Equations of Lines

May 17

★ **slope-intercept form:** $y = mx + b$

***ex. 1*: *y*-intercept = -2 and to perpendicular to $y = -8x + 9$**

b: -2

m: -8

1 slope = $\frac{1}{8}$ (neg. reciprocal)

slope

$y = \frac{1}{8}x - 2$

***ex. 2*: slope = 2/3, point on line = (-6, 4)**

m: $\frac{2}{3}$

x, y: (-6, 4)

$y = mx + b$

$4 = \frac{2}{3}(-6) + b$

$4 = -4 + b$

$8 = b$

$y = \frac{2}{3}x + 8$

point-slope form: $y - y_1 = m(x - x_1)$

$m = \frac{y - y_1}{x - x_1}$ slope

m = slope

(x_1, y_1) Known pt

(x, y) all other pts

***ex. 3*: parallel to the line y = -3*x* - 2, point on line (4, -5)**

$m = -3$ (= slopes) $(x_1, y_1) = (4, -5)$

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

$y - (-5) = -3(x - 4)$

$y + 5 = -3(x - 4)$

$y = -3x + 12 - 5$

$y = -3x + 7$

***ex. 4*: points (1, -2) and (-3, 5) on line**

$m = \frac{-2-5}{1-(-3)} = \frac{-7}{4}$ $\frac{\text{rise}}{\text{run}}$

$(x_1, y_1) = (1, -2)$

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

$y - (-2) = \frac{-7}{4}(x - 1)$

$y + 2 = \frac{-7}{4}x + \frac{7}{4} - \frac{8}{4}$

$y = \frac{-7}{4}x - \frac{1}{4}$