

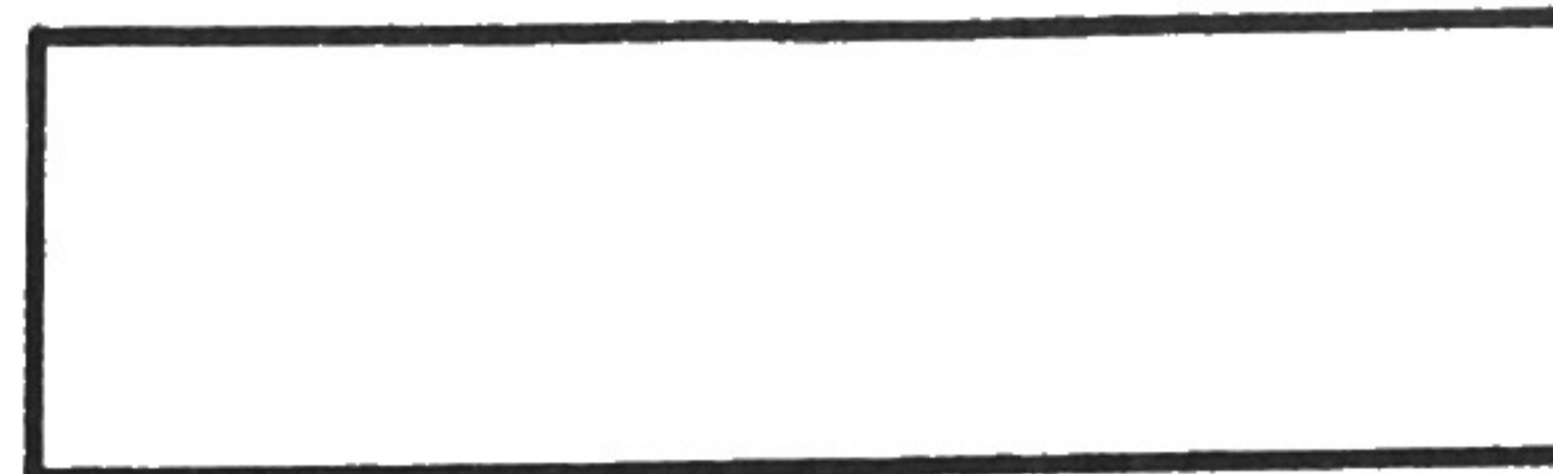
Name: key  
Serafino • Algebra 2E

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

2R

Unit 2 Quest Review

Linear & Piecewise Functions Test



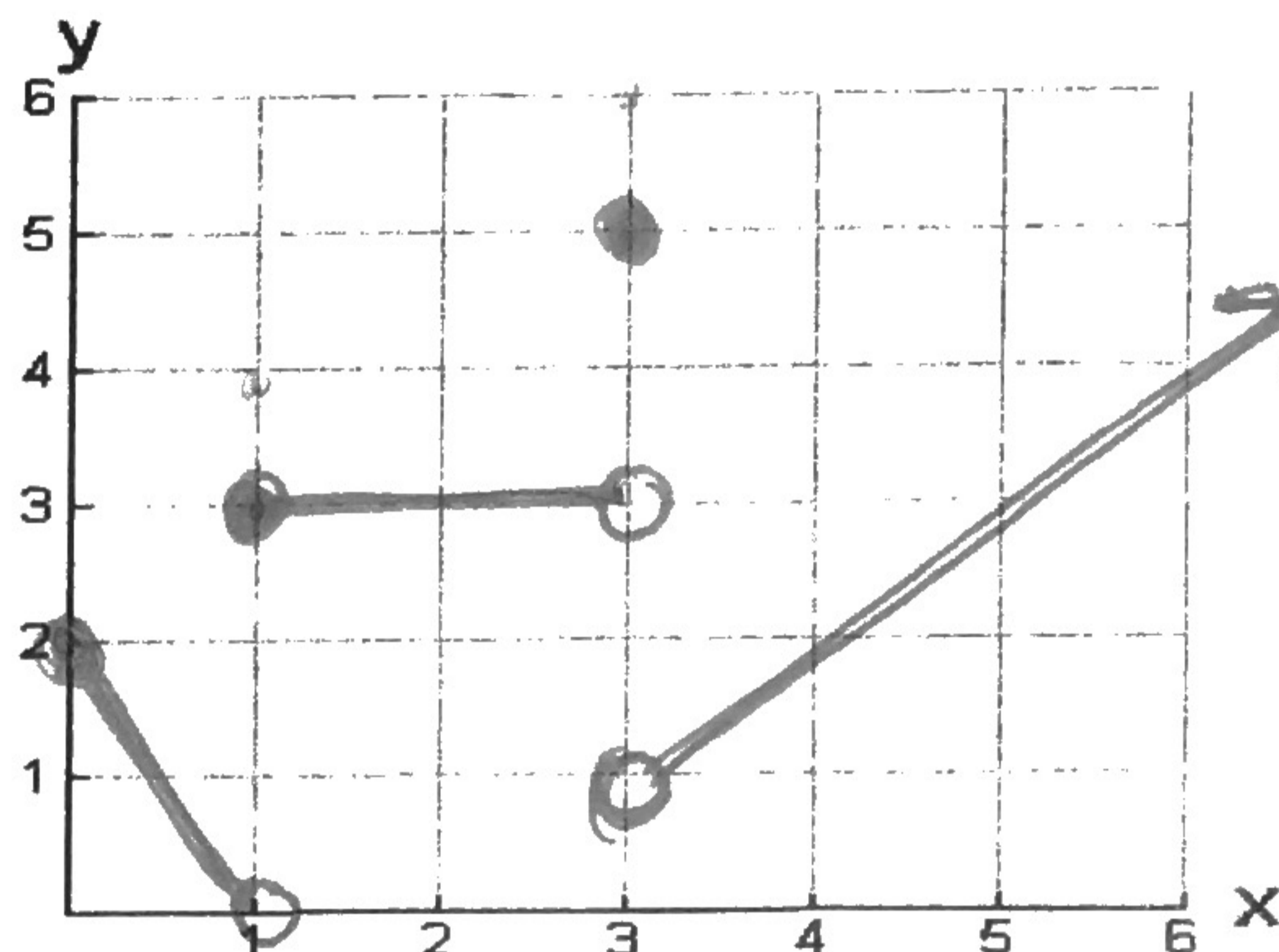
Do all work neatly for full credit.

