1) =$

$$1+(1)^2 = 2$$

$$(1, 2)$$

c.  $f(-4) =$

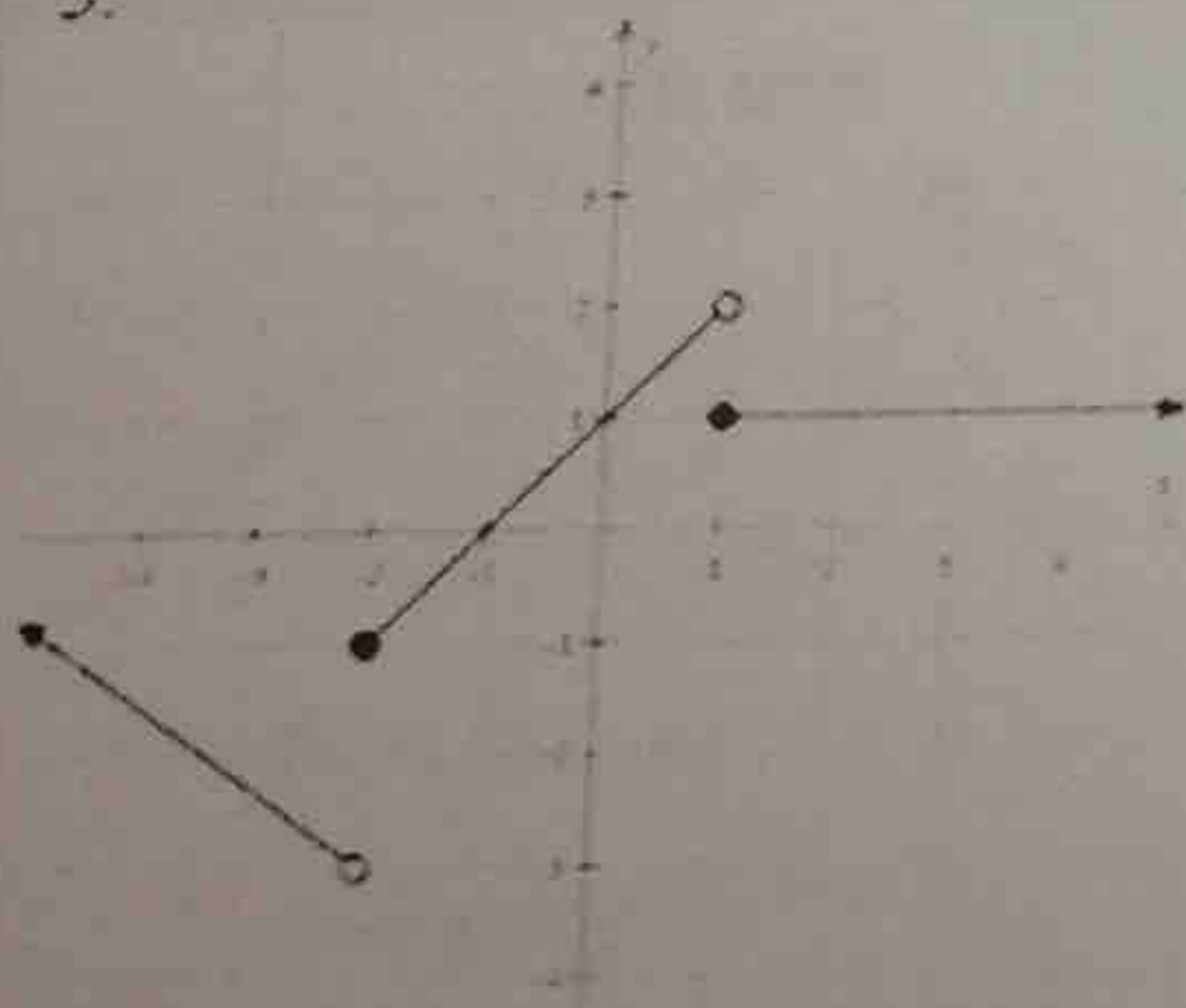
$$|2(-4)+7| = 1$$

$$(-4, 1)$$

d.  $f(2) =$

$$(2, 6)$$

5.



