2.4. Advanced Algebra
Writing Equations

DATE: 9/12

With your partner, fill in the blank to recall your prior knowledge.

- Given the slope-intercept form $y = mx + b$, m represents the slope and b represents the y-intercept.
- The slope formula is $m = \frac{y_2 - y_1}{x_2 - x_1}$ or $\frac{y_1 - y_2}{x_1 - x_2}$.
- The slopes of parallel lines are equal.
- The slopes of perpendicular lines are opposite reciprocals and their product is always equal to -1.

Example 1

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x y

conditions

Slope intercept form is:

$y = mx + b$ ← substitute slope value and x, y values

$1 = \frac{-3}{2} \cdot -4 + b$ ← Now we can solve for b and find its value.

Multiply fractions across

$-\frac{3}{2} \cdot \frac{-4}{1}$

$= \frac{+12}{2} = 6$

$1 = 6 + b$

$-6 \quad -6$

$-5 = b$

Final ans: $y = mx + b$

$y = -\frac{3}{2}x - 5$

what's the condition here?

Example 2

Write an equation of the line that passes through (-1, 4) and (-4, 5)?

$x_1\ y_1 \quad x_2\ y_2$

Same process as Ex 1 but need slope first: $m = \frac{y_2 - y_1}{x_2 - x_1}$

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

$y = mx + b$

Choose (-1, 4) or (-4, 5)

I'll choose (-1, 4).

$x \quad y$

$4 = \frac{1}{-3} \cdot -1 + b$

Two negatives equals a +

$\frac{1}{-3} \cdot \frac{-1}{1}$

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

$= \frac{1}{3}$

$4 = \frac{1}{3} + b$

$3 \cdot 4 = 3 \cdot \frac{1}{3} + 3b$

Mult by 3 to get rid of fraction

$12 = 1 + 3b$

$-1 \quad -1$

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

Final ans: $y = mx + b$

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

Example 3

Write an equation of the line that passes through (-4, 3) and is perpendicular to the line whose equation is y = -4x - 1.