1. Graph the piecewise function:

$$f(x) = \begin{cases} -2x + 2, & 0 \leq x < 1 \\ 3, & 1 \leq x < 3 \\ 5, & x = 3 \\ x - 2, & x > 3 \end{cases}$$

Domain:  $x \geq 0$

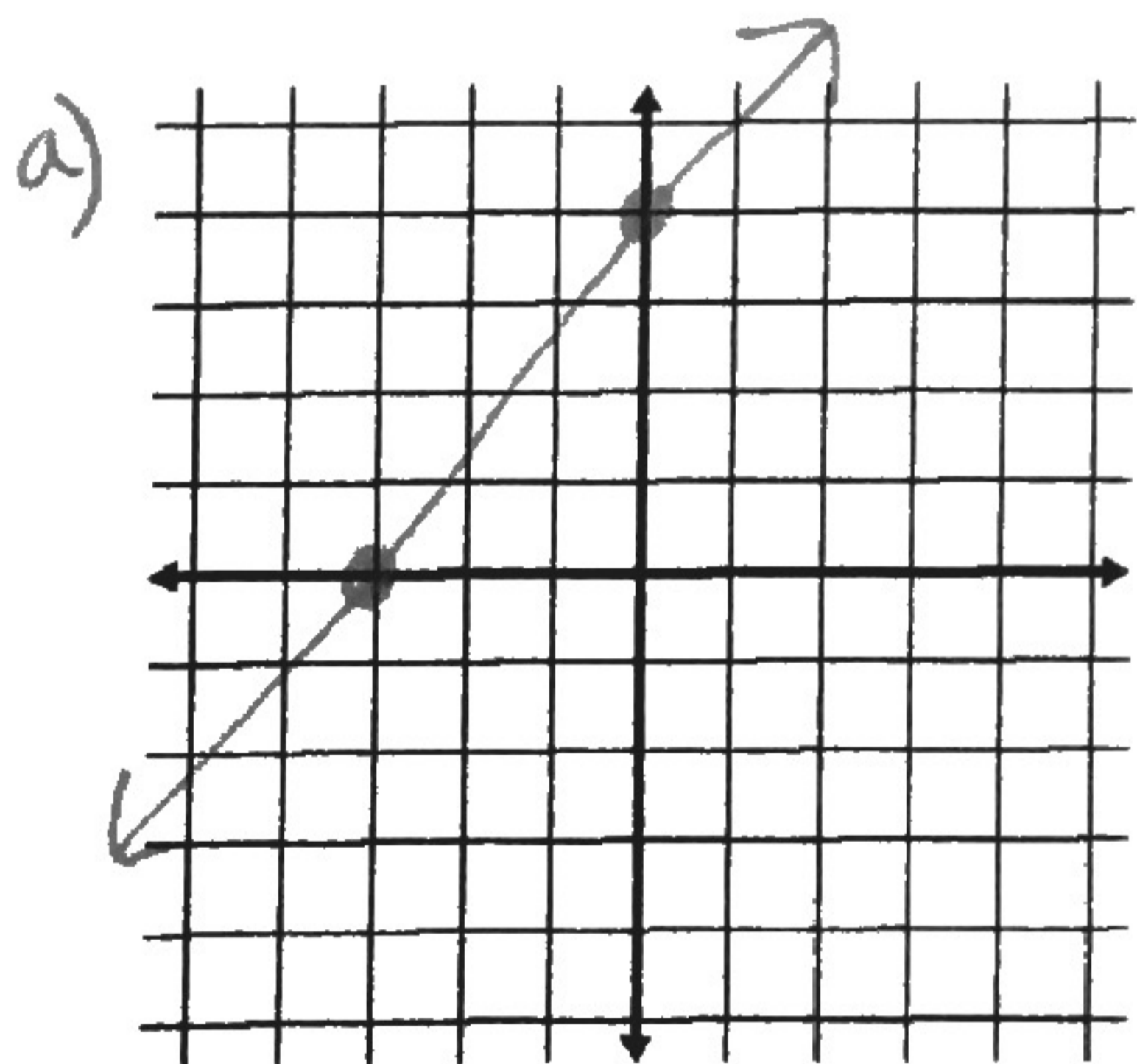
Range:  $y > 0$



Show all work for full credit. Draw a box around final answers:

*cover up / cover up*

2)  $4x - 3y = -12$



b.  $f(2) =$

$$\begin{aligned} 4(2) - 3y &= -12 \\ 8 - 3y &= -12 \\ -3y &= -20 \\ y &= \frac{20}{3} \end{aligned}$$