a.  $f(-1) = 0$

$$(-1, 0)$$

b.  $f(2) = 1$

$$(2, 1)$$

c.  $f(1) = 1$

$$(1, 1)$$

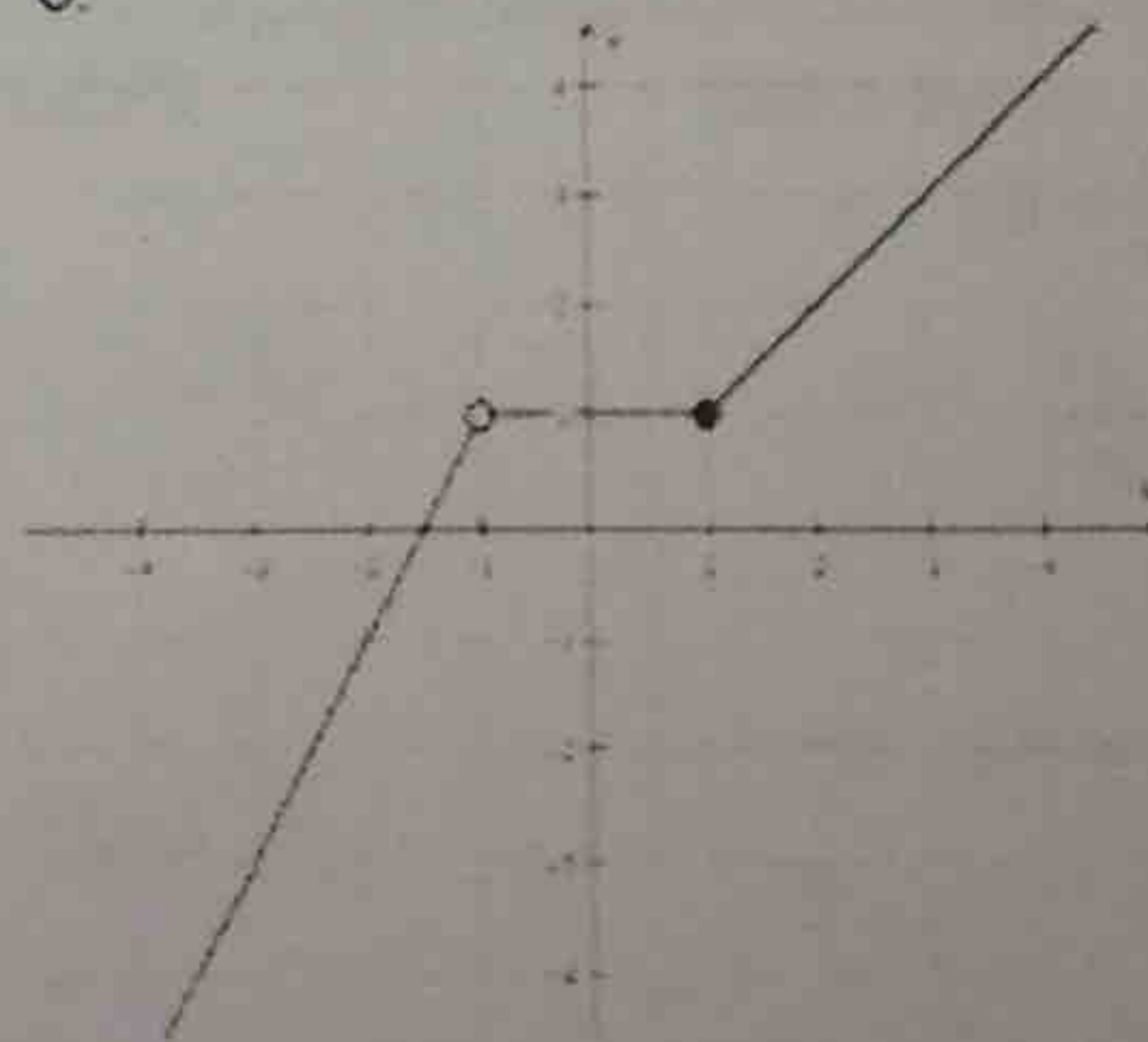
d.  $f(-2) = -1$

$$(-2, -1)$$

e.  $f(0) = 1$

$$(0, 1)$$

6.



