

HW: Worksheet/8-27

**Warm up:**

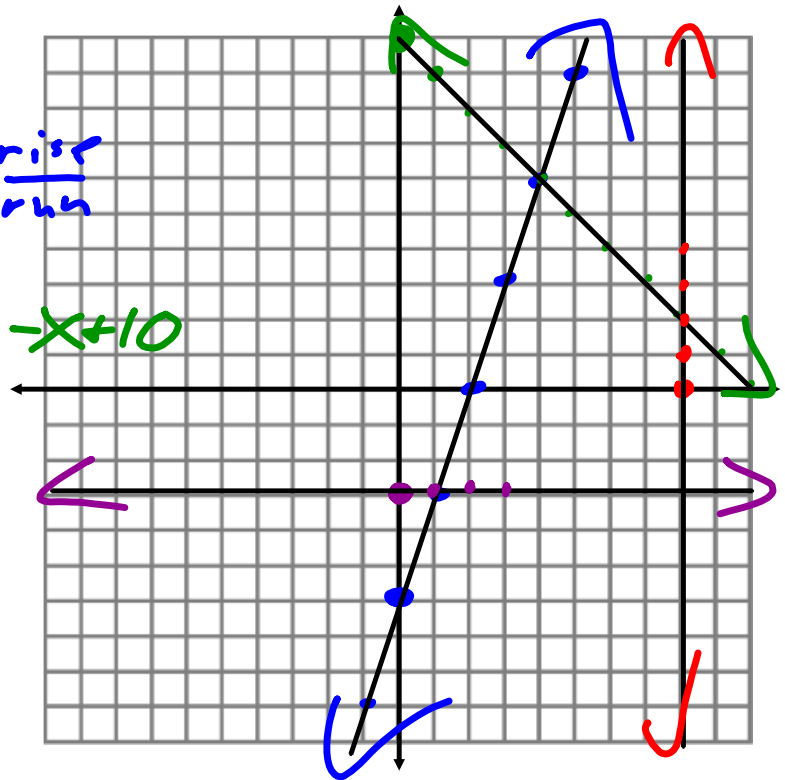
Graph.

1)  $y = 3x - 6$        $\frac{3}{1}$  rise  
run

2)  $x + y = 10$   
 ~~$x$~~     ~~$y$~~     $y = -x + 10$   
 $y = 10 - x$

3)  $x = 8$

4)  $y = -3$



## HW Solutions

$$\textcircled{3} \quad (-3, 4) \quad (3, -4)$$

$$\frac{\Delta y}{\Delta x} = \frac{4 - (-4)}{-3 - 3} = \frac{8}{-6} = -\frac{4}{3}$$