c. Where is  $f(x) = -4$

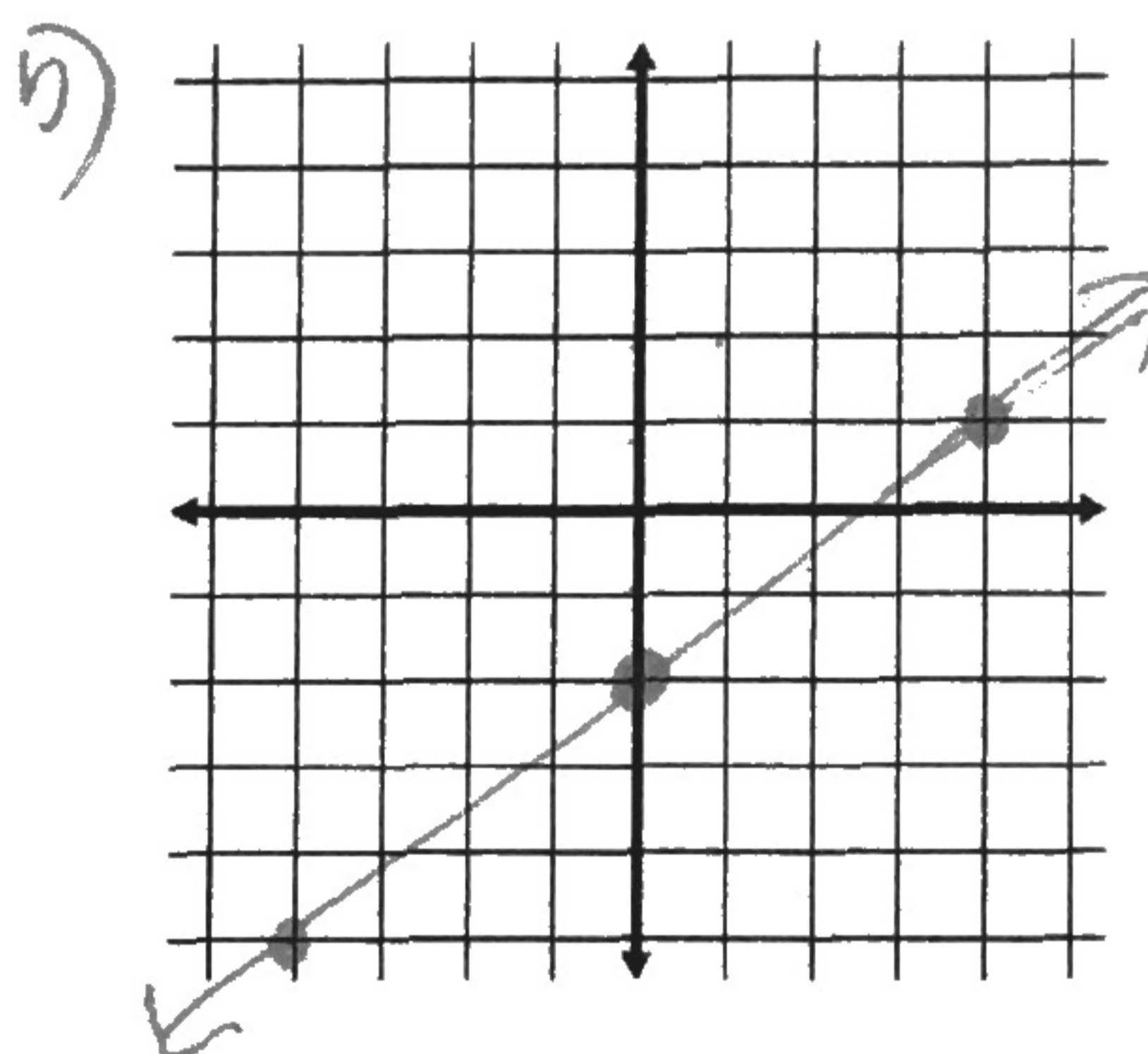
$$4x - 3(-4) = -12$$

$$4x + 12 = -12$$

$$4x = -24$$

$$x = -6$$

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



b.  $f(16) =$

$$\begin{aligned} \frac{3}{4}(16) - 2 \\ 12 - 2 \\ y = 10 \end{aligned}$$

