MTH-PC College Algebra Session 14 10/27

1.) Find the slope between $(4,-8)$ $(-2,6)$ (x_2, y_2 and x_1, y_1)

$$m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-8-6}{4-(-2)} = \frac{-8-6}{4+2} = \frac{-14 \div 2}{6 \div 2}$$

$$\boxed{-\frac{7}{3}}$$

2.) What is the equation of line with a slope (m) of $4/3$ and y-intercept of -5 (b)

Slope-Intercept Form

$$y = mx + b$$

$$\boxed{y = \frac{4}{3}x - 5}$$

3.) Find the equation of a line with a slope of $-4/3 = m$ through $(6,-9)$

$$y = mx + b$$

$$-9 = \left(-\frac{4}{3}\right)\left(\frac{6}{1}\right) + b$$

$$-9 = -8 + b$$

$$+8 \quad +8$$

$$\boxed{-1 = b}$$

$$-\frac{4}{3} * \frac{6}{1} = \frac{-24}{3} = -8$$

$$y = mx + b$$

$$\boxed{y = -\frac{4}{3}x - 1}$$

Point-Slope

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

$$y - (-9) = -\frac{4}{3}(x - 6)$$

$$y + 9 = -\frac{4}{3}(x - 6)$$

$$y + 9 = -\frac{4}{3}x + 8$$

$$-9 \qquad -9$$

$$\boxed{y = -\frac{4}{3}x - 1}$$

4.) Rewrite in slope-intercept form. → $y = mx + b$

standard form

$2x - 8y = 16$

$-2x \quad -2x$

$\frac{-8y}{-8} = \frac{-2x}{-8} + \frac{16}{-8}$

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

$12 = 3x + 4y$

$-4y \quad -4y$

$-4y + 12 = 3x$

$-12 \quad -12$

$\frac{-4y}{-4} = \frac{3x}{-4} - \frac{12}{-4}$

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

$12 = 3x + 4y$

$-3x \quad -3x$

$\frac{-3x + 12}{4} = \frac{4y}{4}$

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

Find the equation for the line through $(4, -2)$ and $(2, 8)$

slope: $\frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - (-2)}{2 - 4} = \frac{10}{-2} = -5 = m$

$y = mx + b$

$\Rightarrow 8 = (-5)(2) + b$

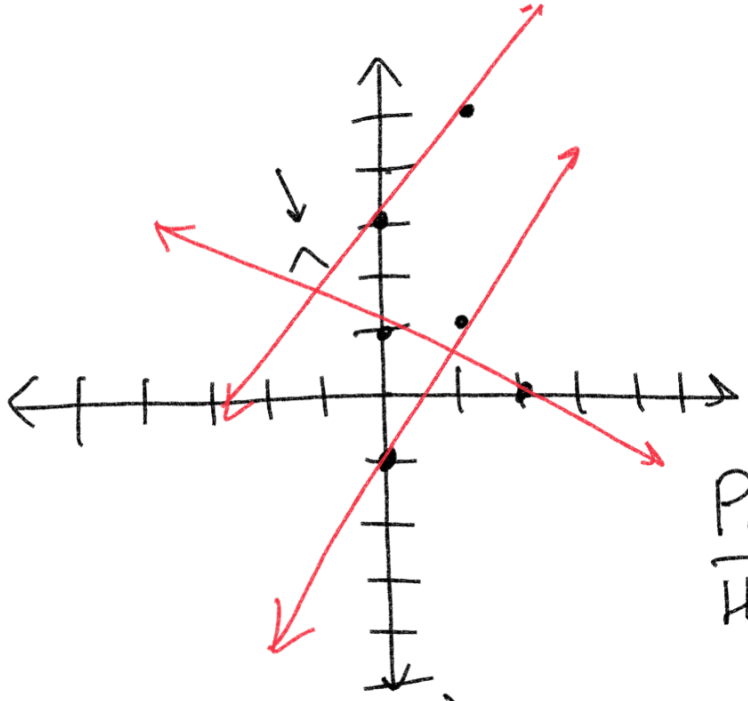
$8 = -10 + b$

$+10 \quad +10$

$b = 18$

$y = mx + b$

$y = -5x + 18$



$y = \underset{\text{slope}}{2}x - \underset{\text{y-int}}{1}$

$y = 2x + 3$

Parallel lines →
Have the same slope.

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

Perpendicular Lines

Have opposite inverse slope
(opposite: change sign; inverse: flip)

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

$\frac{-2}{1} \rightarrow \frac{-1}{2}$

Parallel line to $y = 4x + 3$ that goes through $(2, 5)$

same slope $m = 4$

$y = mx + b$

$5 = (4)(2) + b$

$5 = 8 + b$

$-8 \quad -8$

$b = -3$

$y = mx + b$

$y = 4x - 3$

Line perpendicular to $3x + 2y = 12$ that goes through $(1, 6)$

$3x + 2y = 12$

$-3x \quad -3x$

$\frac{2y}{2} = \frac{-3x}{2} + \frac{12}{2}$

$y = \frac{-3}{2}x + 6$

slope $= -\frac{3}{2}$

$y = mx + b$

opposite inverse

$-\frac{3}{2} \rightarrow \frac{3}{2} \rightarrow \frac{2}{3}$

our line $m = \frac{2}{3}$

$y = mx + b$

$6 = (\frac{2}{3})(1) + b$

$6 = \frac{2}{3} + b$

$-\frac{2}{3} \quad -\frac{2}{3}$

$b = 5\frac{1}{3} = \frac{16}{3}$

$y = mx + b$

$y = \frac{2}{3}x + \frac{16}{3}$

s varies directly with t

↳ numerator

say this! Right now!

$s = kt$

variation constant

v varies directly with x^3

$v = kx^3$

f varies inversely with λ

↳ denominator

$$f = \frac{k}{\lambda}$$

F varies directly with w and g and inversely with L

$$F = \frac{k w g}{L}$$

A varies directly with square of r

$A = 9\pi$ when $r = 3$

Find equation

$A = kr^2$

$9\pi = k(3)^2$

$\frac{9\pi}{9} = \frac{9k}{9}$

$k = \pi$

$A = \pi r^2$