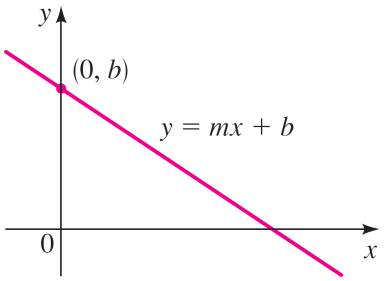
Slope-Intercept Form of the Equation of a Line



Slope-Intercept Form of the Equation of a Line

An equation of the line that has slope m and y-intercept b is

$$y = mx + b$$

EXAMPLE: Find an equation of the line with slope 3 and y-intercept -2.

Solution: $y = mx + b = 3x + (-2) = 3x - 2$

EXAMPLE: Find an equation for the line that has x-intercept 6 and y-intercept 4.

Solution: Since the line passes through the points $(6, 0)$ and $(0, 4)$, the slope of this line is

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

Since the y-intercept is 4, it follows that $b = 4$. Therefore the slope-intercept equation of the line is

$$y = mx + b = -\frac{2}{3}x + 4$$

EXAMPLE: Write the linear equation $2x - 3y = 15$ in slope-intercept form, and sketch its graph. What are the slope and y-intercept?

Solution: We have

$$2x - 3y = 15 \quad \Longrightarrow \quad -3y = -2x + 15 \quad \Longrightarrow \quad y = \frac{-2x + 15}{-3} = \frac{-2x}{-3} + \frac{15}{-3} = \frac{2}{3}x - 5$$

Therefore the slope is $\frac{2}{3}$ and y-intercept is -5.