

## CHAPTER 2 PRACTICE TEST

1.  $\{(2,3), (4,-2), (5,3), (3,-2)\}$

A) Domain =  $x$ 's  
 $= \{2, 4, 5, 3\}$

B) Range =  $y$ 's  
 $= \{3, -2\}$

C) No  $x$  is used twice so it's a function.

2.  $\{(4,2) (3,7) (-2,6) (3,10)\}$

A) Domain =  $\{4,3,-2\}$

B) Range =  $\{2,7,6,10\}$

C) 3 is used twice as an x, so it is NOT a function.

3.  $f(x) = 2x + 7$

$$f(4) = 2(4) + 7$$

$$= 8 + 7$$

$$= 15$$

everywhere there used to be an  $x$ ,  
there is now a 3.

4.  $f(x) = 2x + 7$

$$f\left(\frac{3}{2}\right) = 2\left(\frac{3}{2}\right) + 7$$

$$= 3 + 7$$

$$= 10$$

Linear equations have:

1. no exponents on variables
2. no variables under roots
3. no variables multiplied together
4. no variables in the BOTTOM of fractions

5.  $2x - \frac{1}{3}y = 7$  is linear

6.  $3x^2 + 5 = 4$  is NOT linear because  $x$  has a power.

Slope-Intercept Form:  $y = mx + b$

• get  $y$  by itself

7.  $\frac{4x}{3} - \frac{2}{3} = \frac{3y}{3}$

$\frac{4}{3}x - \frac{2}{3} = y$

x-intercept:  
• set  $y=0$   
• solve for  $x$

y-intercept:  
• set  $x=0$   
• solve for  $y$

8.  $6x - 4y = 12$

x-int:

$$6x - 4(0) = 12$$

$$\frac{6x}{6} = \frac{12}{6}$$

$$x = 2$$

x-intercept:  $(2, 0)$

y-int:

$$6(0) - 4y = 12$$

$$\frac{-4y}{-4} = \frac{12}{-4}$$

$$y = -3$$

y-intercept:  $(0, -3)$

Slope

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

9.  $(8, -4)$   $(6, 1)$

$$m = \frac{1 - (-4)}{6 - 8} = \frac{5}{-2} = -\frac{5}{2}$$

10.  $(2, -5)$   $(7, -5)$

$$m = \frac{-5 - (-5)}{7 - 2} = \frac{0}{5} = 0$$

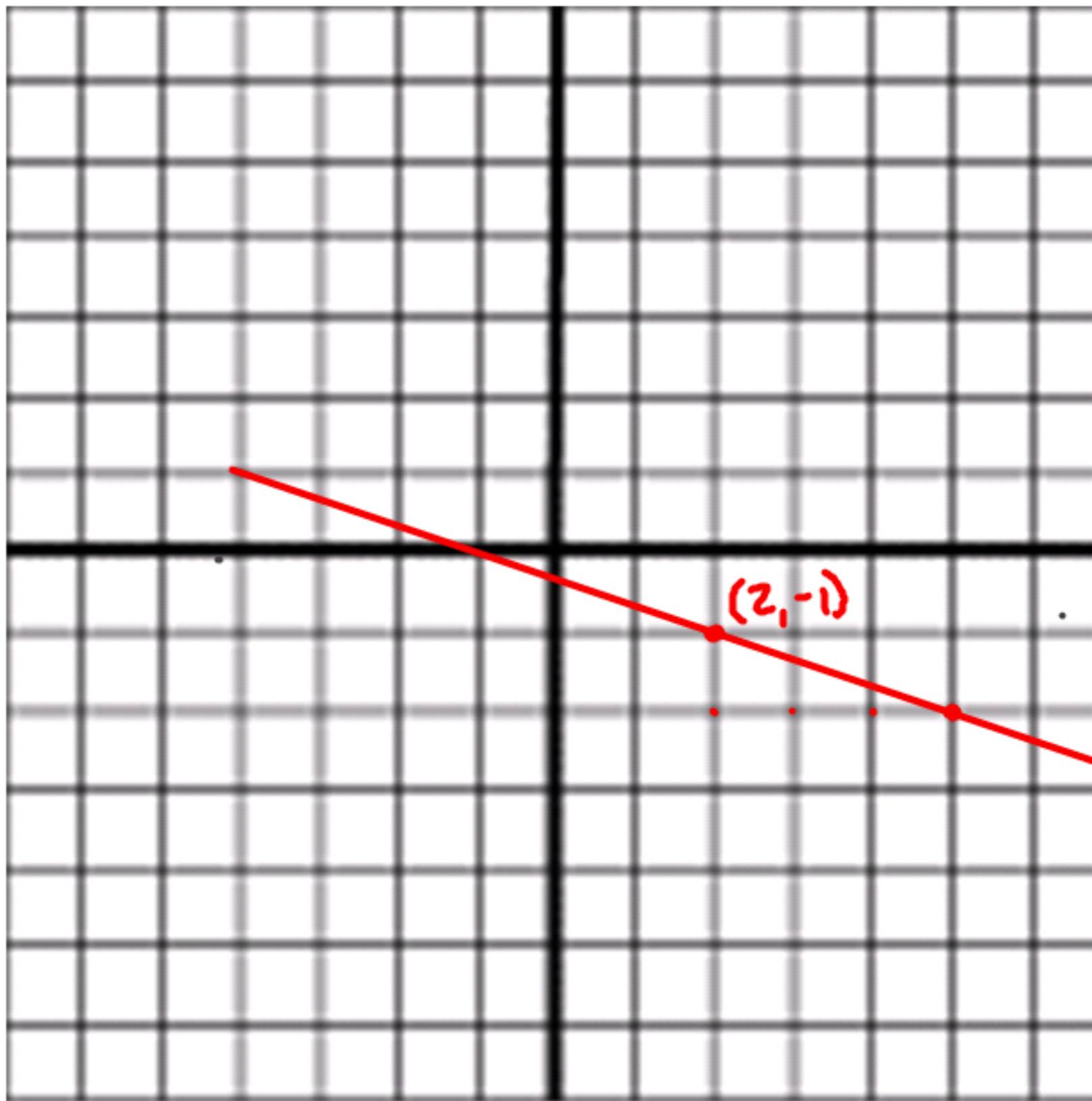
11.  $(4, 3)$   $(4, 7)$

$$m = \frac{7 - 3}{4 - 4} = \frac{4}{0} = \text{undefined}$$

12.

$$m = -\frac{1}{3}$$

↓  
↑



13. slope =  $\frac{1}{2}$  point:  $(\begin{matrix} 4 \\ x \end{matrix}, \begin{matrix} 5 \\ y \end{matrix})$

$$y = \frac{1}{2}x + b$$

plug in  $x = 4$  to find  $b$ .

$$5 = \frac{1}{2}(4) + b$$

$$5 = 2 + b$$

$$\cdot 2 \quad -2$$

$$3 = b$$

Now make the equation:

$$\boxed{y = \frac{1}{2}x + 3}$$

14. Passes through  $(1, -3)$  and  $(4, 3)$

• we need the slope so we use the slope formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{3 - (-3)}{4 - 1} = \frac{6}{3} = 2$$

• make the equation:

$$y = 2x + b$$

either point will work

$$3 = 2(4) + b$$

$$3 = 8 + b$$

$$\begin{array}{r} -8 \\ -8 \end{array}$$

$$-5 = b$$

$$\boxed{y = 2x - 5}$$

15. passes through  $(-2, 5)$ , parallel to  $-2x + y = 4$

- we need to know the slope
  - parallel lines have equal slopes
  - find the slope of the equation given:

$$-2x + y = 4$$

$$+2x$$

$$+2x$$

$$y = 2x + 4 \leftarrow \text{slope-intercept form}$$

slope of our new equation is also 2

$$y = 2x + b$$

$$5 = 2(-2) + b$$

$$5 = -4 + b$$

$$+4 \quad +4$$
$$9 = b$$

$$y = 2x + 9$$

16. passes through  $(-3, 3)$ , perpendicular to  $2x + 3y = 9$
- perpendicular lines have opposite, reciprocal slopes

Slope of 1<sup>st</sup> line:

$$2x + 3y = 9$$

$$-2x \quad -2x$$

$$\text{slope} = -\frac{2}{3}$$

$$\text{perpendicular slope} = \frac{3}{2}$$

$$\frac{3y}{3} = \frac{-2x + 9}{3}$$

$$y = -\frac{2}{3}x + 3$$

Equation:

$$y = \frac{3}{2}x + b$$

$$y = \frac{3}{2}x + \frac{15}{2}$$

$$3 = \frac{3}{2}(-3) + b$$

$$3 = -\frac{9}{2} + b$$

$$\frac{3}{2} + \frac{9}{2} = b$$

$$\frac{12}{2} = b$$

$$6 = b$$

17.  $f(x) = \begin{cases} x+1 & \text{if } x < 2 \\ -3 & \text{if } x \geq 2 \end{cases}$   
 cut off @ 2

