(day 1)

se

The third way to write an equation of a line:

$$y - y_1 = m(x - x_1)$$

$m =$ slope

x and y = variables

$\left.\begin{array}{c} x_1 \\ y_1 \end{array}\right\}$ Represent a point (x_1, y_1)
They will be replaced with numbers.

For example:

$$y - 5 = \frac{3}{4}(x - 1)$$

slope $= \frac{3}{4}$

passes thru point $(1, 5)$

$$y + 6 = -2(x - \boxed{7})$$
$$y - (-6) = -2(x - 7)$$

slope $= -2$

passes thru point $(7, -6)$

Ex. Write the equation of a line that:

a) passes thru $(\overset{x_1}{6}, \overset{y_1}{-5})$

slope $= \frac{1}{2}$ m

$$y - y_1 = m(x - x_1)$$

$$y - -5 = \frac{1}{2}(x - 6)$$

$$y + 5 = \frac{1}{2}(x - 6)$$

b) passes thru $(\overset{x_1}{-4}, \overset{y_1}{7})$

slope $= \frac{4}{3}$ m

$$y - y_1 = m(x - x_1)$$

$$y - 7 = \frac{4}{3}(x - -4)$$

$$y - 7 = \frac{4}{3}(x + 4)$$

Ex. Write the equation (in all 3 formats) for a line that passes thru $(\overset{x_1}{-1}, \overset{y_1}{-5})$ and has a slope of 3.

$y = mx + b$

line that passes thru $(-1, -5)$ and has a slope

of $\underset{m}{3}$.

(x_1, y_1)

$y = mx + b$

① $y - y_1 = m(x - x_1)$

② $y + 5 = 3(x + 1)$

$y - -5 = 3(x - -1)$

$y + 5 = 3x + 3$

$-5 -5$

slope
point
form

$\boxed{y + 5 = 3(x + 1)}$

$\boxed{y = 3x - 2}$ slope-intercept
form

$Ax + By + C = 0$

③ $y = 3x - 2$

$-3x + 2 \quad -3x + 2$

$(-3x + y + 2 = 0) \cdot (-1)$

$\boxed{3x - y - 2 = 0}$ general form

Practice on whiteboards

writing equations.

Slope Point Form (day 2)
November 23-17   10:12 AM

✱ If we only know 2 points on a line, we can write the equation using slope point form:

① Label the points with x_1, y_1, x_2 y_2

② Calculate the slope

③ substitute the slope and one of the points into the slope-point form equation.

Ex. Write the equation of the line that passes thru $(-6,-3)$ and $(4,5)$ in all 3 ways.
$\quad\quad x_1 \quad y_1 \quad\quad\quad x_2 \ y_2$ * only 2 points!

① Find slope:

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

$$= \frac{5 - -3}{4 - -6}$$

$$= \frac{5+3}{4+6}$$

$$= \frac{8}{10}$$

$$m = \frac{4}{5}$$

② Slope-point form:

$$y - y_1 = m(x - x_1)$$

$$y - -3 = \frac{4}{5}(x - -6)$$

$$y + 3 = \frac{4}{5}(x + 6)$$

③ Slope Intercept form:

$$y + 3 = \frac{4}{5}(x + 6)$$

$$y + 3 = \frac{4}{5}x + \frac{24}{5}$$
$$\quad -3 \quad\quad\quad\quad\quad -3$$

$$y = \frac{4}{5}x + \frac{9}{5}$$

$$\frac{4}{5} \times \frac{6}{1} = \frac{24}{5}$$

$$\frac{24}{5} - \frac{3}{1} = \frac{24}{5} - \frac{15}{5} = \frac{9}{5}$$

* keep as fractions *

④ General Form:

$$y = \frac{4}{5}x + \frac{9}{5}$$
$$-\frac{4}{5}x \quad -\frac{9}{5} \quad -\frac{4}{5}x \quad -\frac{9}{5}$$

$$\left(-\frac{4}{5}x + y - \frac{9}{5} = 0 \right) \cdot (-1)$$

$$\left(\frac{4}{5}x - y + \frac{9}{5} = 0 \right) \cdot (5)$$

$$4x - 5y + 9 = 0$$

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