Lesson 8

Graphing Linear Equations (Slope-Intercept Form)

Lesson

A linear equation graphs as a straight line. The most useful form is slope-intercept form:

$$y = mx + b$$

where:
- m = slope (rise over run -- how steep the line is)
- b = y-intercept (where the line crosses the y-axis)

Slope formula between two points (x_1, y_1) and (x_2, y_2):

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Example: Graph $y = 2x - 3$

Identify: $m = 2$ (slope), $b = -3$ (y-intercept)

Step 1: Plot the y-intercept at $(0, -3)$

Step 2: From that point, use the slope: rise 2, run 1
Move up 2 and right 1 to reach $(1, -1)$

Step 3: Plot that point and draw a line through both points.

Check another point: $x = 2$ gives $y = 2(2) - 3 = 1$, so $(2, 1)$ should be on the line.

Practice Problems

1) Identify the slope and y-intercept of $y = 4x + 1$.

2) Identify the slope and y-intercept of $y = -3x + 5$.

3) Find the slope between the points (1, 2) and (3, 8).

4) Find the slope between the points (2, 7) and (5, 1).

5) Rewrite in slope-intercept form: $2x + y = 10$.

6) Rewrite in slope-intercept form: $3x - 2y = 12$.

7) A line passes through (0, 4) with slope -2. Write its equation and find the value of y when x = 3.