

**Essential Question:** How do we graph linear functions written in standard form?

**Do Now:** Solve for  $y$  in each equation.

$$\begin{array}{r} a) \ y - 5 = x \\ \quad +5 \quad +5 \end{array}$$

$$y = x + 5$$

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

$$y = x - 2$$

$$c) \ \begin{array}{r} 3x + 6y = 12 \\ -3x \quad -3x \end{array}$$

$$\frac{6y}{6} = \frac{-3x + 12}{6}$$

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

### Graphing Linear Functions in Standard Form



Recall that a Linear Function is a function whose graph is a line. A Linear Function is easy to graph when it is in the form  $y = mx + b$ .

$$\begin{array}{c} \text{co-efficient} \qquad \qquad \qquad \text{constant} \\ \swarrow \qquad \qquad \qquad \searrow \\ y = mx + b \\ \uparrow \qquad \qquad \qquad \uparrow \\ \text{output} \qquad \qquad \qquad \text{input} \end{array}$$

The **standard form** of a linear function is  $Ax + By = C$ , where  $A$ ,  $B$  and  $C$  are real numbers.

How do we rewrite these functions in  $y = mx + b$  form? isolate  $y$  (use inverse operations and reverse PEMDAS)

$$1. \ \begin{array}{r} 30x - 10y = 50 \\ -30x \quad -30x \end{array}$$

$$\frac{-10y}{-10} = \frac{-30x + 50}{-10}$$

$$y = +3x - 5$$

$$2. \ \begin{array}{r} 2x - y = 1 \\ -2x \quad -2x \end{array}$$

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

$$y = 2x - 1$$

$$3. \ \begin{array}{r} -4x + 3y = 9 \\ +4x \quad +4x \end{array}$$

$$\frac{3y}{3} = \frac{4x + 9}{3}$$

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

$$4. \ \begin{array}{r} x - 5y = -15 \\ -x \quad -x \end{array}$$

$$\frac{-5y}{-5} = \frac{-x - 15}{-5}$$

$$y = \frac{1}{5}x + 3$$

## Let's graph!

5. Draw the graph of  $4x + 2y = -6$ .

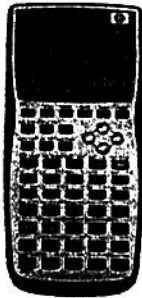
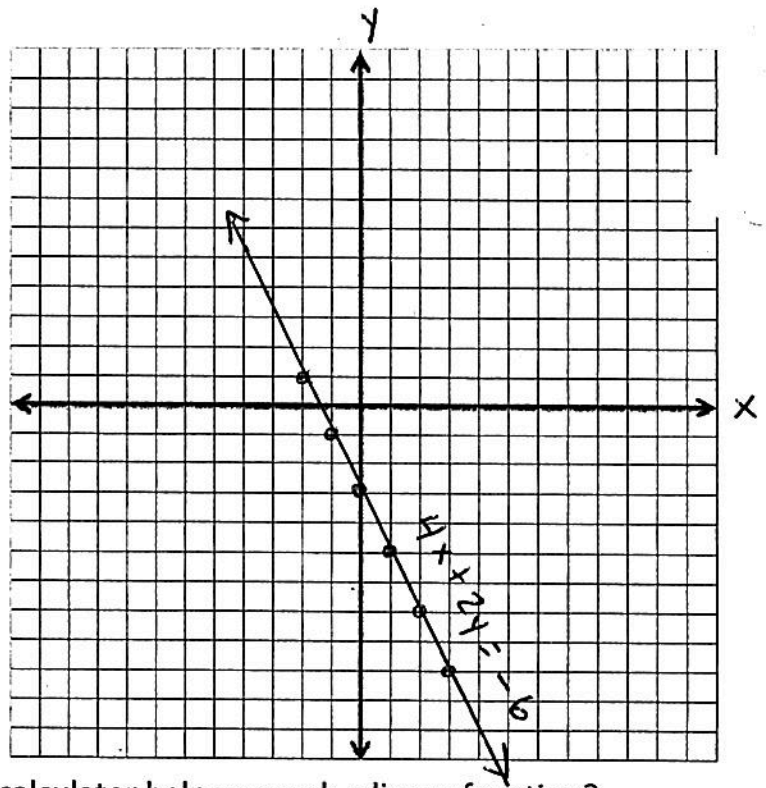
x	y
-2	1
-1	-1
0	-3
1	-5
2	-7
3	-9

$$4x + 2y = -6$$

$$-4x \quad -4x$$

$$2y = \frac{-4x - 6}{2}$$

$$y = -2x - 3$$



How can our graphing calculator help us graph a linear function?



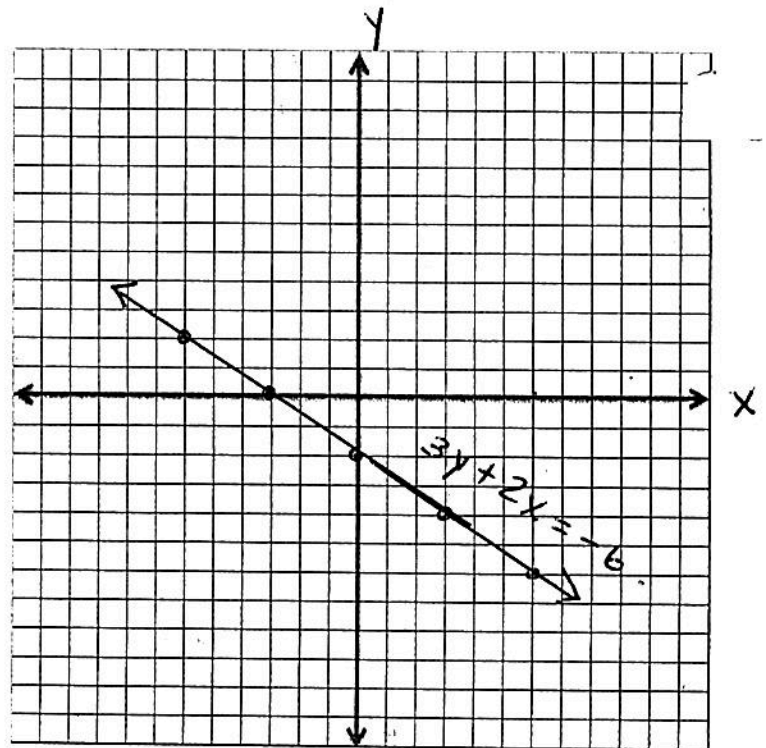
6.  $3y + 2x = -6$

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

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

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

x	y
-6	2
-3	0
0	-2
3	-4
6	-6



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

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

The **TAKEAWAY**

Creating a table of values for a linear function is easiest when the equation is written in  $y = mx + b$  form.