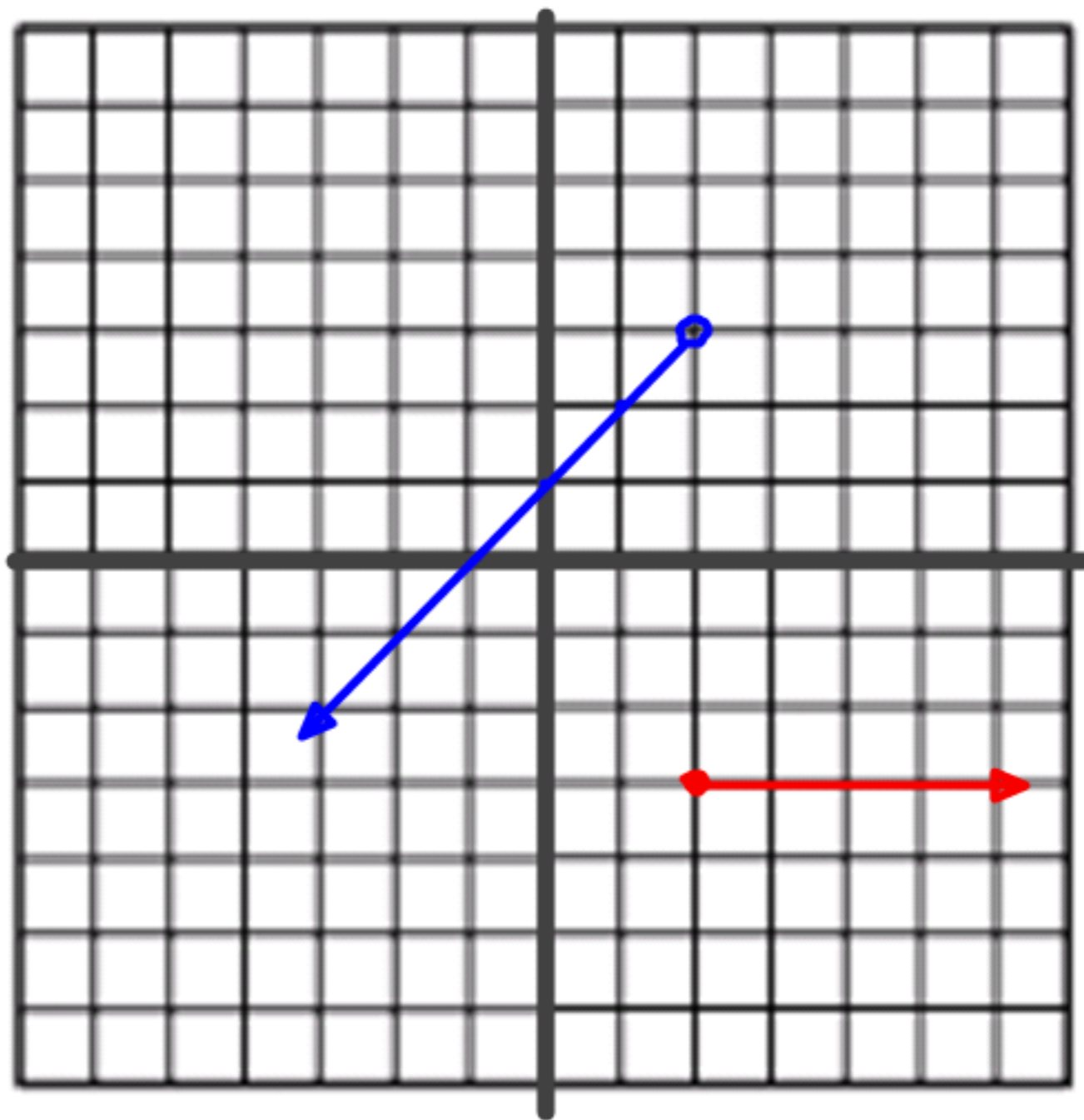
$y = x + 1$

x	y
2	3
1	2
0	1

$y = -3$

x	y
2	-3
3	-3
4	-3

D:  $(-\infty, 2)$   
 R:  $(-\infty, 3)$



18.

$$f(x) = \begin{cases} x & \text{if } x \leq -2 \\ 4 & \text{if } -2 < x < 3 \\ -x & \text{if } x \geq 3 \end{cases}$$