a.  $f(-3) = -3$

$$(-3, -3)$$

b.  $f(4) = 4$

$$(4, 4)$$

c.  $f(1) = 1$

$$(1, 1)$$

d.  $f(-1) = \text{NS}$

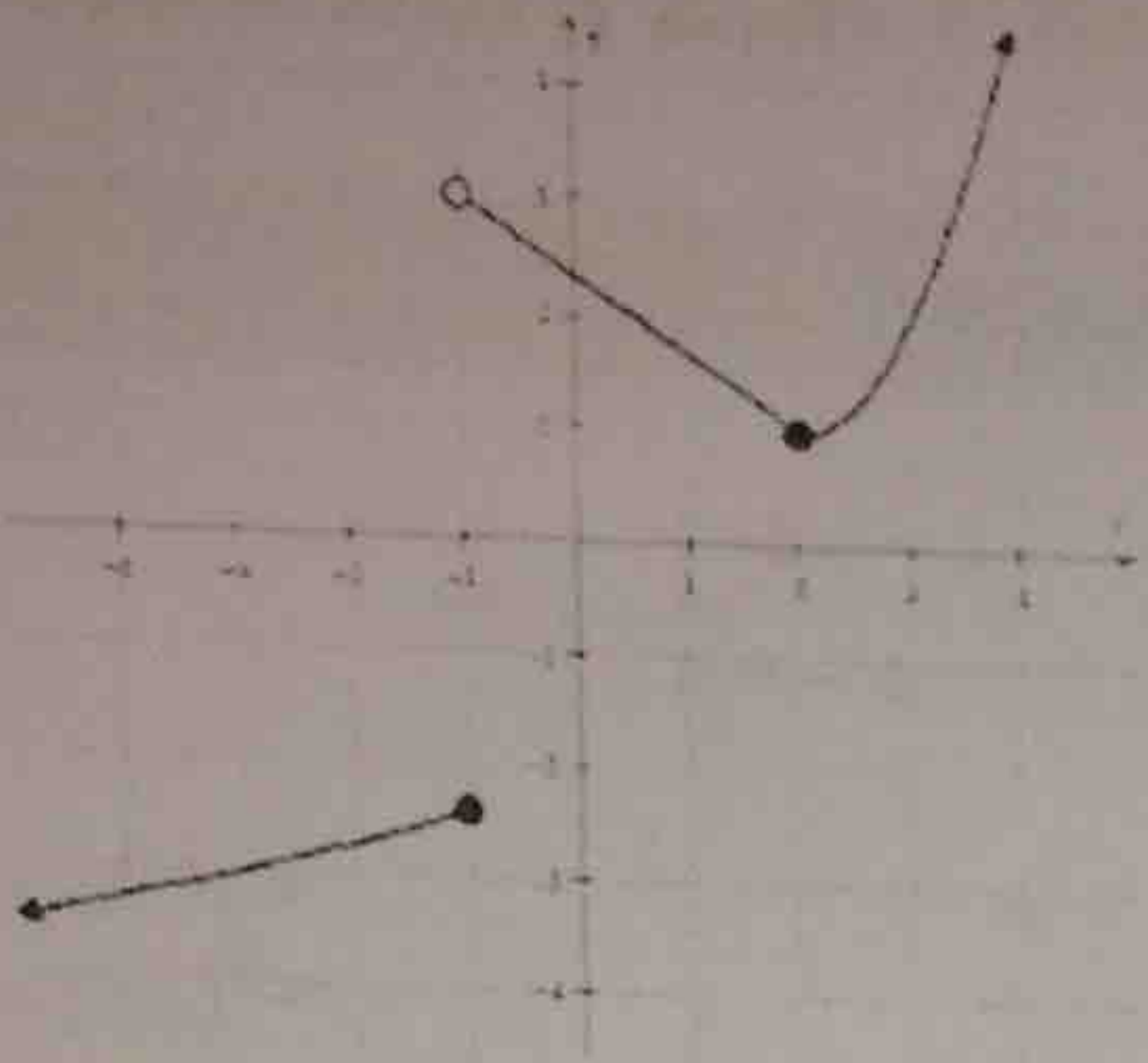
$$\emptyset$$