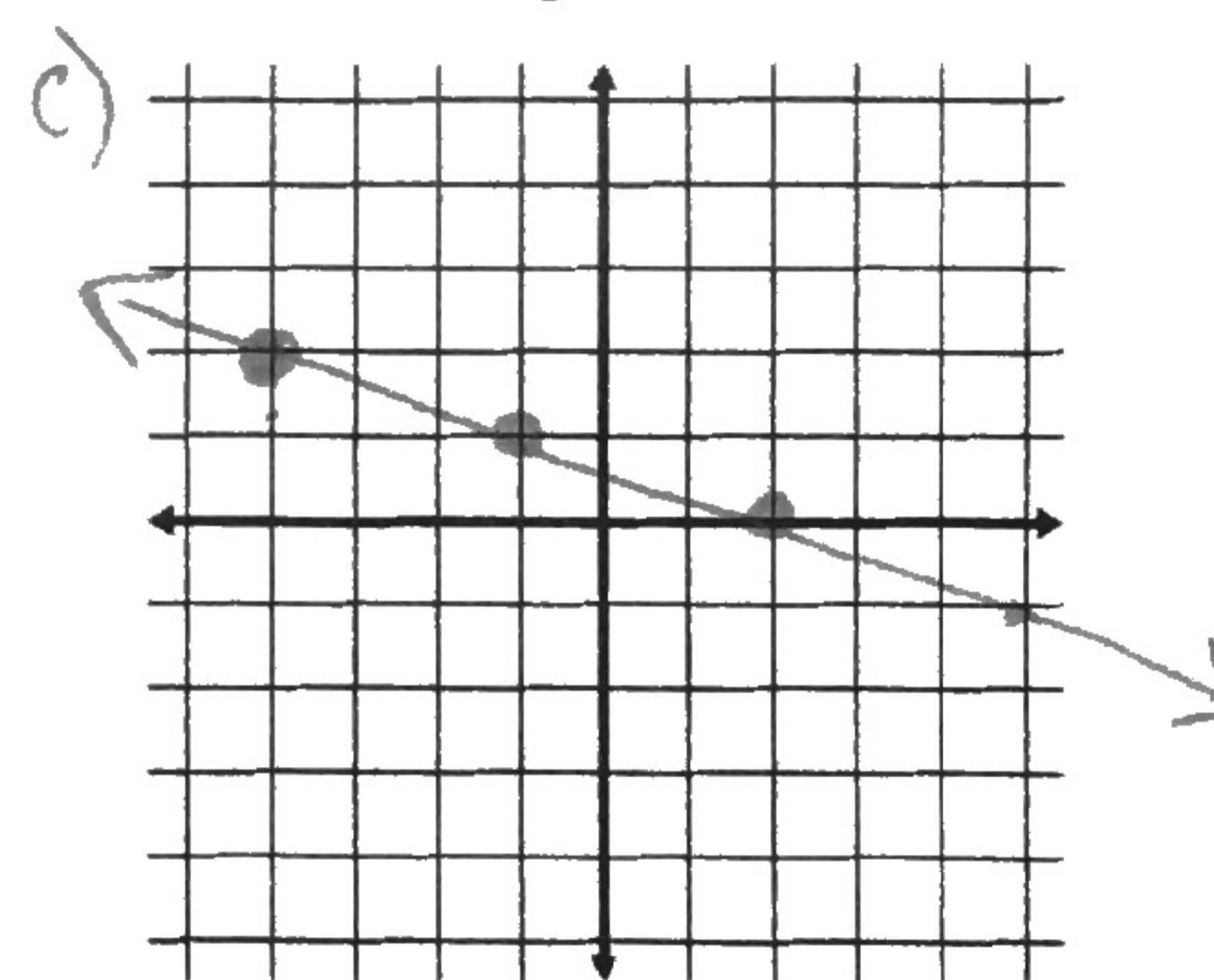
c. Where is  $f(x) = 10$

$$10 = \frac{3}{4}x - 2$$

$$12 = \frac{3}{4}x$$

$$x = 16$$

4)  $y = -\frac{1}{3}(x + 4) + 2$



b.  $f(8) =$

$$\begin{aligned} -\frac{1}{3}(8 + 4) + 2 \\ -4 + 2 \\ y = -2 \end{aligned}$$

c. Where is  $f(x) = 10$