cut offs @ -2 and 3

$$f(x) = x \quad f(x) = 4 \quad f(x) = -x$$

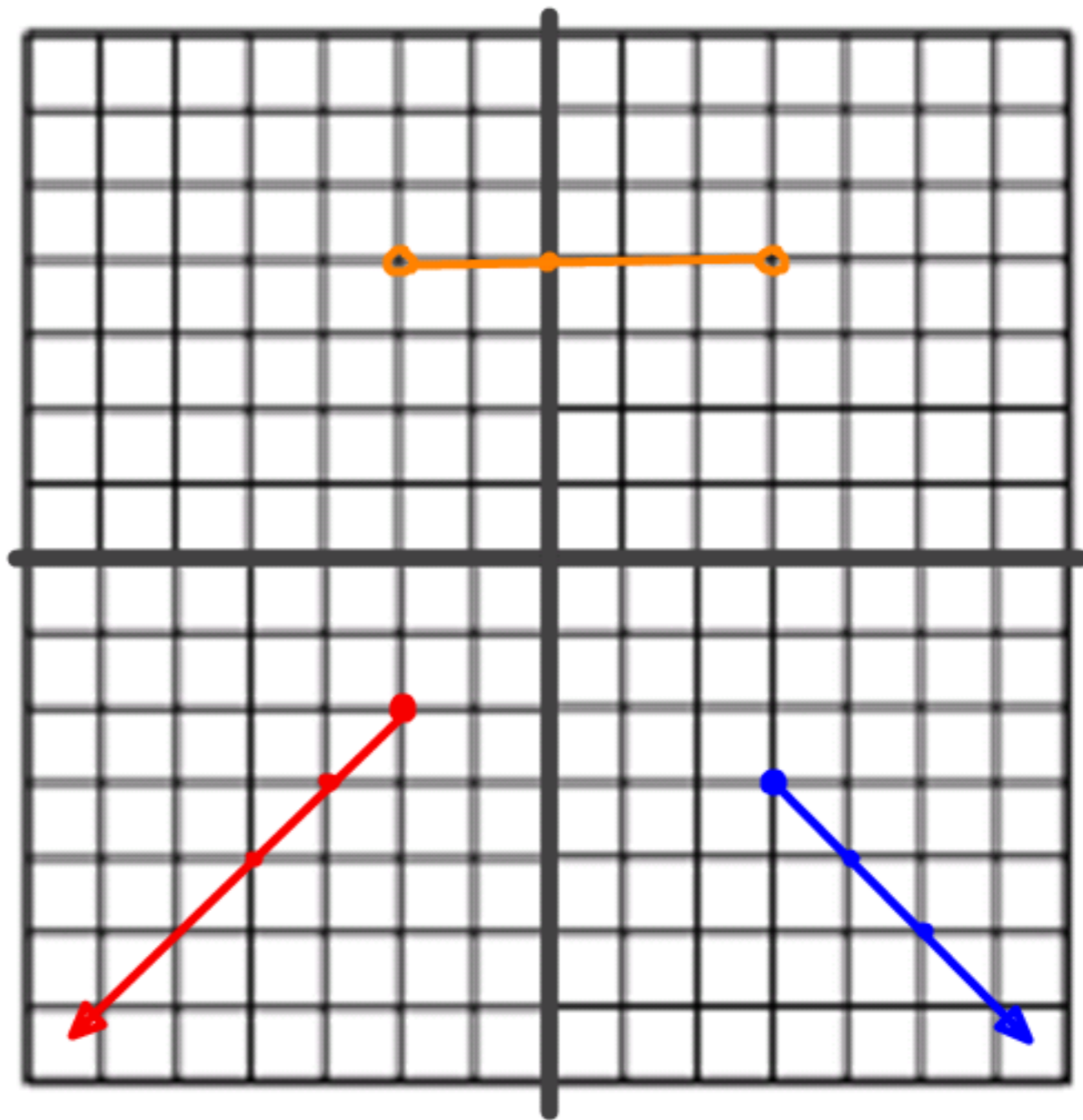
x	y
-2	-2
-3	-3
-4	-4

x	y
-2	4
0	4
3	4

x	y
3	-3
4	-4
5	-5

$$D: (-\infty, \infty)$$

$$R: (-\infty, -2] \cup [4, \infty)$$



19.  $f(x) = \begin{cases} 2x & \text{if } x < 0 \\ -x & \text{if } x \geq 2 \end{cases}$  cut offs at 0 & 2

$f(x) = 2x$

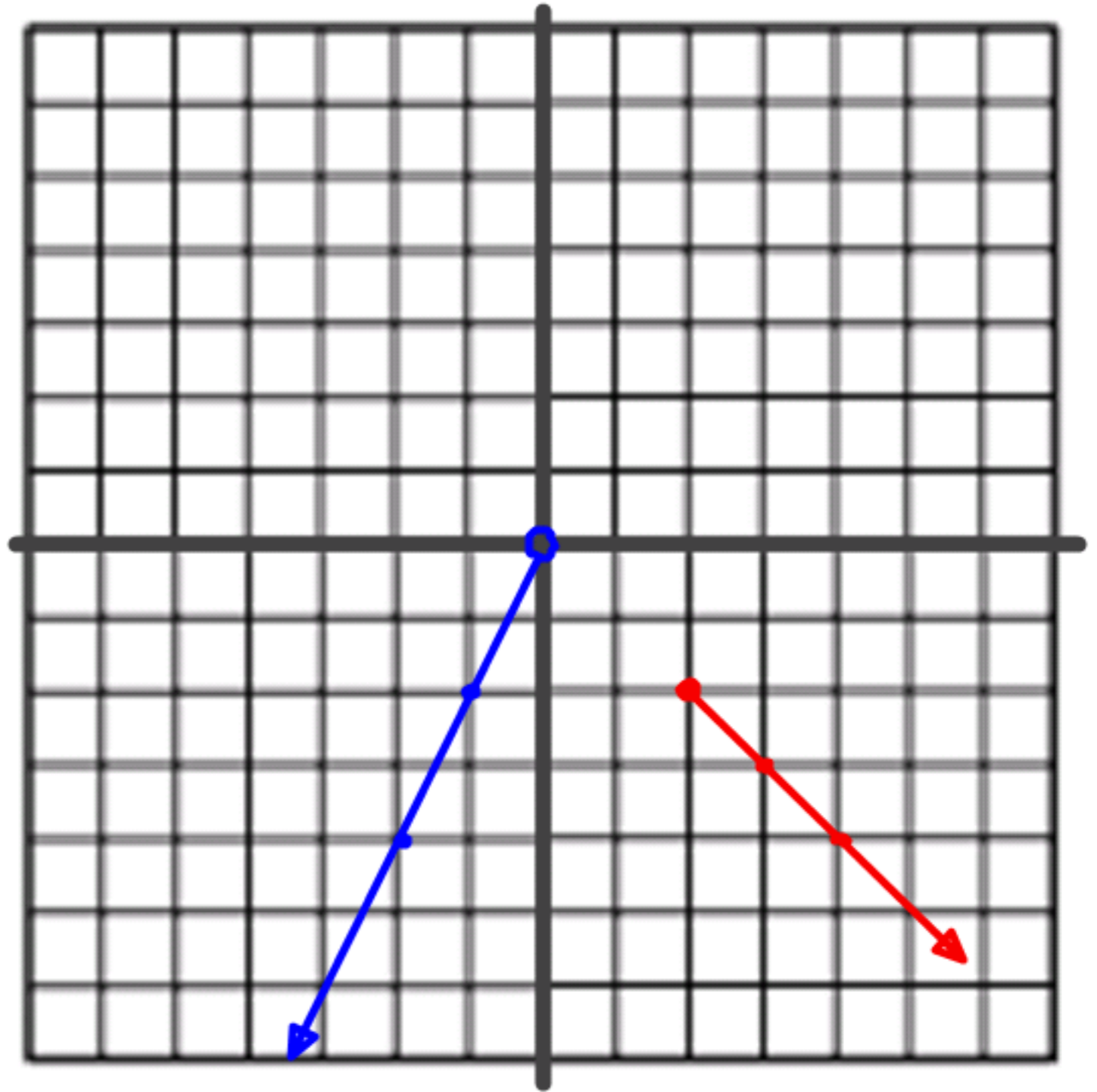
x	y
0	0
-1	-2
-2	-4

D:  $(-\infty, 0) \cup [2, \infty)$

R:  $(-\infty, 0)$

$f(x) = -x$

x	y
2	-2
3	-3
4	-4



$$20. y = |x+2| - 1$$

a) find the "middle"  $x$ :

