x-intercept $(x, 0)$  y-intercept $(0, y)$

How to find the $x$ and $y$ intercepts:

- $x$-intercept - the $x$ value when $y = 0$ and where the line crosses the $x$-axis
- $y$-intercept - the $y$ value when $x = 0$ and where the line crosses the $y$-axis

Example: Find the x-intercept and the y-intercept for the equation:

$$3x - 4y = 0$$

For $x$-intercept set $y = 0$ and solve for $x$:

$$3x - 4(0) = 0 \rightarrow 3x - 0 = 0 \rightarrow 3x = 0$$

$$\frac{3x}{3} = \frac{0}{3} \quad x = 0$$

For $y$-intercept set $x = 0$ and solve for $y$:

$$3(0) - 4y = 0 \rightarrow 0 - 4y = 0 \rightarrow -4y = 0$$

$$\frac{-4y}{-4} = \frac{0}{-4} \quad y = 0$$
Find the x-intercept and y-intercept of the equation $3x + 4y = 12$.

**x-intercept:** $3x + 4(0) = 12$

$3x + 0 = 12$

$3x = 12$

$\frac{3x}{3} = \frac{12}{3}$

$x = 4$ \(\rightarrow\) point (4,0)

**y-intercept:** $3(0) + 4y = 12$

$0 + 4y = 12$

$4y = 12$

$\frac{4y}{4} = \frac{12}{4}$

$y = 3$ \(\rightarrow\) point (0,3)

You can find slope with these 2 pts (4,0) (0,3)

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 0}{4 - 0} = \frac{3}{4}$

Slope = negative slope

Rise $\downarrow \frac{3}{4}$

Run $\rightarrow 4$
Write an equation of a line that passes through \((2, -2)\) and \((0, 2)\).

**Step 1 - write formula**

\[ y = mx + b \]

\[ \text{slope} \quad \text{y-intercept} \]

**Step 2 - find slope**

\[
\frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - (-2)}{0 - 2} = -\frac{4}{-2} = 2
\]

**Step 3 - substitute slope into formula**

\[ y = -2x + b \]

**Step 4 - find y-intercept**

\[ (y\text{-value when } x = 0) \]

\[ (y\text{-axis}) \]

\[ \text{substitute ordered pair into formula} \]

\[ -2 = -2(2) + b \]

\[ +4 +4 \]

\[ 2 = b \]

**Step 5 - rewrite equation with \(m : b\)**

\[ y = -2x + 2 \]

\[ \text{remember } y \text{ and } x \text{ will stay as variables (letters)} \]