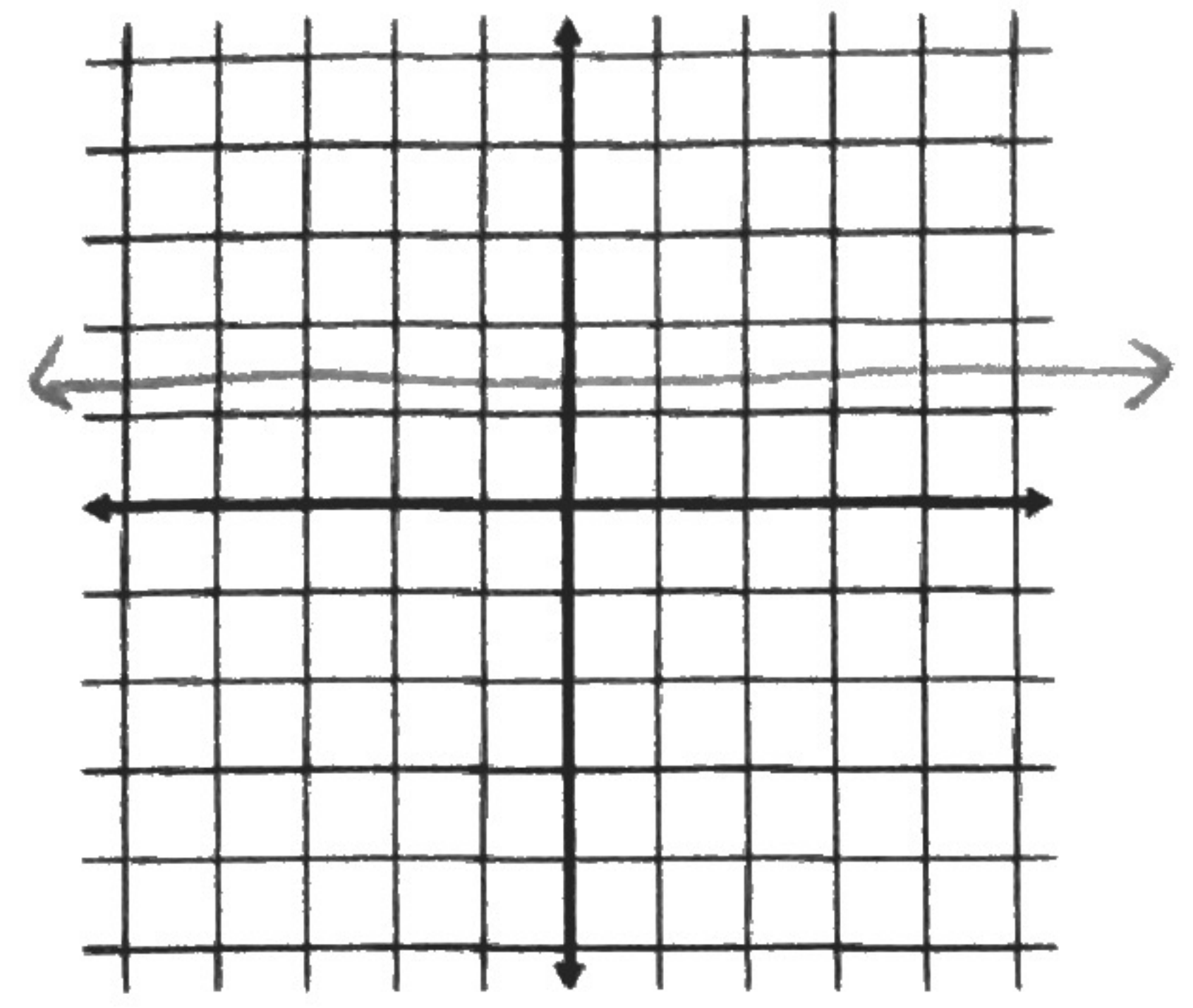
$$10 = -\frac{1}{3}(x + 4) + 2$$

$$-3 \cdot 8 = x + 4$$

$$x = -28$$

$y$  is always  $1.\bar{3}$

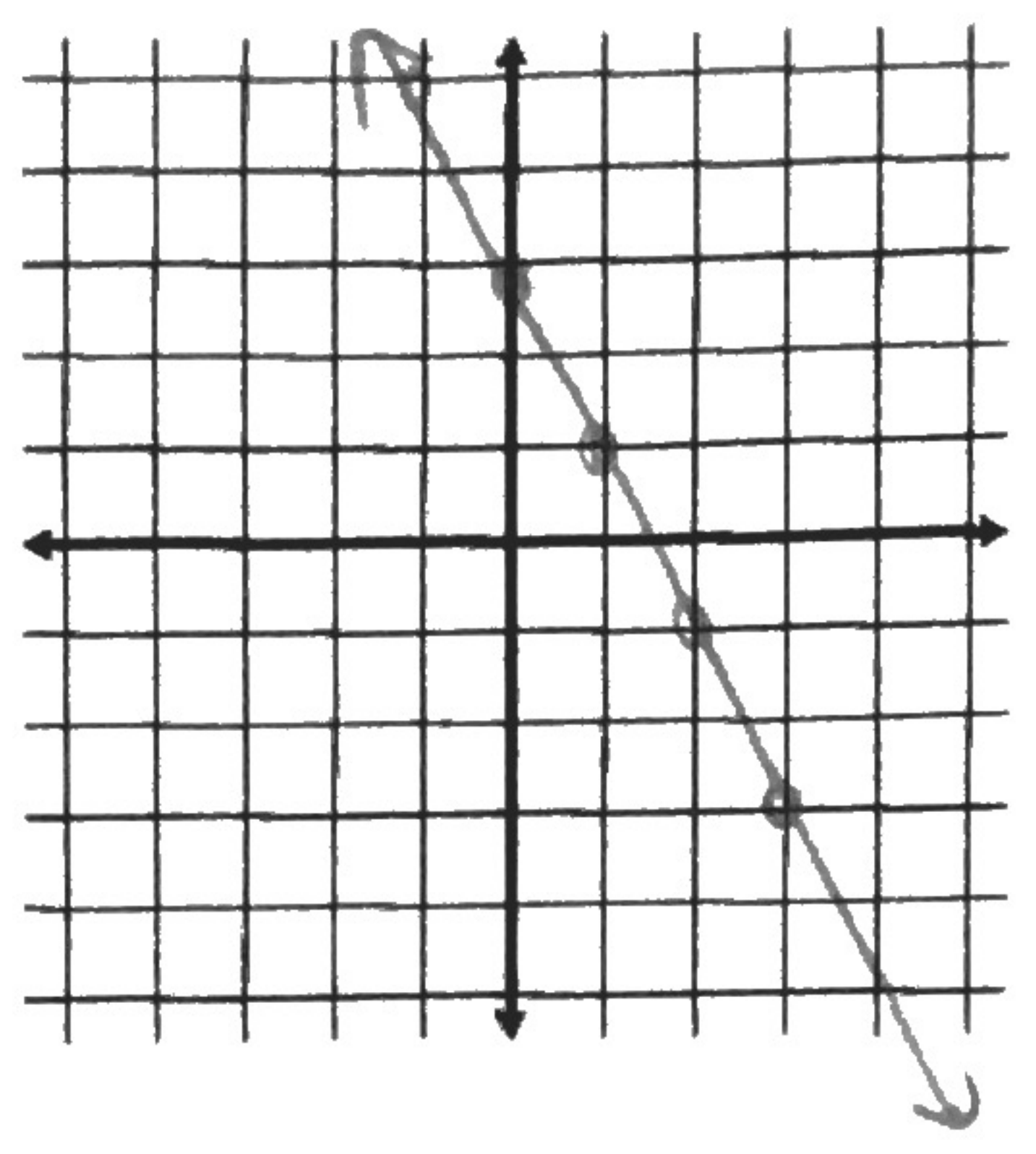
5)  $y = \frac{4}{3}$



b. Domain?  $x \in \mathbb{R}$

c. Range?  $y = \frac{4}{3}$

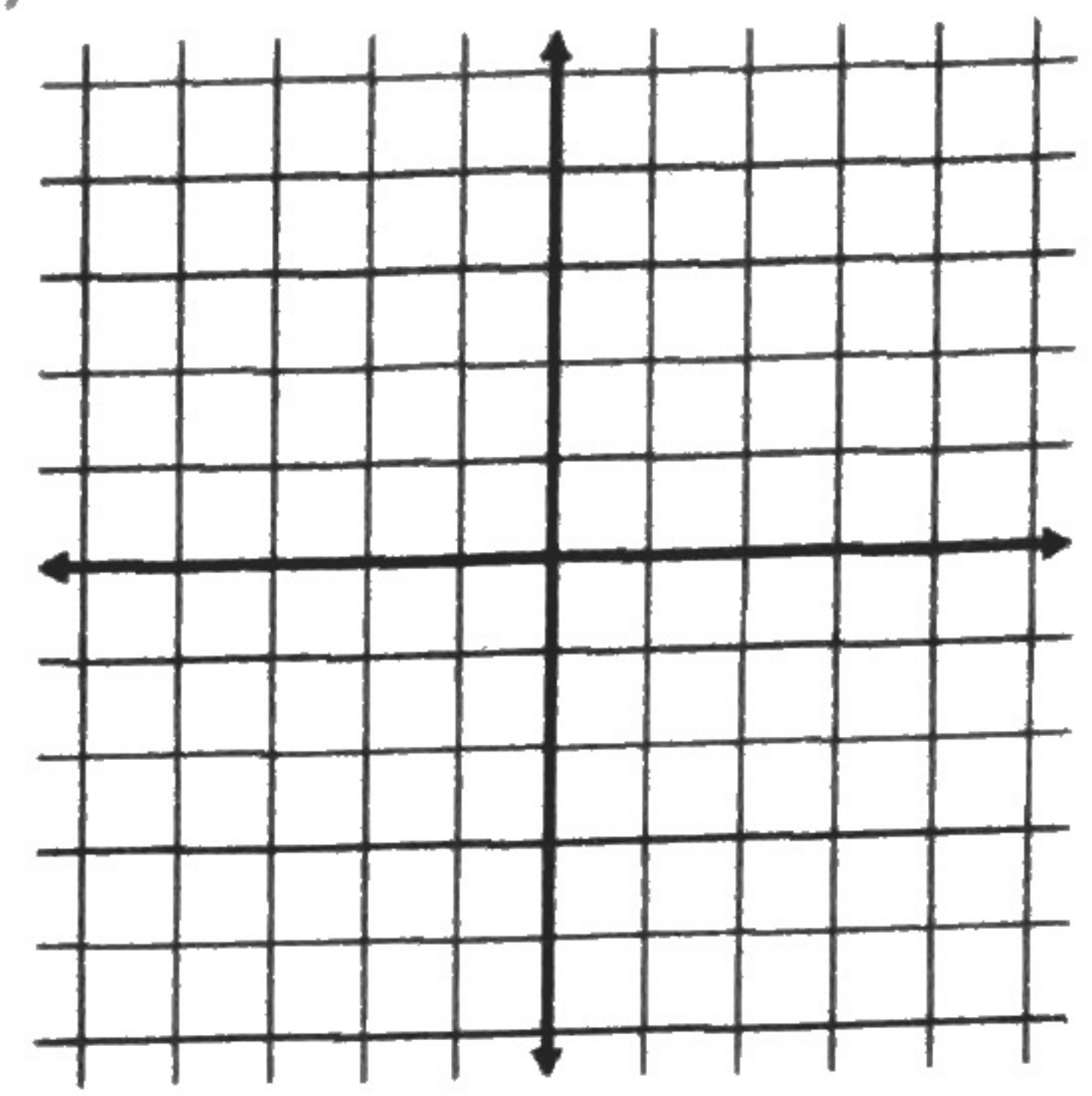