$$x+2=0 \quad \boxed{x=-2}$$

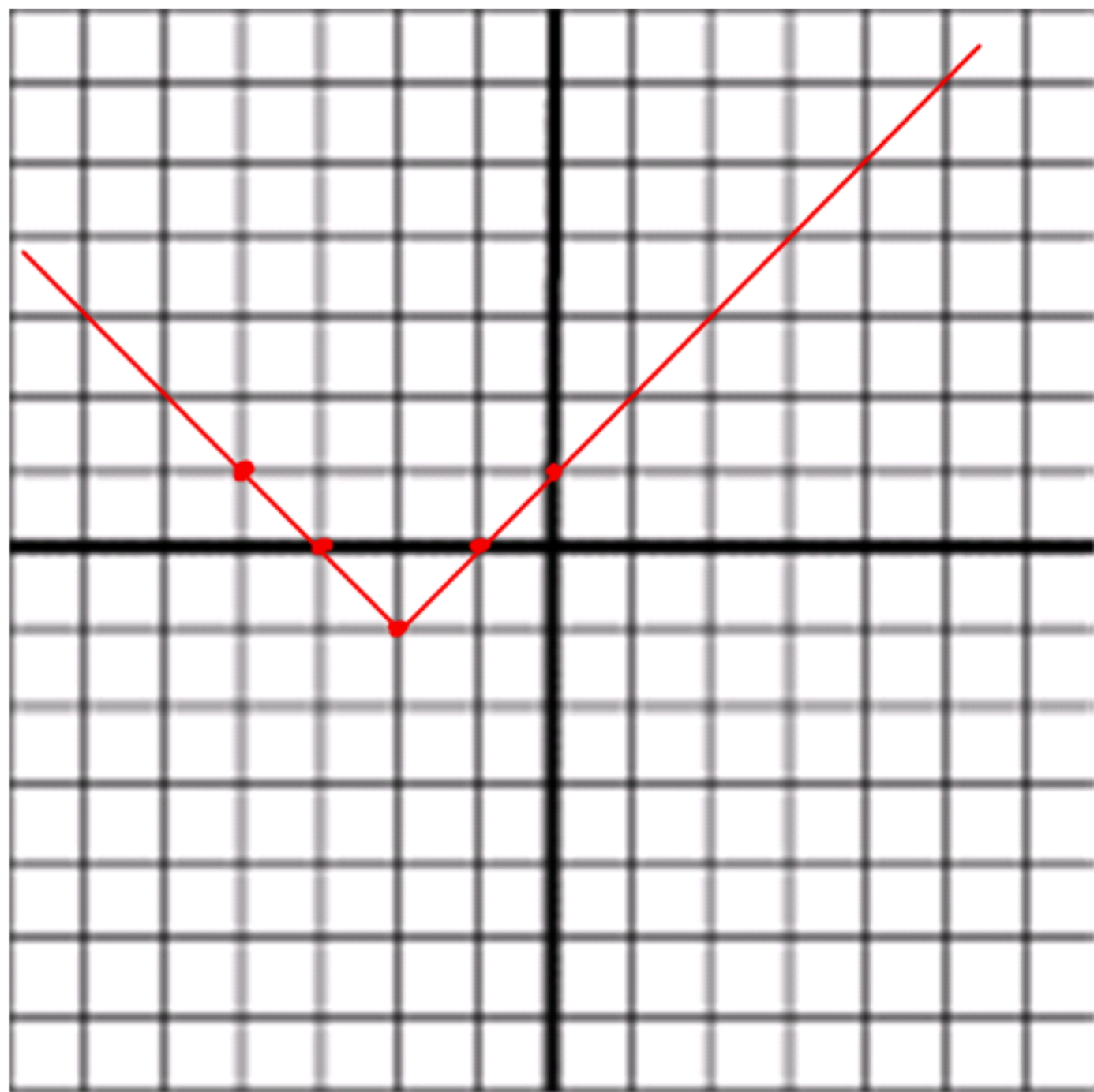
-2    -2

b) make an  $x$ - $y$  table

$x$	$y$
-4	$  -4+2   -1 = 1$
-3	$  -3+2   -1 = 0$
-2	$  -2+2   -1 = -1$
-1	$  -1+2   -1 = 0$
0	$  0+2   -1 = 1$