$$y = -\frac{4}{3}x + b$$

$$-4 = -\frac{4}{3}(3) + b$$

$$-4 = -4 + b$$

$$\begin{array}{r} +4 \quad +4 \\ \hline 0 = b \end{array}$$

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

$$\textcircled{4} (3, -1) (6, 7)$$

$$\frac{7 - (-1)}{6 - 3} = \frac{8}{3}$$

$$y = \frac{8}{3}x + b$$

$$7 = \frac{8}{3}(6) + b$$

$$\begin{array}{r} 7 = 16 + b \\ -16 \quad -16 \\ \hline -9 = b \end{array}$$

$$y = \frac{8}{3}x - 9$$

$$\textcircled{5} \quad (-3, -1) \quad (1, -4)$$

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

$$y = -\frac{3}{4}x + b$$

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

$$-4 = -\frac{3}{4} + b$$

$$+\frac{3}{4}$$

$$+\frac{3}{4}$$

$$-\frac{13}{4} = b$$

$$-4 + \frac{3}{4}$$

$$-\frac{16}{4} + \frac{3}{4} = -\frac{13}{4}$$

$$y = -\frac{3}{4}x - \frac{13}{4}$$

$$Q \quad (0, -1) \quad (1, 4)$$

$$\frac{\Delta y}{\Delta x} = \frac{4 - (-1)}{1 - 0} = \frac{5}{1} = 5$$

$$y = 5x + b$$

$$-1 = 5(0) + b$$

$$-1 = b$$

$$y = 5x - 1$$

③

X	Y
2	9
4	12
6	15
8	18

$$\frac{\Delta y}{\Delta x} = \frac{9-12}{2-4} = \frac{-3}{-2} = \frac{3}{2}$$

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

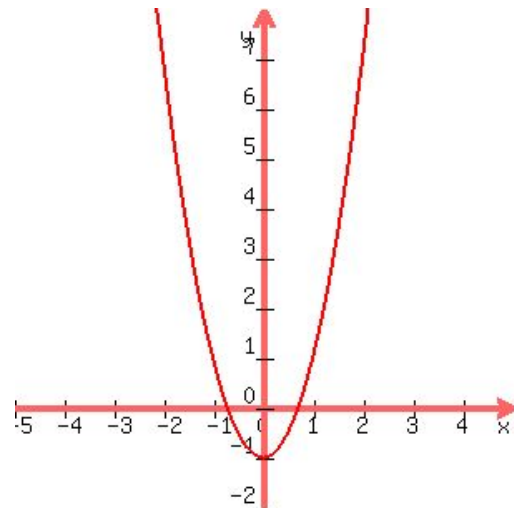
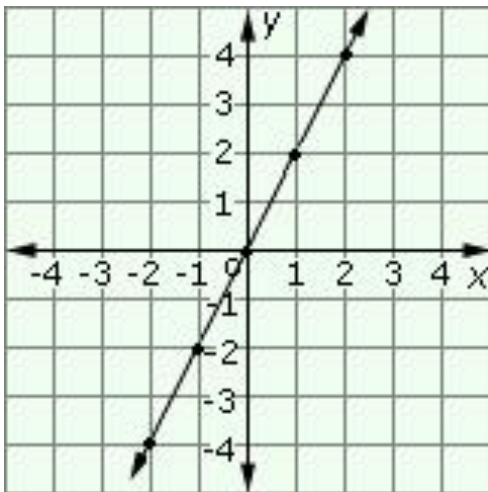
$$9 = \frac{3}{2}(2) + b$$