6)  $y = 3 - 2x$



b. Domain?  $x \in \mathbb{R}$

c. Range?  $y \in \mathbb{R}$

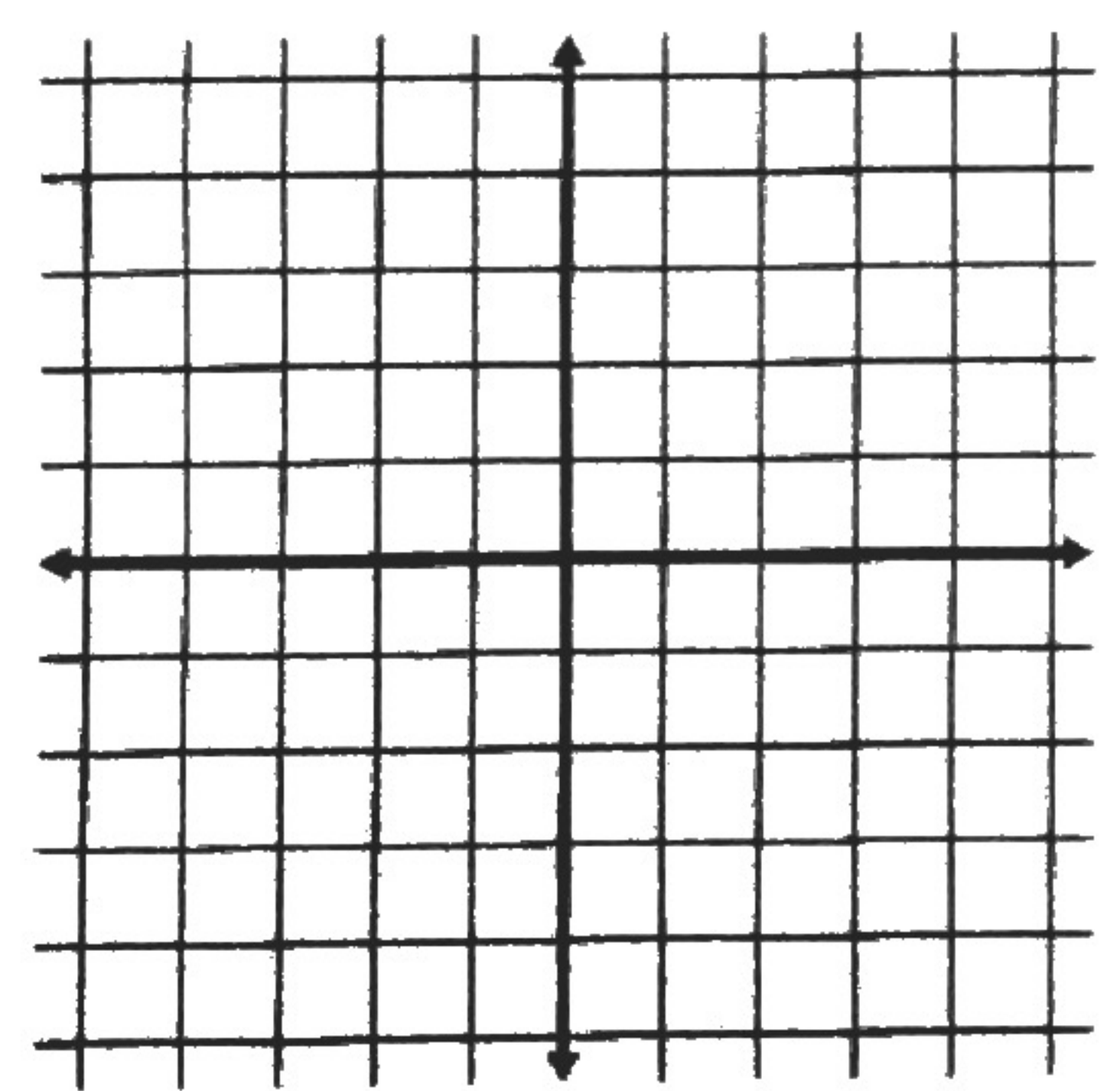
~~7)~~  $f(x) = 2|x + 3| - 1$



b. Domain?

c. Range?

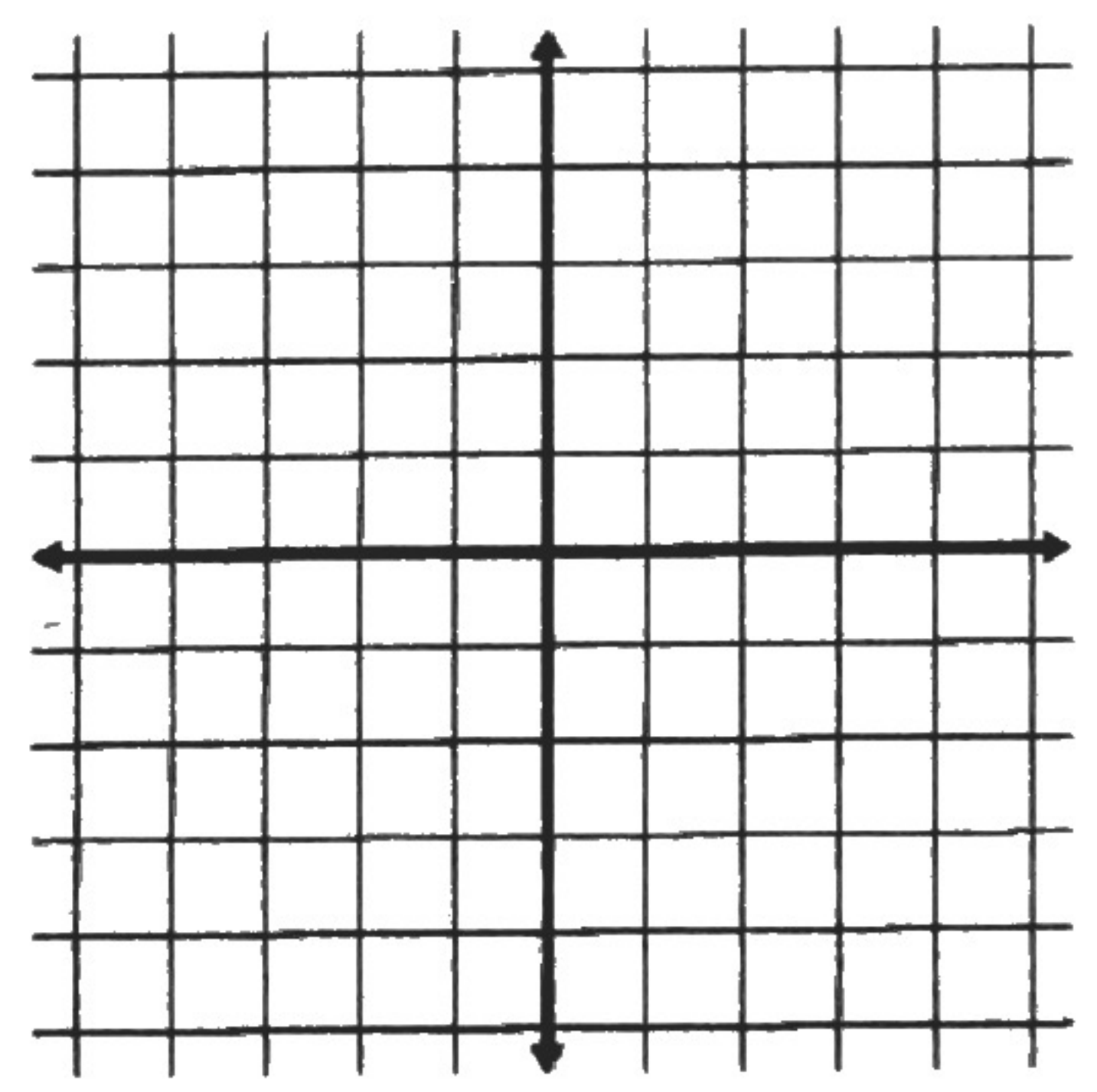
~~8)~~  $y = -3|x - 1|$



b.  $f(-5) =$

c. Axis of Symmetry?

