Finding Linear Equations From a Graph

Level 1 - Find the equation of the given graph with y-intercept integer values
Level 2 - Find the equation of the given graph y-intercept fractional values

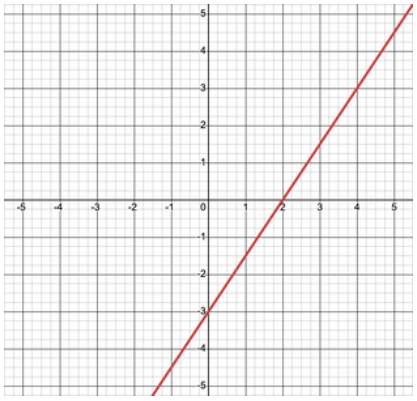
When you look at a straight line on a graph, you can find its equation using points on the line.

Slope-Intercept Form:	$y = mx + b$
Slope:	$m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$
y-intercept:	b

We can use any two points on the line along with the y-intercept to create an equation.

If the y-intercept isn't clear, we may have to find it using point-slope form and a point on the graph.

Example #1

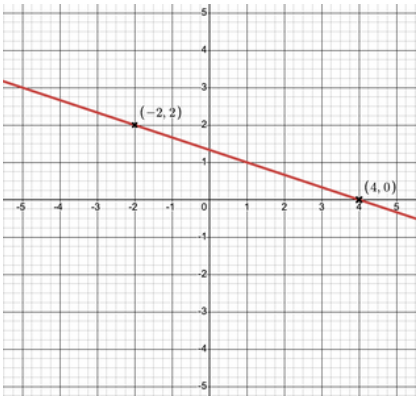


$y - intercept: \; b = -3$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - (-3)}{2 - 0} = \frac{3}{2}$$

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

Example #2



$y - intercept: \; b = \; ?$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - (2)}{4 - (-2)} = \frac{-2}{6} = -\frac{1}{3}$$

$point - slope\ form: \; y - y_1 = m(x - x_1)$

$$y - 0 = -\frac{1}{3}(x - 4)$$

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

Remember:

- Pick clearly known points to avoid reading errors.
- Keep the rise/run sign consistent: up is **+**, down is **−**; right is **+**, left is **−**.
- If you can't see **b** clearly, use point–slope or plug a known point into ***y* = m*x* + b** to solve for **b**.