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

(-7, 6) (-3, 1) $= \frac{1-6}{-3+7} = \frac{-5}{4}$

a)Find the equation of a line in slope point form

$m = -\frac{5}{4}$ (-7, 6)

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

$y - 6 = -\frac{5}{4}(x - -7)$

$y - 6 = -\frac{5}{4}(x + 7)$

Slope point form

b)Find the equation of a line in slope intercept form $y = mx + b$

$y - 6 = -\frac{5}{4}(x + 7)$

$y - 6 = -\frac{5}{4}x - \frac{35}{4} + \frac{6 \cdot 4}{1 \cdot 4}$

$y = -\frac{5}{4}x - \frac{35}{4} + \frac{24}{4}$

$y = -\frac{5}{4}x - \frac{11}{4}$

OR

$y - 6 = -\frac{5}{4}x - \frac{35}{4}$ (multiply by 4)

$4y - 24 = -5x - 35$

$\frac{4y}{4} = \frac{-5x}{4} - \frac{11}{4}$

$y = \frac{-5x}{4} - \frac{11}{4}$

Slope = m

y intercept = b

Slope intercept form

$y = mx + b$

m: slope, b: y intercept

Calculate Slope

- given graphs (See)

$m = \frac{\text{rise}}{\text{run}}$

- given 2 points (x_1, y_1) (x_2, y_2)

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

Point-Slope

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

Standard

$Ax + By = C$

← constant (# alone)

← No fraction → # in front of x is positive

General

$Ax + By + C = 0$

(No fraction and # in front of x is positive)

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

$y - 3 = \frac{2}{5}(x + 7)$

Tell me the $m = \frac{2}{5}$

point $(-7, 3)$ x, y

opposite sign than equation

Ex) $y = \frac{3}{7}x - 5$

positive

Rewrite into General form $(Ax + By + C = 0)$

$7(y) = \frac{3}{7}(7)x - 5(7)$

$7y = 3x - 35$

↳ got to go to other side

$7y - 7y = 3x - 7y - 35$

$0 = 3x - 7y - 35$

Ex) $y - 4 = \frac{3}{5}(x + 1)$ ← point slope form

Rewrite in General form

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

$5(y - 4) = 3(x + 1)$

multiply through bracket

$5y - 20 = 3x + 3$

↳ ↳

$5y - 5y - 20 = 3x - 5y + 3$

$-20 + 20 = 3x - 5y + 3 + 20$

↳

$0 = 3x - 5y + 23$

OR

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

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

$5y - 20 = 3x + 3$

$3x - 7y = 15$ Standard

Rewrite in slope-intercept form $y = mx + b$

$-3x \quad -3x$

$3x - 7y = 15$

$\frac{-7y}{-7} = \frac{-3x}{-7} + \frac{15}{-7}$

$y = \frac{3}{7}x - \frac{15}{7}$

Ex) $3x - 7y + 21 = 0$

a) find x intercept (let $y=0$)

$3x - 7y + 21 = 0$

$3x - 7(0) + 21 = 0$

$3x + 21 = 0$ -21 -21

$\frac{3x}{3} = \frac{-21}{3}$

$x = -7$

b) find y-intercept let $x=0$

$3x - 7y + 21 = 0$

$3(0) - 7y + 21 = 0$

$-7y + 21 = 0$ -21 -21

$\frac{-7y}{-7} = \frac{-21}{-7}$

$y = +3$

c) find slope

$3x - 7y + 21 = 0$ $y = mx + b$

$-7y = -3x - 21$

$\frac{-7y}{-7} = \frac{-3x}{-7} - \frac{21}{-7}$

$y = \frac{3}{7}x + 3$

$m = \frac{3}{7}$

use intercepts

$x = -7$ OR $(-7, 0)$

$(0, 3)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-0}{0-7} = \frac{3}{-7}$

Laws of Exponents

- multiplying like bases → add exponents

$2^4 \cdot 2^6 = 2^{4+6} = 2^{13}$

- Divide like bases
  - ↳ subtract exponents

$\frac{3^6}{3^2} = 3^{6-2} = 3^4$

- power of a power
  - ↳ exponent raised to a power
  - ↳ multiple the exponents

$(2^3)^4$ ← Repeat 2^3 → 4 times

$2^3 \cdot 2^3 \cdot 2^3 \cdot 2^3 = 2^{3\times4} = 2^{12}$

- zero rule
  - → anything to an exponent "0" will equal 1

Ex $y^0 = 1$

$(2x^4)^0 = 1$

$(8000000)^0 = 1$

- Power of product
  - ↳ exponent applied to a bracket the exponent applies to all inside

$(x^3 y^{4x^7})^7$

↳ multiply inside exponents

$(x^3)^7 (y^4)^7$ ← don't need to show

x^{21} y^{28}

- power of quotient

$\left(\frac{4^4 x^{20}}{3 x^4}\right)^5$

don't do cal → $\frac{4^5 x^{15}}{3^5 x^5}$

Gr. 10

Negative exponents

$\left(\frac{n}{1}\right)^{-3}$ → flip fraction make exponent positive $\left(\frac{1}{n^2}\right)^3$ ⇒ apply power of quotient $\frac{1^3}{n^3} = \frac{1}{n^3}$

$(7x)^{-2}$

$\frac{7^{-2}}{1}\ \frac{x^{-2}}{1}$

$\frac{1}{7^2}\ \frac{1}{x^2}$

$\frac{1}{49 x^2}$

Ex) Simplify $= \frac{n^3}{n^2}\left(\frac{x^4}{x^7}\right)$ quotient law

quotient law

$= n^1 x^{-3}$ ← move to denominator to make positive

$= \frac{n^1}{x^3}$

Ex) $\left(\frac{x}{n}\right)^{-4}$ ← move to bottom

$= \frac{x^{-4}}{n^{-4}}$ ← move to top

$\frac{n^4}{x^4}$