e.  $f(0) = 1$

$$(0, 1)$$

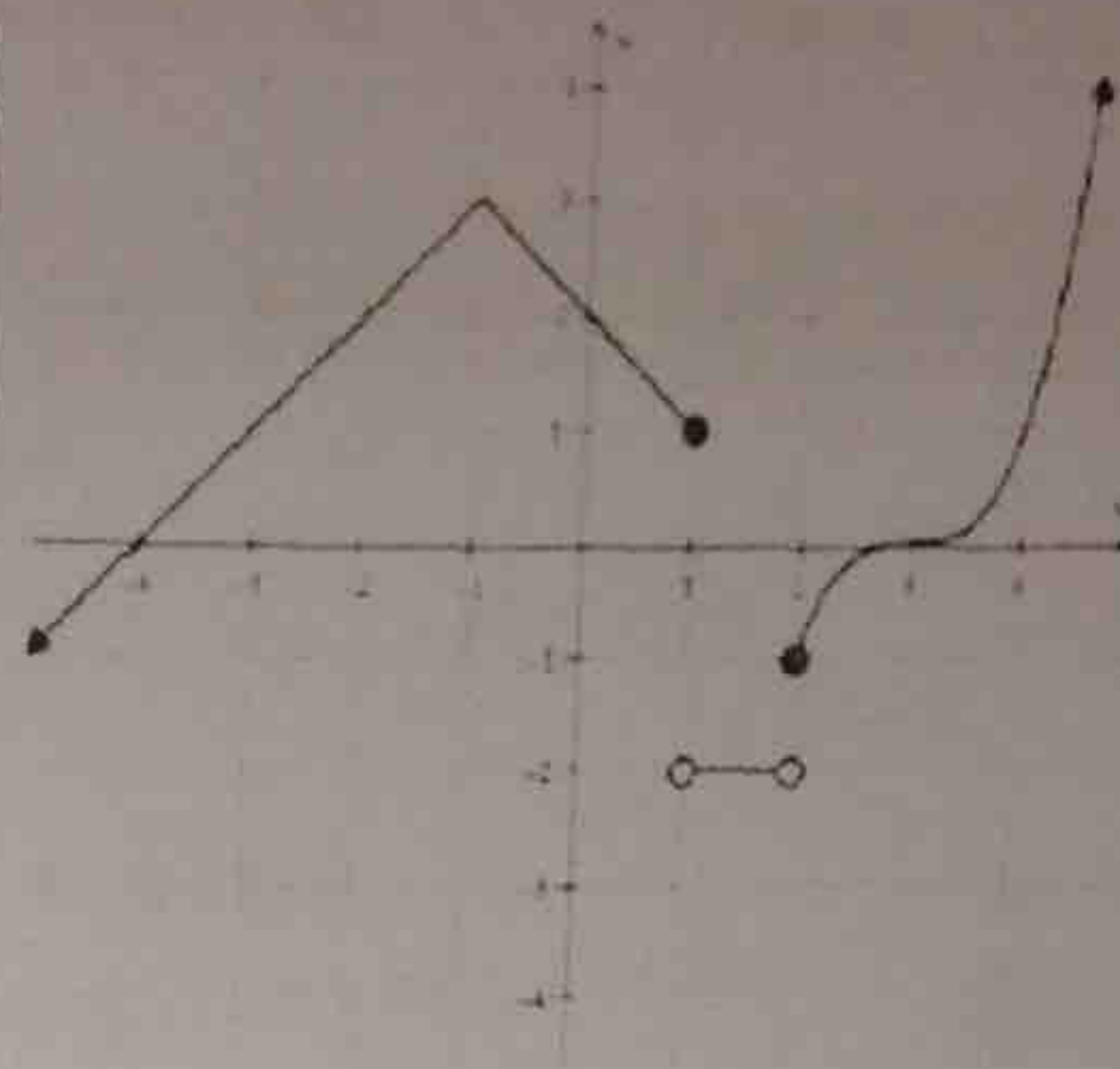


7.



- a.  $f(3) = 2$   
 b.  $f(-1) = -2.5$   
 c.  $f(-3) = -3$   
 d.  $f(2) = 1$   
 e.  $f(0.5) = 2$

8.