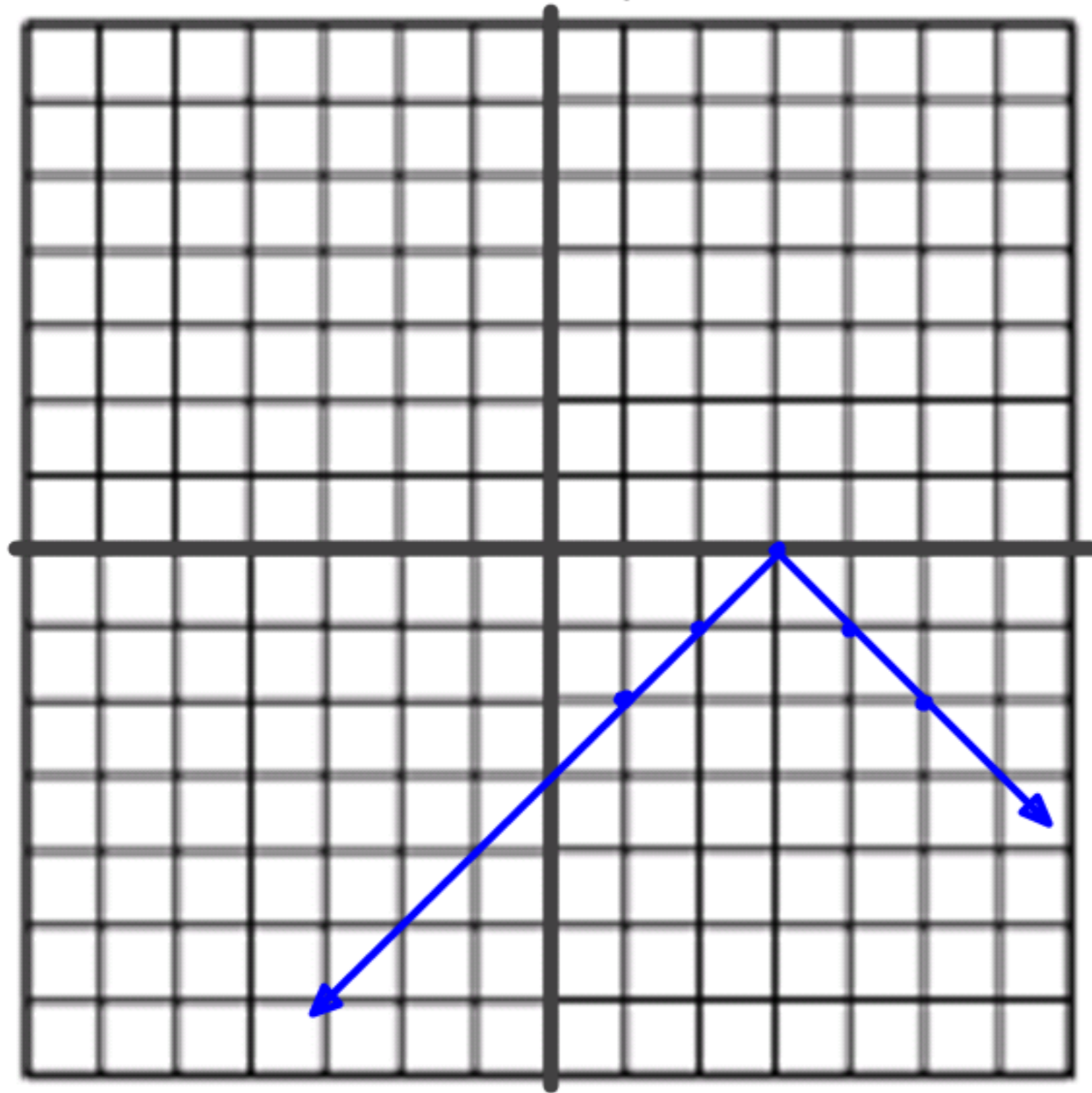
middle  $x$  →

c) Plot dots & graph



21.  $f(x) = -|x-3|$

center  $x$ :  $x-3=0$   
 $x=3$



$x$	$- x-3 $	$y$
1	$- 1-3 $	-2
2	$- 2-3 $	-1
3	$- 3-3 $	0
4	$- 4-3 $	-1
5	$- 5-3 $	-2

22.  $y < 2x - 1$

a) graph the line  
slope =  $\underline{2}$

$$y\text{-int} = -1$$

b) solid or dashed?

