Date: 8/17/18

Chp: Chp. 1.1 = Lines

Objectives: Find slope, || & ⊥ lines,
                  & eqs. of lines.

* <u>Increments</u> = Used to describe the
distance/length a
particle moves.

$\Delta x \rightarrow x_2 - x_1$

$\Delta y \rightarrow y_2 - y_1$
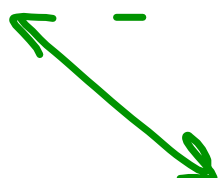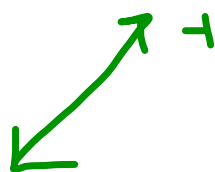
Ex.1

a) $(4, -3), (2, 5)$ b) $(5, 6), (5, 1)$

$2 - 4 = -2$

$5 - (-3) = 8$

* <u>Slope</u> = Each nonvertical line
           has one.

$$= m = \frac{rise}{run} = \frac{\Delta y}{\Delta x}$$

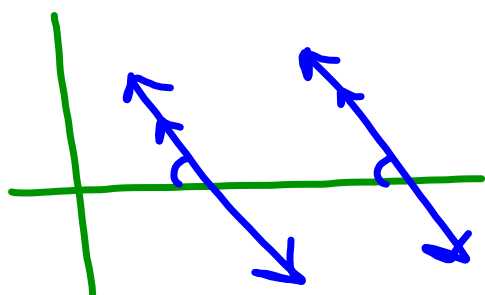<u>4 Types of Slope</u>   0   undefined

↗ +   ↖ —   ↙   ↔   ↕

* <u>Parallel</u> = Lines w/ the same Slope.

alt int.
alt. ext.
Same-side int or Consec. int.
corresponding

* <u>Perpendicular</u> = Slopes are opp. reciprocals.

$$= \quad m_1(m_2) = -1$$

Eqs. of 3 Lines

diagonal $\rightarrow$ $y = mx + b$

horizontal $\rightarrow$ $y = b$ or $y = \#$

vertical $\rightarrow$ $x = \#$

<u>Ex. 2</u>

If vert. & hor. lines go thru (2, 3) then $x = ?$ $y = ?$

$$x = 2$$
$$y = 3$$

$*$ <u>Pt· Slope Eq</u> $=$ $y - y_1 = m(x - x_1)$

$$pt = (x_1, y_1)$$
$$m = Slope$$

Ex. 3

Write pt-Slope eq. for the line
that goes thru (2,3) & m=-3/2

$$y - y_1 = m(x - x_1)$$
$$y - 3 = -\frac{3}{2}(x - 2)$$
$$y - 3 = -\frac{3}{2}x + 3$$
$$y = -\frac{3}{2}x + 6$$

* <u>Y-Intercept</u> = (0, #)

$\qquad\qquad$ = y-coordinate of pt where nonvertical line intersects y-axis.

$*$ <u>x-Intercept</u> $= (\#, 0)$

$= x$-coordinate of pt
where non~~vertical~~ horizontal line
intersects the x-axis.

* <u>Slope-Intercept Eq</u> = $y = mx + b$

$b = y\text{-int}$

$m = \text{slope}$

Ex.4

Write the slope-int. eq. for the line that goes thru $(-2,-1), (3,4)$

$$y = mx + b$$

$$m = \frac{4 - (-1)}{3 - (-2)} = \frac{5}{5} = 1$$

$$4 = 1(3) + b$$

$$1 = b$$

$$\boxed{y = x + 1}$$

* <u>Standard Form</u> = $Ax + By = C$
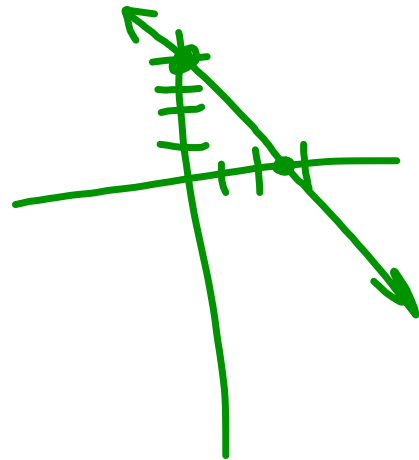
$$= A \text{ \& } B \neq 0$$

at same time

Ex.5

Find the Slope (m) & y-int. (b) of

$8x + 5y = 20$ then graph.

$5y = -8x + 20$

$y = -\frac{8}{5}x + 4$

$m = -\frac{8}{5}$

$b = 4$

Ex. 6

Write the eq. of a line that goes thru $(-1, 2)$ & is

a) $\parallel$

b) $\perp$ to $y = 3x - 4$

a) $y = mx + b$

$2 = 3(-1) + b$

$5 = b$

$y = 3x + 5$

b) $y = mx + b$

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

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

$\boxed{y = -\frac{1}{3}x + \frac{5}{3}}$

E.X. 1

X	Y
-1	14/3
1	-4/3
2	-13/3

Table gives values for a linear function. Determine m & b.

$$m = \frac{\frac{14}{3} + (+\frac{4}{3})}{-1-1} = \frac{\frac{18}{3} \cdot \frac{-1}{2}}{\cdot 2 \nearrow} = \frac{-18}{6} = -3$$

$$y = mx + b$$

$$\frac{14}{3} = -3(-1) + b$$

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

Ex.8

Find the relationship between F & C temps if $F = mC + b$. Freezing is $32°F$ & $0°C$. Boiling is $212°F$ & $100°C$. Find C equivalent of $90°F$ & F equivalent of $-5°C$.

$$32 = m(0) + b \qquad\qquad 212 = m(100) + 32$$
$$32 = b \qquad\qquad\qquad \frac{9}{5} = m$$

$$\rightarrow F = \frac{9}{5}C + 32 \qquad\qquad F = \frac{9}{5}(-5) + 32$$
$$90 = \frac{9}{5}C + 32 \qquad\qquad F = 23°$$
$$32.2° = C$$

Homework:

p.9 (#1-37 odds, 46)