

1. Determine if each equation is linear or nonlinear.

- a.  $-x = 3y + 10$  *linear*
- b.  $x^2 + 2y = 0$  *nonlinear*
- c.  $y = 1$  *linear*
- d.  $x = y^3$  *nonlinear*
- e.  $x = 25$  *linear*
- f.  $|x| = y$  *nonlinear*
- g.  $x - y = 9$  *linear*

2. Find 3 ordered pairs that satisfy each equation.

a.  $x - y = 6$

x	y
6	0
4	-2
5	-1

b.  $3x - 2y = 6$

x	y
$-\frac{2}{3}$	-4
$\frac{10}{3}$	2
$-\frac{4}{3}$	-5

c.  $y = \frac{1}{3}x$

x	y
0	0
6	2
-3	-1

d.  $y = -5x + 2$

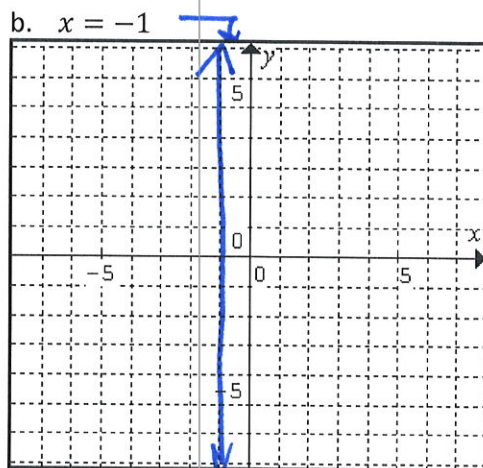
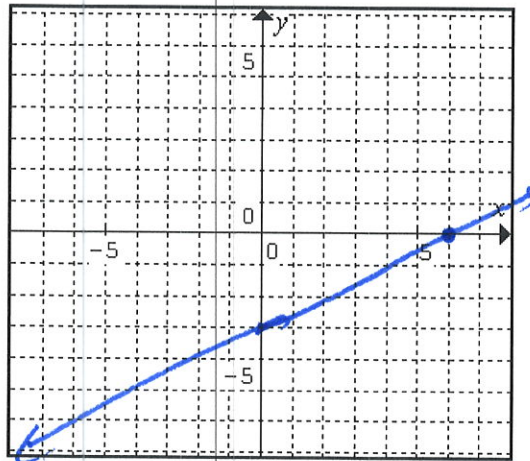
x	y
0	2
1	-3
2	-8