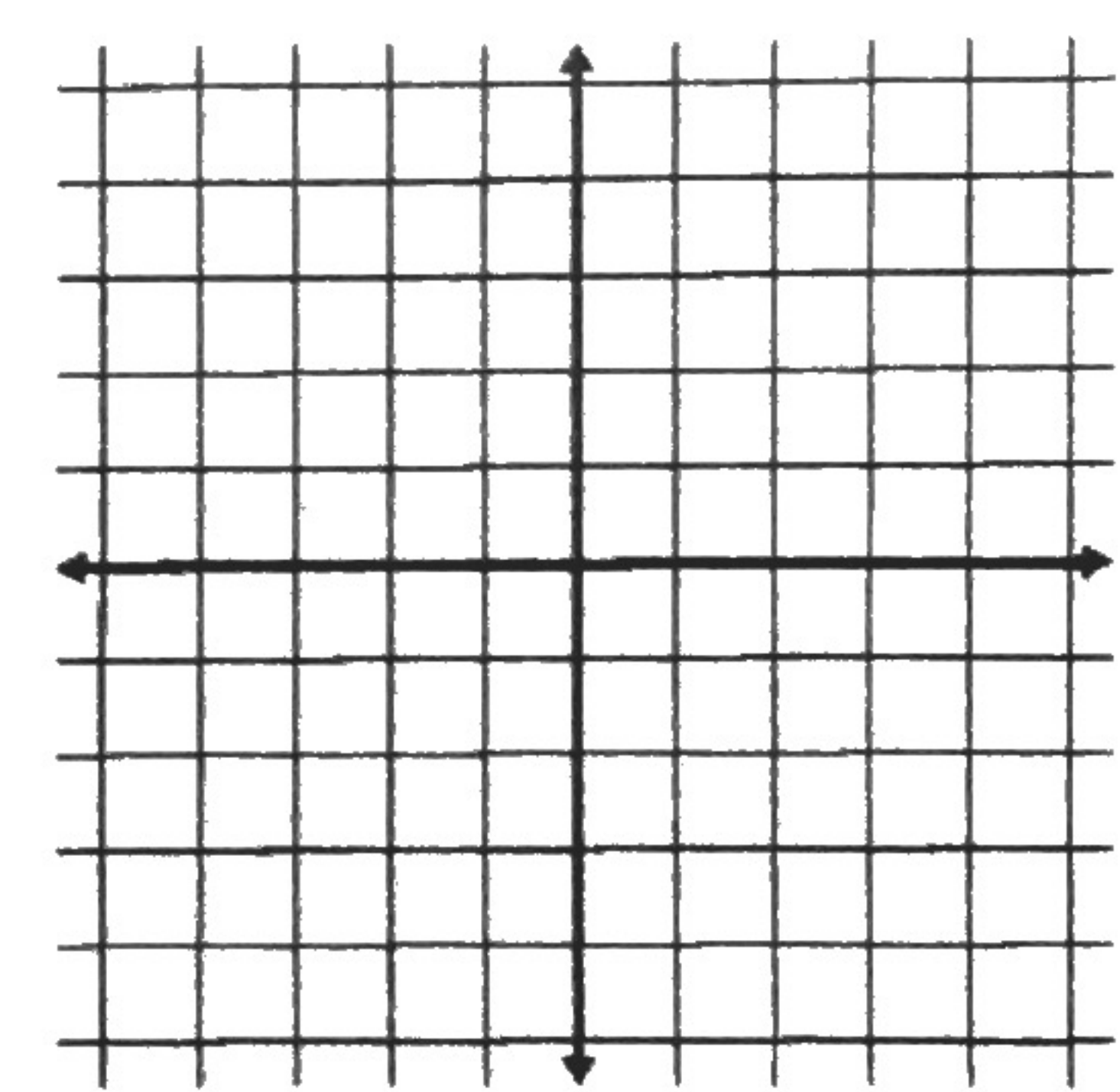
~~9)~~  $y = |x| - 4$



b.  $f(-8) =$

c. Axis of Symmetry?

~~10)~~  $y = 2|-2x - 5| - 3$



b.  $f(10) =$

c. Axis of Symmetry?

11. The equation of a linear function is  $f(x) = -3x + 5$ .

a. What is the y-intercept of  $f(x - 10)$ ?

$f(x - 10) = -3(x - 10) + 5$

$y = -3(x - 10) + 5$

$y = -3(0 - 10) + 5$

$= -3(-10) + 5$

$= 30 + 5$

$(0, 35)$

b. What is the y-intercept of  $2f(x) + 4$ ?

$2f(x) + 4 =$

$2[-3x + 5] + 4$

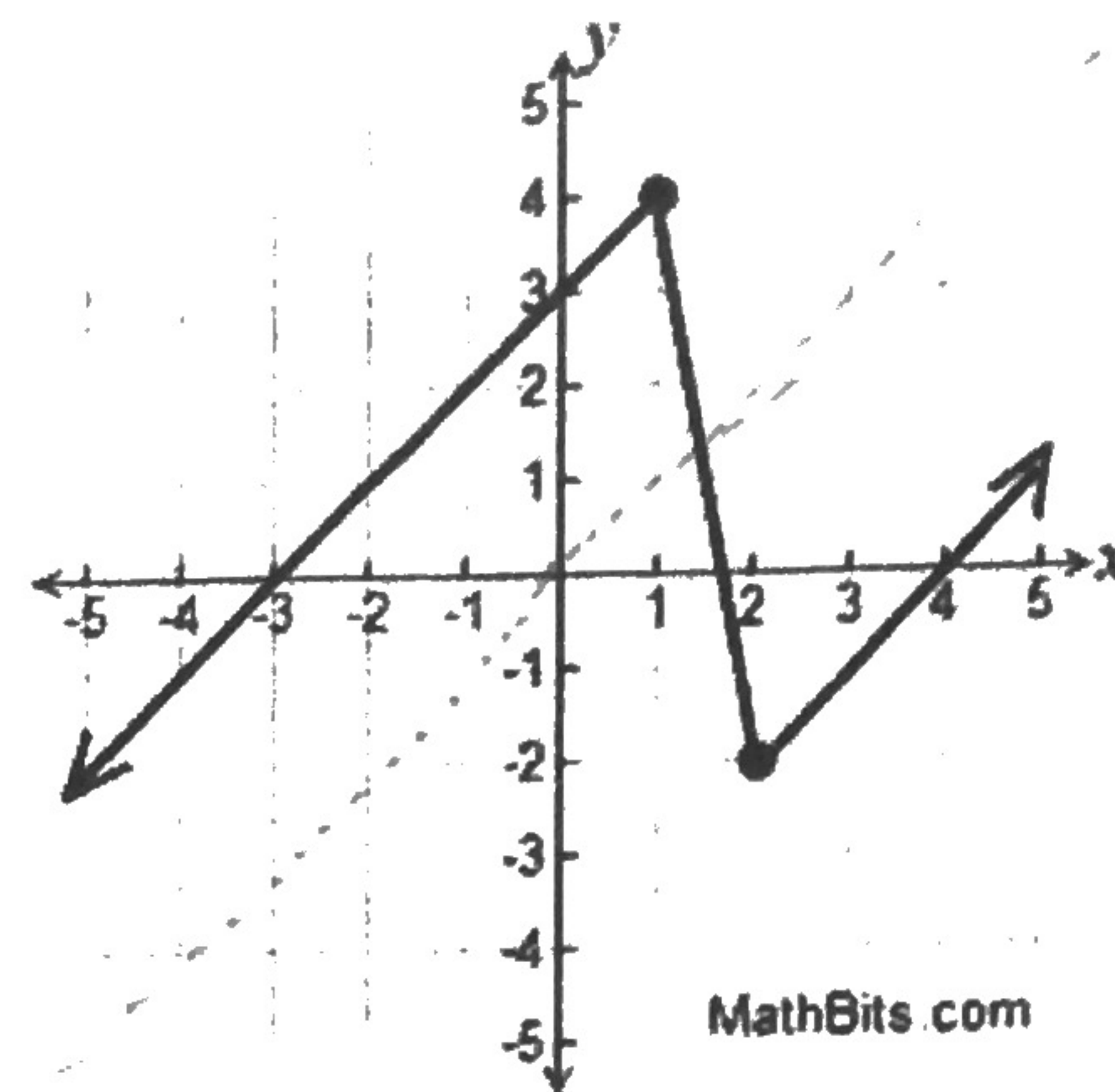
$-6x + 10 + 4 = -6x + 14$

$(0, 14)$

12. Refer to the piecewise function  $f(x)$ , to the right:

a. Domain:  $x \in \mathbb{R}$

Range:  $y \in \mathbb{R}$



b. Fill in the chart for the three pieces of  $f(x)$

|         | Domain of Piece<br>(As inequality) | Slope Intercept Form | Point-Slope Form    | Standard Form |
|---------|------------------------------------|----------------------|---------------------|---------------|
| Piece 1 | $x \leq 1$                         | $y = x + 3$          | $y = (x + 2) + 1$   | $x - y = -3$  |
| Piece 2 | $1 < x < 2$                        | $y = -6x + 10$       | $y = -6(x - 1) + 4$ | $6x + y = 10$ |
| Piece 3 | $x \geq 2$                         | $y = x - 4$          | $y = 1(x - 2) - 2$  | $x - y = 4$   |