$$9 = 3 + b$$

$$\begin{array}{r} -3 \quad -3 \\ \hline 6 = b \end{array}$$

$$y = \frac{3}{2}x + 6$$

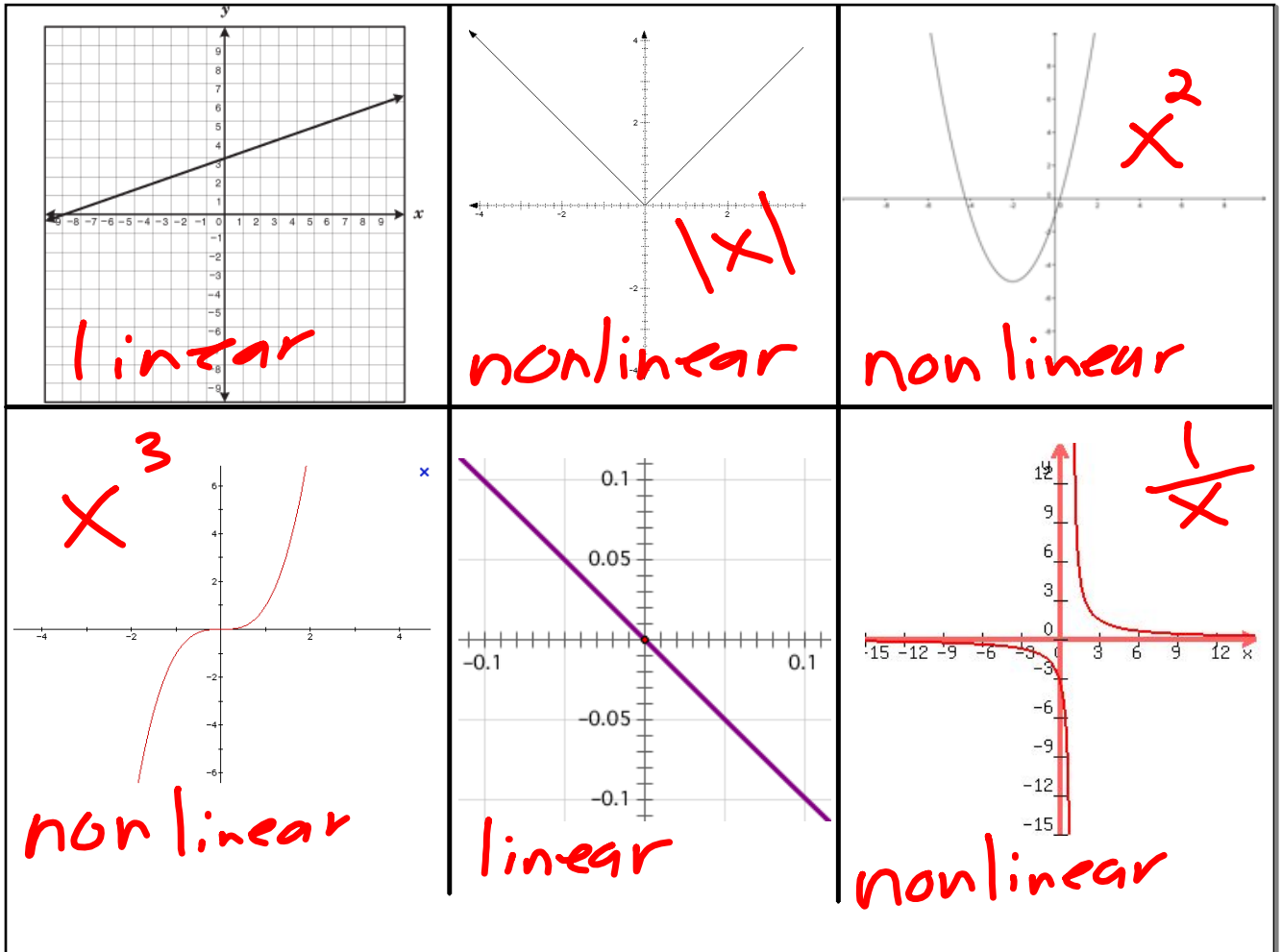
# Linear vs. Nonlinear



linear functions - functions in which the graph of the solutions forms a line

nonlinear functions - functions that do not have constant rates of change; therefore, their graphs are not straight lines



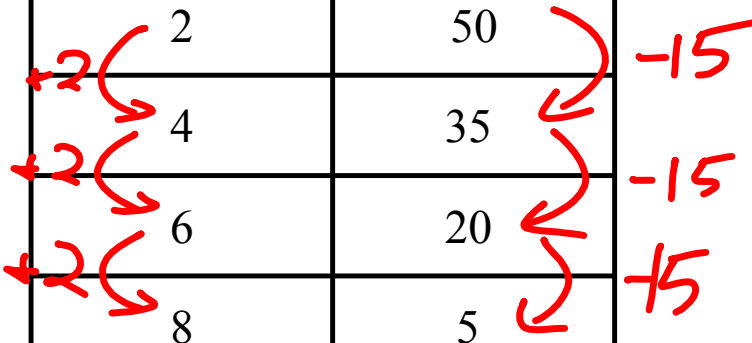


x	y
1	5
2	8
3	11
4	14



linear

x	y
2	50
4	35
6	20
8	5



linear

$$y = x^2$$

x	y
1	1
4	16
7	49
10	100

nonlinear

+3  
+3  
+3

+15  
+33  
+51

Linear functions can always be written in the form:

$$y = mx + b$$

exception:  $x = k$

$$x = 5$$

$$y = 3x + 1 \quad \text{linear}$$

$$y = x^2 - 6 \quad \text{non linear}$$

$$y = x^3 \quad \text{non linear}$$

$$y = |x| \quad \text{non linear}$$

$$3x + y = 9$$

$$\begin{array}{r} -3x \quad -3x \\ \hline y = -3x + 9 \end{array}$$

linear

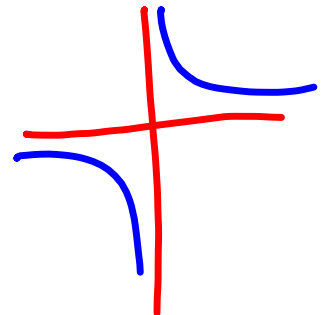
$$y = \frac{x}{4}$$

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

linear

$$y = \frac{2}{x}$$

nonlinear



Identify the functions as linear or nonlinear.

1)  $2x + 5y = -6$  *linear*

2)  $5x = 9y$  *linear* 12)

3)  $y = 5 + x^2$  *nonlinear* +2

4)  $y = x^3 - 7$  *nonlinear* +2

5)  $y = x$  *linear* +2

6)  $x = 8$  *linear* 13)

7)  $y = -10$  *linear*

8)  $y = |x| + 2$  *nonlinear* +4

9)  $y = |4x - 6|$  *nonlinear* +4

10)  $y = 5/x$  *nonlinear* +4

11)  $y = x/3 + 12$  *linear*

x	y
1	1
3	7
5	13
7	19

*linear*

x	y
8	-2
12	0
16	4
20	10

*nonlinear*