e.  $y = -4x + 3$

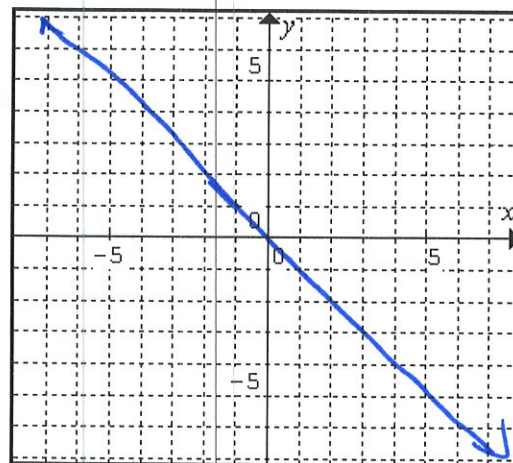
x	y
0	3
1	-1
-1	7


3. Graph each equation.

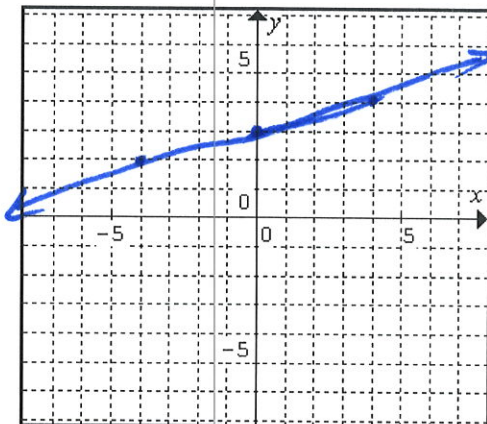
a.  $x - 2y = 6$  



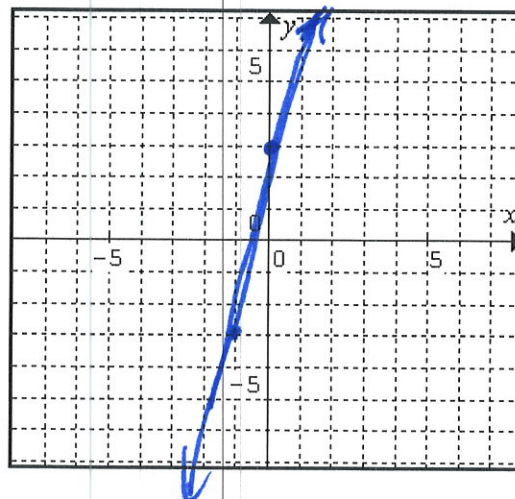
c.  $y = -x$  



d.  $y = \frac{1}{4}x + 3$  



e.  $y = 6x + 3$  

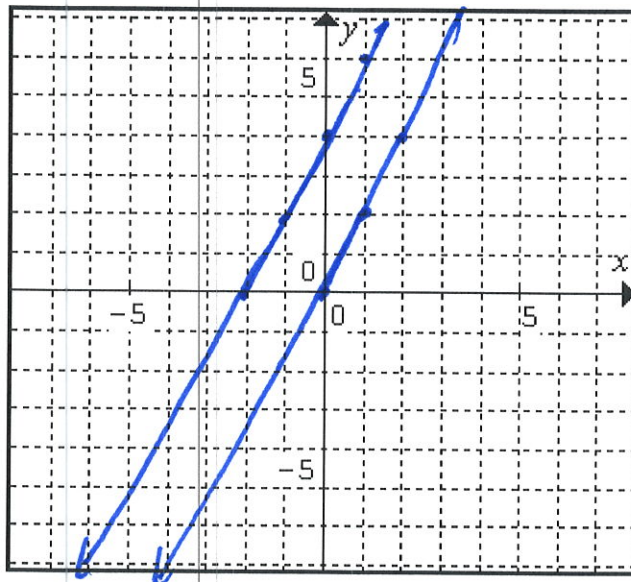


4. Graph each pair of equations on the same graph. In what ways are they similar or different?

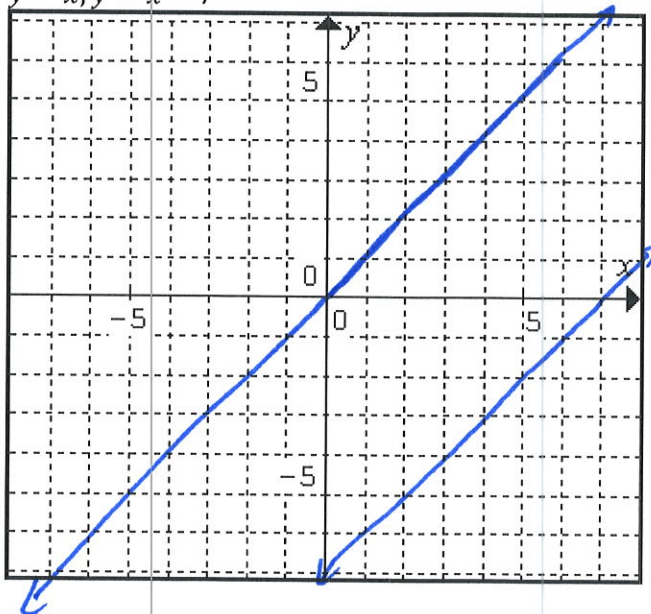
a.  $y = 2x, y = 2x + 4$

the # in front of  $x$  is the same; the intercepts are different.

