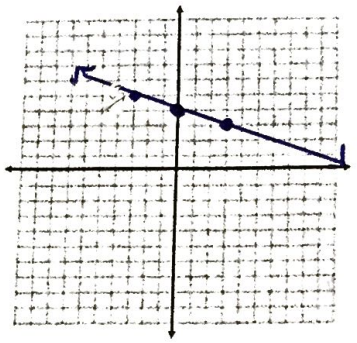
Notes – Graphing From Each of the 3 Linear Equation Forms

1. **Slope-Intercept Form:** $y = mx + b$

   b=begin – start at the y-intercept. Put it on the graph first.

   m=move – move from point to point according the slope ($\frac{rise}{run} = \frac{\Delta y}{\Delta x}$)

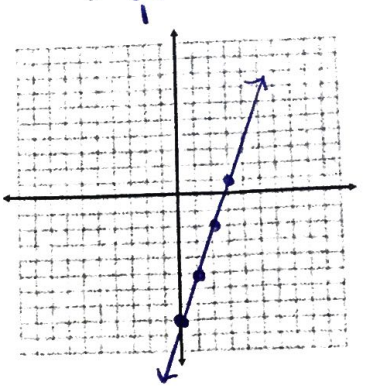
$y = -\frac{1}{3}x + 4$



$M = \frac{-1}{3}$ ↓ →

$\frac{1}{-3}$ ↑ ←

$y = \frac{3x}{1} - 8$

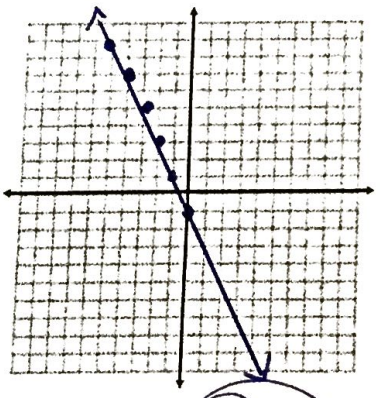


2. **Point-Slope Form:** $y - y_1 = m(x - x_1)$

   - Start at the point (x_1, y_1) given in the equation. Be careful – the equation has subtraction signs built in so you have to change the signs on the numbers!
   - Move from the original point according to the slope

$y - y_1 = M(x - x_1)$ (x_1, y_1)

$y - 7 = -2(x + 4)$ $(-4, 7)$



$M = \frac{-2}{1}$ ↓ →

$\frac{2}{-1}$ ↑ ←

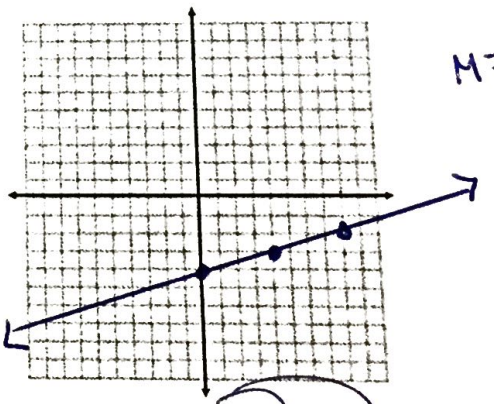
$y - 7 = -2(x+4)$

$y - 7 = -2x - 8$

$+7 \quad +7$

$y = -2x - 1$

$y + 2 = \frac{1}{4}(x - 8)$ (x_1, y_1) $(8, -2)$



$M = \frac{1}{4}$

$y + 2 = \frac{1}{4}(x - 8)$

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

$-2 \quad -2$

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

3. **Standard Form:** $Ax+By=C$

Option 1: Graph using the intercepts

- Find the y-intercept by plugging in x=0 and solving for y. (This is the point (0,y))
- Find the x-intercept by plugging in y=0 and solving for x. (This is the point (x, 0))
- Put these two points on the graph and connect them.

Option 2: Change it to slope-intercept form

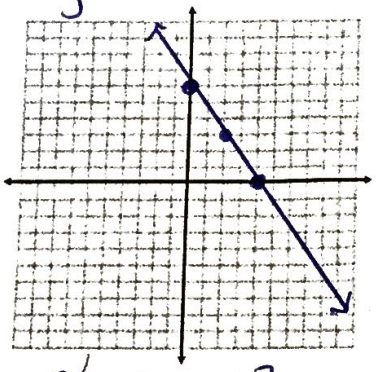
- Solve the equation for y and then graph

$3x+2y=12$

$3(0)+2y=12$ | $3x+2(0)=12$

$2y=12$ | $3x=12$

$y=6$ | $x=4$



$3x+2y=12$

$-3x \quad -3x$

$\frac{2y}{2}=\frac{-3x+12}{2}$

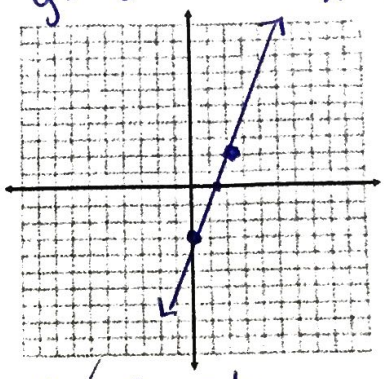
$y=-\frac{3}{2}x+6$

$5x-2y=6$

$5(0)-2y=6$ | $5x-2(0)=6$

$-2y=6$ | $\frac{5x}{5}=\frac{6}{5}$

$y=-3$ | $x=\frac{6}{5}=1.2$



$5x-2y=6$

$-5x \quad -5x$

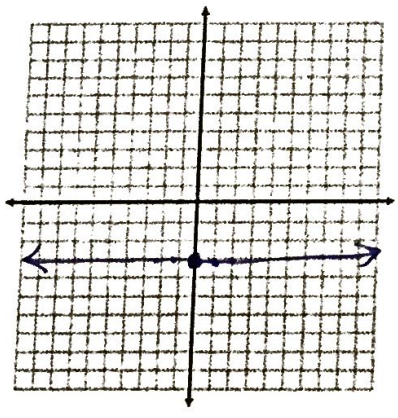
$\frac{-2y}{-2}=\frac{-5x+6}{-2}$

$y=\frac{5}{2}x-3$

4. **Special Cases – Horizontal and Vertical Lines**

- x= some number is a vertical line
- y= some number is a horizontal line

$y=-3$



$x=2$