

Section 2.3: Slope and Intercepts of a Line

Definition: The **slope** of a line measures the steepness of a line or the rate of change of the line.

To find the slope of a line you need two points. You can find the slope of a line between two points (x_1, y_1) and (x_2, y_2) by using this formula.

$$\text{slope } (m) = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$$

The Different Types of slope

- Lines with positive slope rise to the right.
- Lines with negative slope fall to the right.
- Lines with slope equal to 0 are horizontal lines.
- Lines with undefined slope are vertical lines

Example 1: Find the slope of the line containing the following points

a. $(4, -3)$ and $(-2, 1)$

b. $(-3, 1)$ and $(-3, -2)$

c. $(-2, \frac{1}{4})$ and $(1, \frac{3}{4})$

The x -coordinate of the point where a line intersects the x -axis is called the **x -intercept**. It is found by setting $y = 0$ in the equation of the line and solving for x .

The y -coordinate of the point where a line intersects the y -axis is called the **y -intercept**. It is found by setting $x = 0$ in the equation of the line and solving for y .

Example 2: Find the x - and y - intercepts of the following equations.

a. $7x + 2y = 14$

b. $3y = \frac{2}{5}x$

The term intercept also refers to the POINT at which the graph of the line crosses either the x -axis or the y -axis. Sometimes, the question will ask you to write the y -intercept or x -intercept “as a coordinate point” or “in coordinate point form”. To answer this question, the procedure is

x - intercept as a coordinate point –

1. Find the x -intercept by setting $y = 0$ and solving the equation for x .
2. Write the point as $(x\text{-intercept}, 0)$

y -intercept as a coordinate point –

1. Find the y -intercept by setting $x = 0$ and solving the equation for y .
2. Write the point as $(0, y\text{-intercept})$

Example 3: Find the x - and y - intercepts of the line $3x - 2y = 18$ and express the intercepts in coordinate point form.

Example 4: Find the x- and y- intercepts of the line $2y = 14$ and express the intercepts in coordinate point form.

Example 5: Find the x- and y- intercepts of the line $x = -5$ and express the intercepts in coordinate point form

Example 6: Find the x- and y- intercepts of the line $-3x = 15$ and express the intercepts in coordinate point form