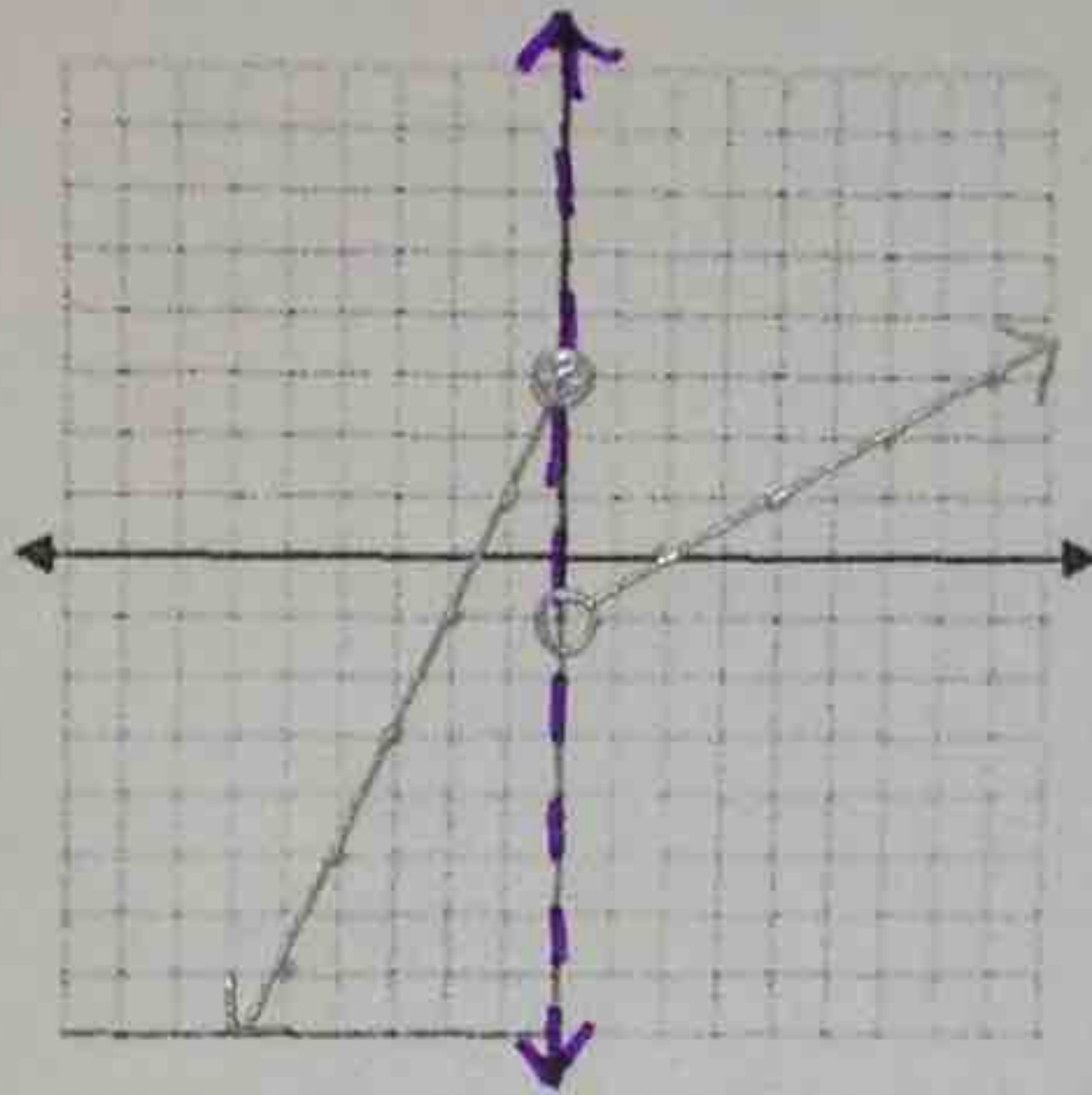


- a.  $f(-4) = 0$   
 b.  $f(1) = 1$   
 c.  $f(3) = 0$   
 d.  $f(2) = -1$   
 e.  $f(1.5) = -2$

Directions: Graph the following piecewise functions.