$<, >$  = dashed

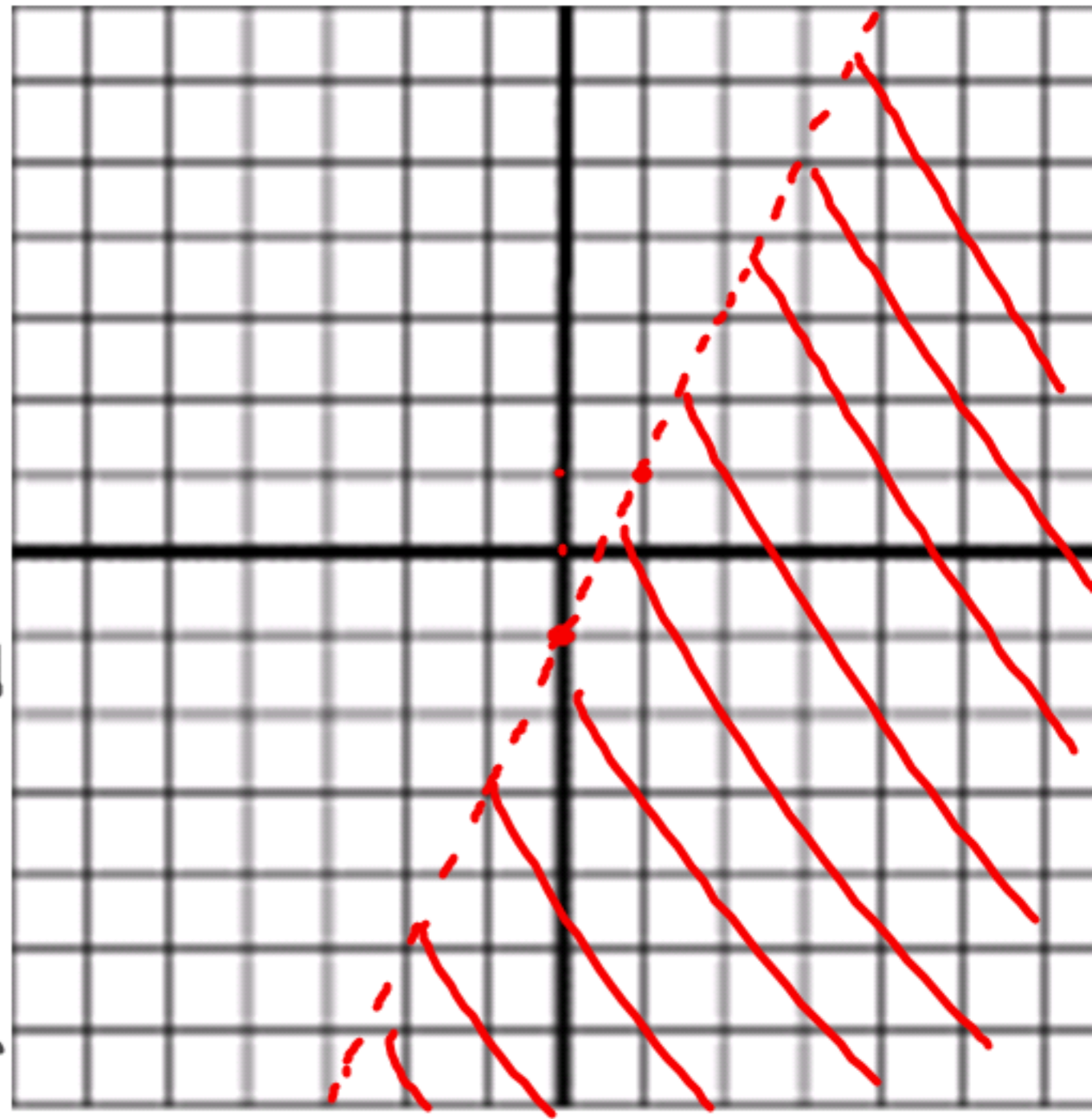
$\leq, \geq$  = solid

This one is dashed

c) Test a point (origin is easiest) to see which way to shade

$$0 < 2(0) - 1$$

$0 < -1$  False, shade the other side



23.  $x + 3y \geq 6$   
a) graph the boundary line:

$$-x + 3y = 6$$

$$3y = -\frac{1}{3}x + 2$$

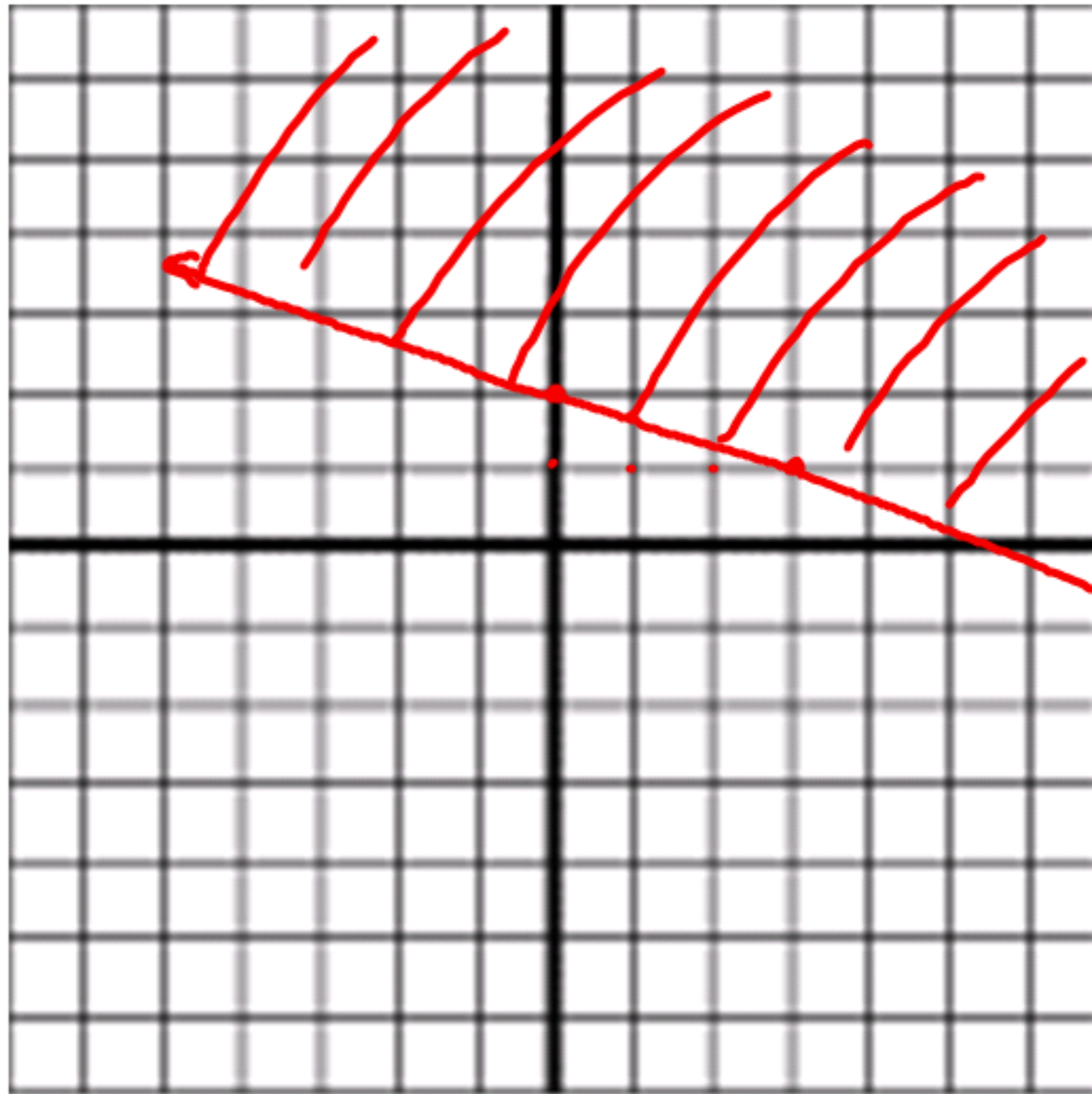
$$y = -\frac{1}{9}x + 2$$

y-int = 2

slope =  $-\frac{1}{3}$

b)  $0 + 3(0) \geq 6$

$0 \geq 6$  False



24.

