10/06 Algebra I - Downing

Go over HW - Time to finish worksheet

* Last day for PC Retakes is Today

4.3 A Parallel and Perpendicular Lines

Parallel Lines - never intersect (don't cross)

- Same slope

Ex) Which lines are parallel?

a) $y = 2x - 3$ → $m = 2$

b) $2x + 3y = 9$ → need to solve for y

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

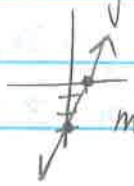
$\frac{3y}{3} = \frac{-2x}{3} + \frac{9}{3}$

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

c) through $(2,5)(4,2)$

x	y
2	5
4	2

$+2 \quad -3$ $m = \frac{-3}{2}$

d) 

$m = \frac{3}{1} = 3$

None are parallel

Ex) Write an equation of a line that goes through $(2, -1)$ and is parallel to $y = -\frac{1}{2}x - 5$

x	y

$y = mx + b$

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

$-1 = -1 + b$

$+1 \quad +1$

$0 = b$

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

Ex) Through $(-5, 3)$ and parallel to $y - 5x = 0$ * solve for y to find slope

x	y

$y = mx + b$

$3 = 5(-5) + b$

$3 = -25 + b$

$+25 \quad +25$

$28 = b$

$+5x \quad +5y$

$y = 5x$ → $m = 5$

$y = 5x + 28$

Perpendicular Lines - $\perp$

- intersect and form right angles (90°)

- slopes are opposite reciprocals
  - (+) positive to negative (−)
  - or (−) negative to positive (+)
  - flipped

Ex) $m = \frac{2}{3} \rightarrow \perp m = -\frac{3}{2}$

Ex) $m = -5 \rightarrow \perp m = \frac{1}{5}$

Ex) $m = 1 \rightarrow \perp m = -1$

Ex) $m = -\frac{5}{2} \rightarrow \perp m = \frac{2}{5}$

Ex) Write equation of line through: $\overset{x\ y}{(4, 10)}$ and is perp. to $y = 3x + 8$

$m = 3 \rightarrow \perp m = -\frac{1}{3}$

$y = mx + b$

$10 = -\frac{1}{3}(4) + b$

$10 = -\frac{4}{3} + b$

$+\frac{4}{3} \quad +\frac{4}{3}$

$11\frac{1}{3} = b$

$y = -\frac{1}{3}x + 11\frac{1}{3}$

Ex) Through $\overset{x\ y}{(5, 7)}$ perp. to $5y - 4x = -30$

$y = mx + b$

$7 = -\frac{5}{4}(5) + b$

$7 = -\frac{25}{4} + b$

$+\frac{25}{4} \quad +\frac{25}{4}$

$13\frac{1}{4} = b$

$+4x \quad +4x$

$\frac{5y}{5} = \frac{4x}{5} - \frac{30}{5}$

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

$m = \frac{4}{5} \rightarrow \perp m = -\frac{5}{4}$

$y = -\frac{5}{4}x + 13\frac{1}{4}$

HW p. 191 #4, 9-12, 16, 19-23, 28 online