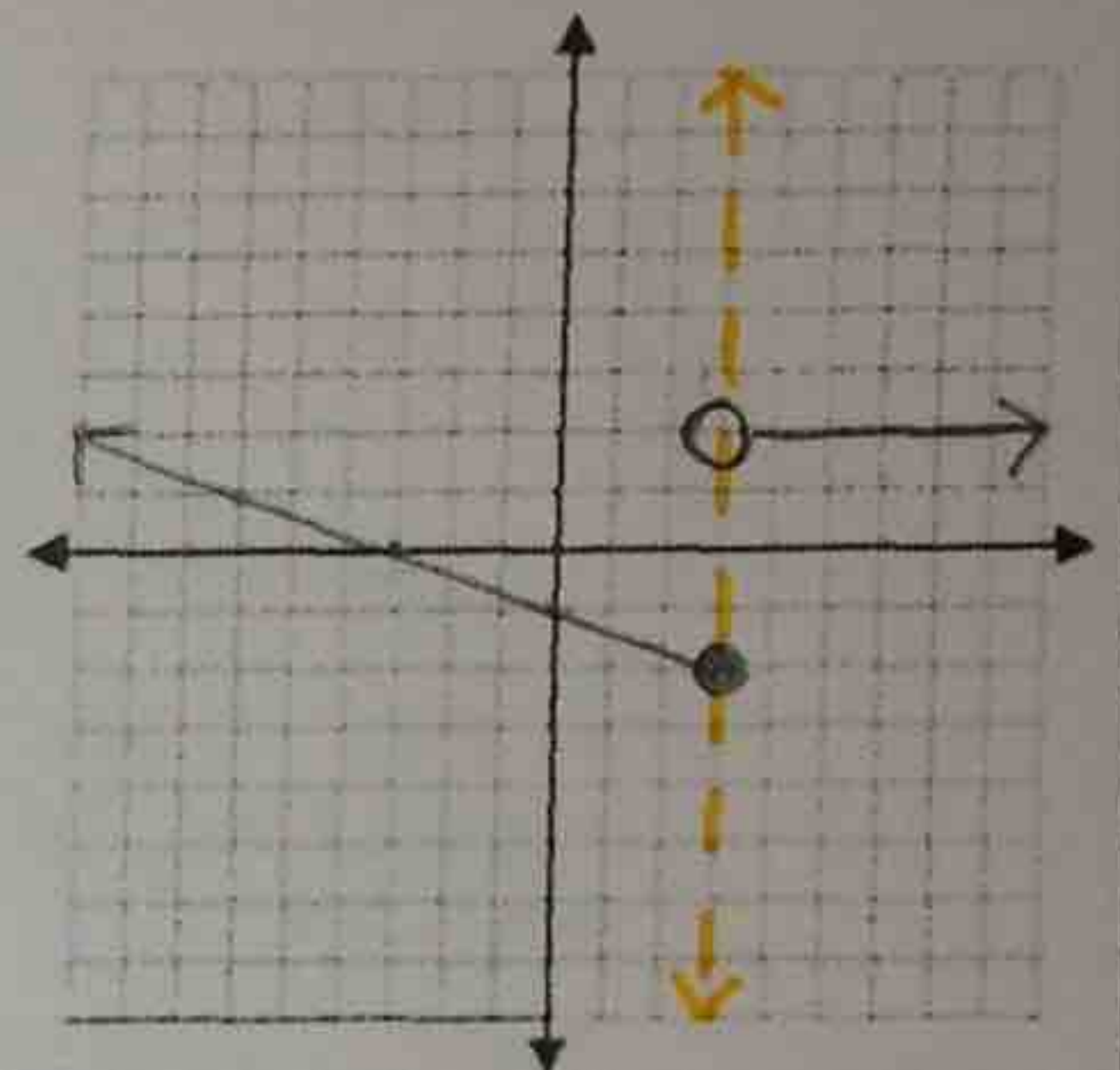
9.

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



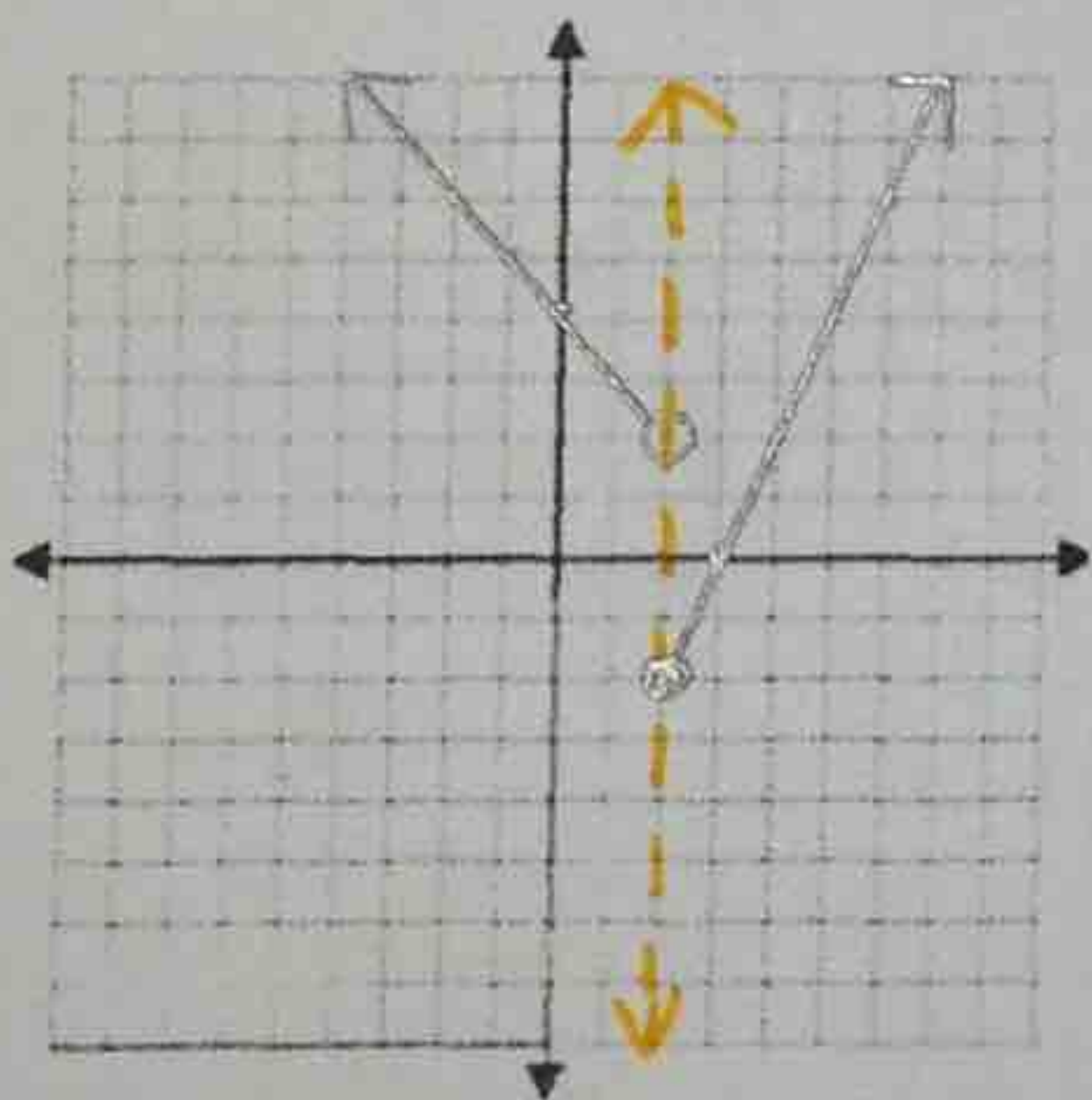
10.