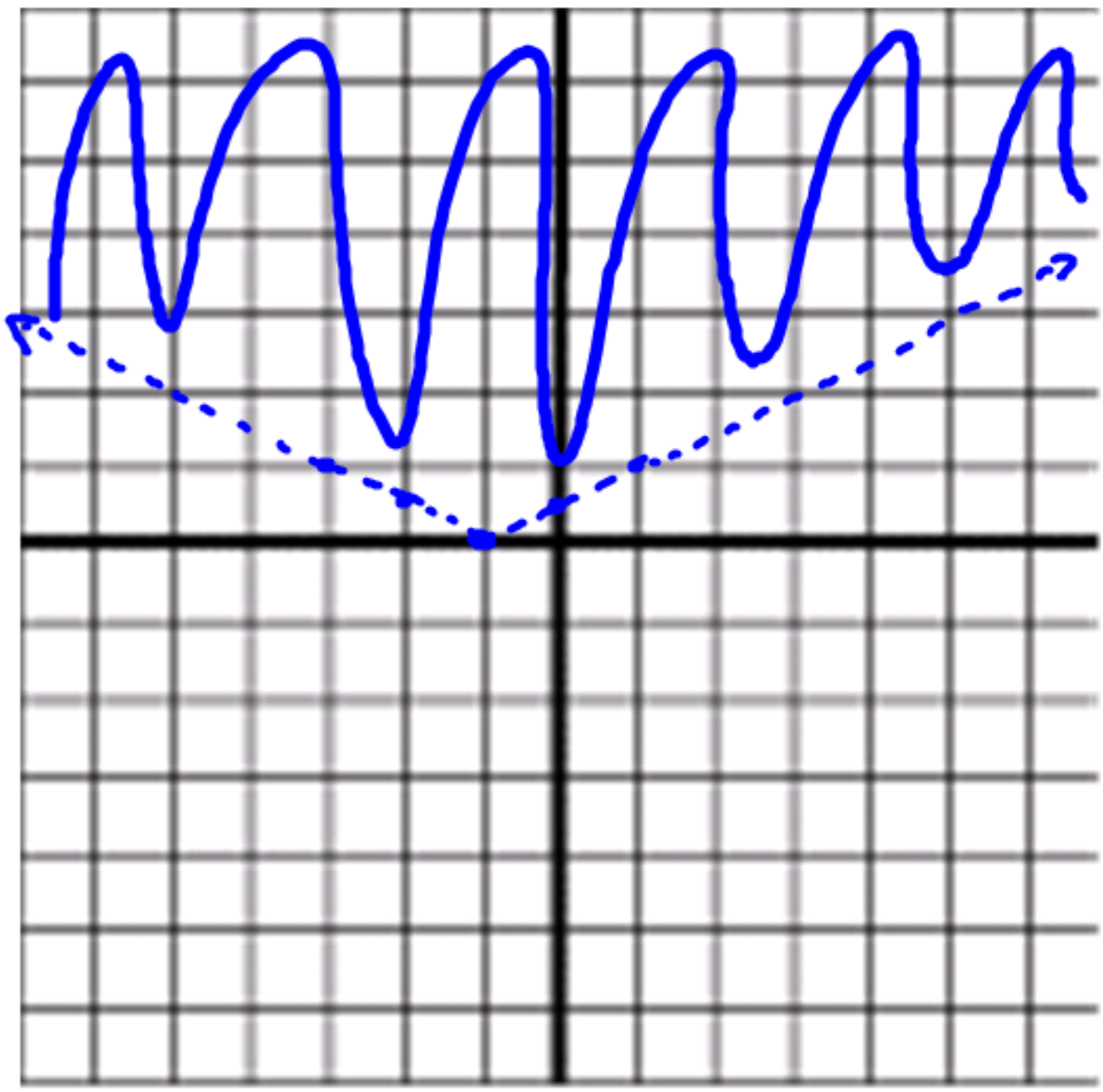
$$2y > \overset{\text{DASHED}}{|x+1|}$$

$$y > \underset{\substack{\uparrow \\ \text{shade up}}}{\frac{|x+1|}{2}}$$

x	$\frac{ x+1 }{2}$	y
-3	$\frac{ -3+1 }{2}$	-
-2	$\frac{ -2+1 }{2}$	-
-1	$\frac{ -1+1 }{2}$	0
0	$\frac{ 0+1 }{2}$	-
-	$\frac{ 1+1 }{2}$	-

get y by itself

center x:  $x+1=0$   
 $\quad \quad \quad -1 \quad -1$        $x = -1$



$$25. \quad y + |x| \leq 2$$

$$\quad \quad -|x| \quad -|x|$$

$$y \leq -|x| + 2$$

↑  
solid

Test:  $0 + |0| \leq 2$   
 $0 \leq 2$  True

Graph the boundary line  
 $x=0$  is middle  $x$

$x$	$y$
-2	$- -2  + 2 = 0$
-1	$- -1  + 2 = 1$
0	$- 0  + 2 = 2$
1	$- 1  + 2 = 1$
2	$- 2  + 2 = 0$