Use the graph and equations to analyze the function:

c.  $f(-2)$

$$y = x + 3$$

$$-2 + 3 = 1$$

d.  $f(2.5) =$

$$x - 4$$

$$2.5 - 4 = -1.5$$

e.  $f(30) =$

$$30 - 4 = 24$$

f. x-intercepts: 3 of them

$$\begin{matrix} (-3, 0) \\ (4, 0) \\ (5/3, 0) \end{matrix}$$

$$0 = -6x + 10$$

$$-10 = -6x$$

$$\frac{-10}{-6} = \frac{-6x}{-6}$$

$$x = 5/3$$

HOW MANY TIMES!!!! Once

g. Where does  $f(x)$  intersect  $y = x$ ?

$$x = -6x + 10$$

$$7x = 10$$

$$x = \frac{10}{7}$$

h. Where is  $f(x) < -5$

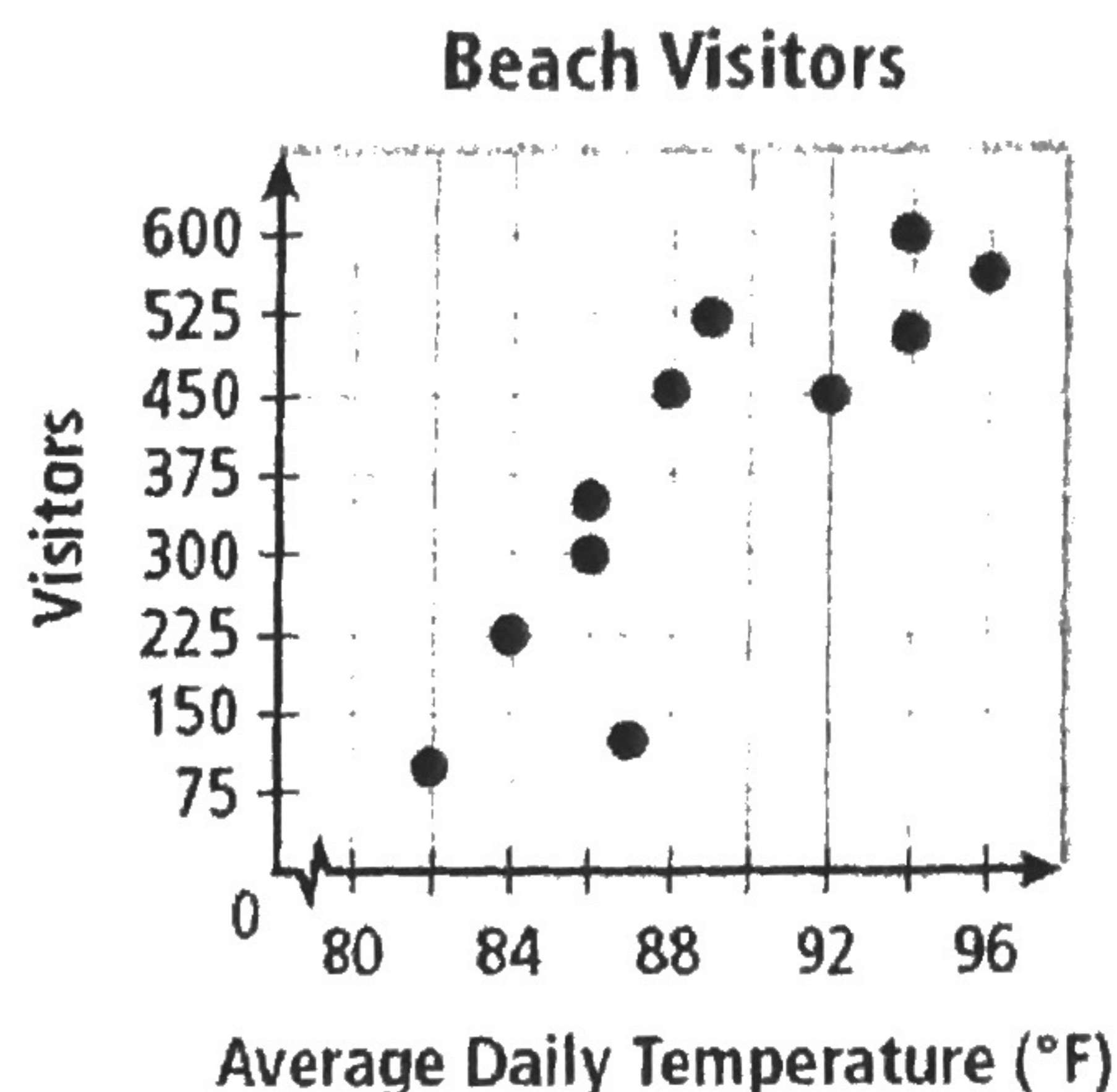
Only in 1st piece

$$x + 3 < -5$$

$$x < -8$$

18. A lifeguard took notice of the temperature and counted the number of people on his beach on 11 different days.

(82, 100), (84, 225), (86, 300),  
 (86, 350), (87, 130), (88, 450), (89, 525),  
 (92, 450), (94, 510), (94, 600), (96, 562)



- a. Use your calculator to calculate the Linear Regression model:  
 (If your calculator malfunctions, use the line of best fit provided below)

$$y = 32.8487x - 2538.5492$$

- b. What percent of the data ( $r^2$ ) is accurately captured by the linear regression model?

$$r = .85645 \quad r^2 = .7335 \quad \boxed{73.35\%}$$

Show what you are doing on your calculator:

- c. Interpolate using your model: How many beach visitors go to the beach on a 90° day?

$$y = 32.8487(90) - 2538.5492 = \boxed{\approx 418 \text{ visitors}}$$

- d. How many beach visitors would there be on a 100° day?

$$f(100) \approx \boxed{746 \text{ visitors}}$$

- e. What temperature would produce only 1 beach visitor?

$$1 = 32.8487x - 2538.5492$$

$$+ 2538 \quad \dots \quad + 25 \quad \dots$$

$$\boxed{77.3^\circ \text{F}}$$

