Lesson 7 Slope-Point Form of a Linear Function_____

The equation of a line that passes through $P(x_1, y_1)$ and has slope m is
$y - y_1 = m(x - x_1)$

In order to find an equation for a line, you must know:
- The slope
- A point on the line
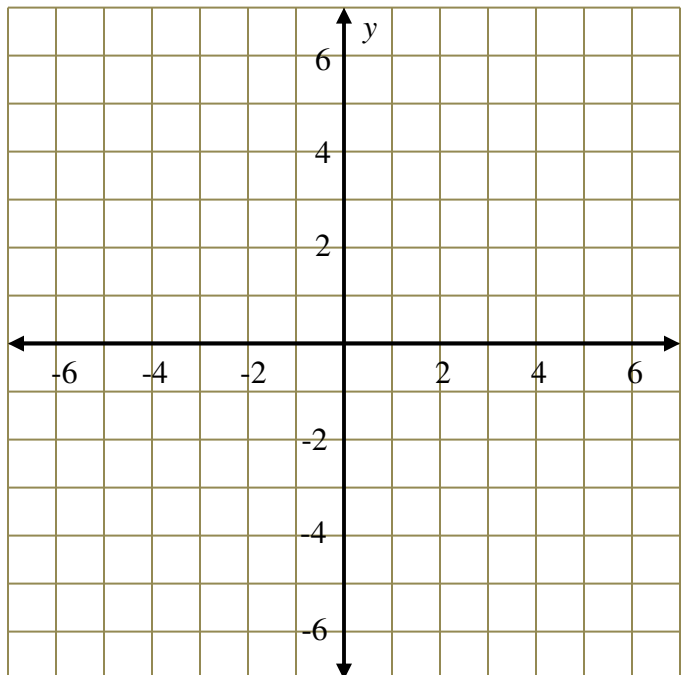
There are three types of questions

1. Given the slope and y-intercept
2. Given the slope and one point (x-int, y-int, coordinate pair)
3. Given two points

There are two methods to use when solving:

1. Slope-Intercept Form ($y = mx + b$)
2. Point-Slope Formula ($y - y_1 = m(x - x_1)$)

Sketch the graph of the linear function with equation:
$y - 3 = \frac{1}{4}(x + 5)$

Type I – Given Slope and *y*-intercept

Write the equation of a line with a slope of $\frac{2}{3}$ and a *y*-intercept of –1.

Type II – Given a Point and the Slope

Example 1

Determine the equation of a line with a slope of 3 that passes through (1, 4).

Example 2

Write the equation of a line passing through (–4, –2) with $m = \frac{2}{3}$.

Type III – Given Two Points

Example 3

Determine the equation of the line passing through the points D (6, 1) and E (–4, –3).

Parallel and Perpendicular Lines

- Parallel slopes are equal
- Perpendicular slopes are negative reciprocals

Example 1

Write the equation of a line that passes through (–2, 4) and is perpendicular to $2x - 3y + 5 = 0$.

Example 2

Write the equation of a line with an *x*-intercept of 2 and parallel to the line $3x - 2y = 6$.

Example 3

Two perpendicular lines intersect on the y-axis. One line has the equation $y - 3 = \frac{1}{2}(x + 4)$. Determine the equation of the other line.