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



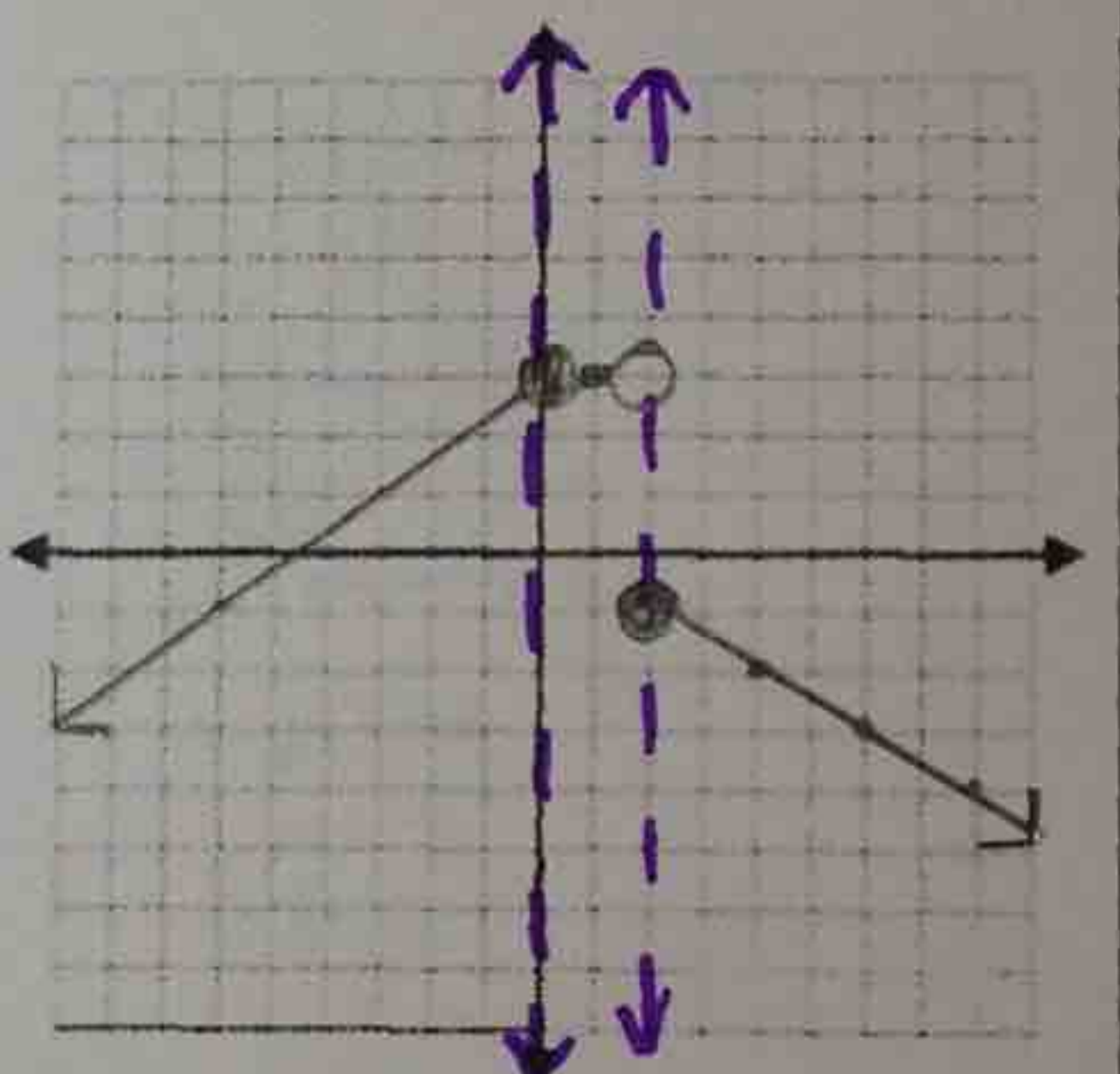
11.