The lines appear to be parallel



b.  $y = x, y = x - 7$



Similar comment to above

5. Translate each statement into an equation.
- a. The y-value is five more than the x-value.

$$y = x + 5$$

- b. Twice the x-value added to three times the y-value is six.

$$2x + 3y = 6$$



# Linear Equations in 2D (1)

2. a.

$$\begin{array}{r} x - y = 6 \\ 6 - y = 6 \\ \hline -6 \quad -6 \\ \hline -y = 0 \\ y = 0 \end{array}$$

$$\begin{array}{r} 4 - y = 6 \\ -4 \quad -4 \\ \hline -y = 2 \\ y = -2 \end{array}$$

$$\begin{array}{r} 5 - y = 6 \\ -5 \quad -5 \\ \hline -y = 1 \\ y = -1 \end{array}$$

b.  $3x - 2y = 6$

$$\begin{array}{r} 3x - 2(-4) = 6 \\ 3x + 8 = 6 \\ \hline -8 \quad -8 \\ \hline 3x = -2 \\ \frac{3x}{3} = \frac{-2}{3} \end{array} \quad x = -\frac{2}{3}$$

$$\begin{array}{r} 3x - 2(2) = 6 \\ 3x - 4 = 6 \\ \hline +4 \quad +4 \\ \hline 3x = 10 \\ \frac{3x}{3} = \frac{10}{3} \\ x = \frac{10}{3} \end{array}$$

$$\begin{array}{r} 3x - 2(-5) = 6 \\ 3x + 10 = 6 \\ \hline -10 \quad -10 \\ \hline 3x = -4 \\ \frac{3x}{3} = \frac{-4}{3} \\ x = -\frac{4}{3} \end{array}$$

c.  $y = \frac{1}{3}x$

$$\begin{array}{l} y = \frac{1}{3}(0) \\ y = 0 \end{array}$$

$$\begin{array}{l} (2 = \frac{1}{3}x) \cdot 3 \\ 6 = x \end{array}$$

$$\begin{array}{l} y = \frac{1}{3}(-3) = -1 \\ y = -1 \end{array}$$

d.  $y = -5x + 2$

$$\begin{array}{r} 2 = -5x + 2 \\ \hline -2 \quad -2 \\ \hline 0 = -5x \\ \hline -5 \quad -5 \\ \hline x = 0 \end{array}$$

$$\begin{array}{l} y = -5(1) + 2 \\ y = -5 + 2 \\ y = -3 \end{array}$$

$$\begin{array}{r} -8 = -5x + 2 \\ \hline -2 \quad -2 \\ \hline -10 = -5x \\ \hline -5 \quad -5 \\ \hline 2 = x \end{array}$$

e. answers will vary. choose one coordinate and find the other

$$\begin{array}{l} x = 0 \\ y = -4x + 3 \\ y = -4(0) + 3 \\ y = 3 \end{array}$$

$$\begin{array}{l} x = 1 \\ y = -4(1) + 3 \\ y = -4 + 3 \\ y = -1 \end{array}$$

$$\begin{array}{l} x = -1 \\ y = -4(-1) + 3 \\ y = 4 + 3 = 7 \end{array}$$

3. a.  $x - 2y = 6$

$$\begin{array}{r} x = 0 \\ -2y = 6 \\ \hline -2 \quad -2 \\ \hline y = -3 \\ (0, -3) \end{array}$$

$$\begin{array}{r} y = 0 \\ x - 0 = 6 \\ x = 6 \\ (6, 0) \end{array}$$



$$3d. y = \frac{1}{4}x + 3$$

$$x=0 \quad (0,3)$$

$$y=3$$

$$x=4$$

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

$$1 + 3 = 4$$

$$(4,4)$$

$$e. y = 6x + 3$$

$$x=0 \quad y = 0 + 3 = 3$$

$$(0,3)$$

$$x = -2$$

$$y = 6(-2) + 3$$

$$y = -12 + 3 = -9$$

$$(-2, -9)$$

$$x = -1$$

$$y = 6(-1) + 3$$

$$-6 + 3 = -3$$

$$(-1, -3)$$