Linear Equations in Two Variables

Today’s objective: To write and graph lines in slope-intercept form and point-slope form.

Vocabulary
- **Linear equation**: an equation whose graph is a ________
- **y-intercept**: the y-coordinate of the point where a line ________ the y-axis
- **Slope-intercept form**: \( y = mx + b \) where \( m = \) ________ and \( b = \) ________

Find the slope and y-intercept of each equation.

a) \( y = -2x + 1 \)  b) \( y = -(4/5)x \)

c) \( y = (7/6)x - 3/4 \)

Example

d) Write an equation of a line with slope -3 and y-intercept \((0, 2)\).

Graphing Lines using the Slope and y-intercept

1. ________ the y-intercept.
2. From this point, use the slope and ________ to plot a second point.
3. Repeat step 2 to get a third point.
4. Draw a line through the three points.

Graph using the slope and y-intercept.

e) \( y = x - 2 \)
POINT-SLOPE FORM

\[ y - y_1 = m(x - x_1) \]

Remember: \( m = \text{slope} \) & \((x_1, y_1) = \text{a point on the line.}\)

Example

f) Write an equation in standard form through \((7, -2)\) with slope = \(\frac{1}{4}\).

g) Find an equation of the line thru the points \((-2, 2)\) and \((4, 3)\). Write in standard form.

Steps for Writing an Equation

1) Find the ________.
   Remember the 4 special cases: vertical, horizontal, parallel, perpendicular

2) Using the given information, write an equation in the requested form.
   - Slope-intercept \(y = mx + b\)
   - Point-slope \(y - y_1 = m(x - x_1)\)
   - Standard \(Ax + By = C\)

Write an equation in standard form.

h) thru \((-2, 8)\) and \(m = 0\)

i) thru \((1, \frac{3}{4})\) and vertical

Write a linear equation in slope-intercept form.

j) \((4, 1)\) and parallel to \(2x + 5y = 10\)
Write a linear equation in slope-intercept form.

k) (2, -7) & perpendicular to 5x + 2y = 18.