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



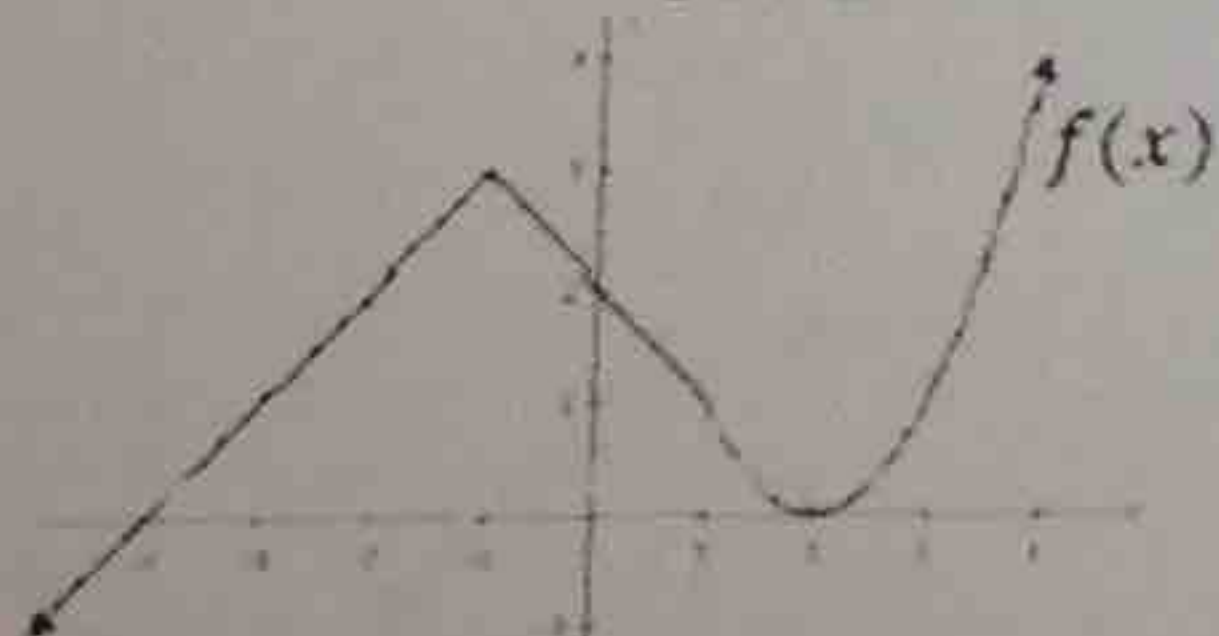
12.

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



Directions: Practice the following algebra skills!!!

GRAPH



- a.  $f(-1) = 3$   
 b. y-intercept =  $(0, 2)$   
 c.  $f(x) = 1$  when  $x = 1, -3$   
 d. x-intercept(s) =  $(-4, 0), (2, 0)$

SIMPLIFY

Simplify the radical.

a.  $\sqrt{24}$

$$\begin{matrix} 6 & 4 \\ \hat{\phantom{0}} & \hat{\phantom{0}} \\ 3 & 2 & \textcircled{2} \end{matrix}$$

$2\sqrt{6}$

b.  $4\sqrt{40}$

$$\begin{matrix} 4 & 10 \\ \hat{\phantom{0}} & \hat{\phantom{0}} \\ \textcircled{2} & 2 & 2 \end{matrix}$$

$8\sqrt{10}$

Solve for x.

a.  $15 = \frac{5}{x} + 4$

$$11 = \frac{5}{x} \quad 11x = 5$$

$$x = 5/11$$

FACTOR

b.  $x^2 - 12x + 35$

$$\begin{matrix} 35 & -5 \\ -7 & \times & -5 \\ -12 & & \end{matrix} \quad (x-7)(x-5)$$