PC U1 L3 Linear Equations in Two Variables

Name: _____ HR: _____

Skills: Graph lines using slope, find slope from two points, write equations of lines, and identify parallel/perpendicular lines.

Warm-Up: Review

You'll use these three skills constantly in this lesson — make sure they're solid before we start.

1. Simplifying Fractions	*2. Evaluating Functions*	*3. Solving for equations.*
Ex: simplify $\frac{18}{24}$ completely.	$g(x) = 2x^2 + 3x + 1$ $f(x) = -4(2x + 3)^2$ Find $g(-4)$	Ex: solve $5x - 6 = 3x + 9$
Your turn — simplify $\frac{48}{36}$:	Find $f(-1)$	Ex: solve $2(x - 5) = 5x - 1$

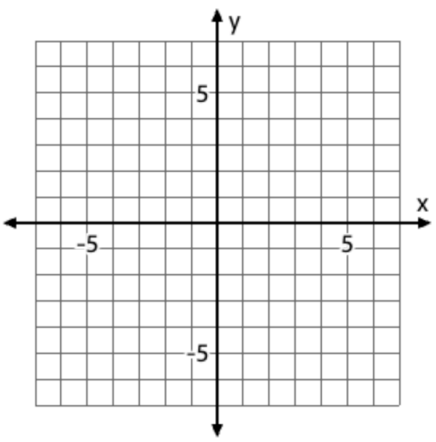
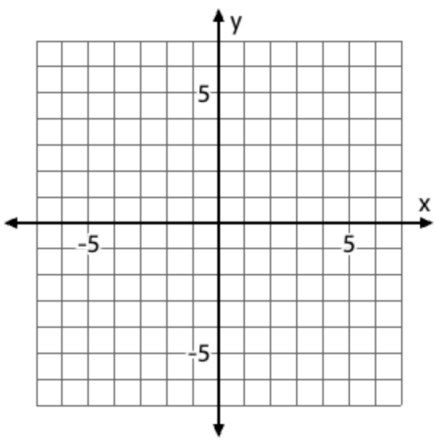
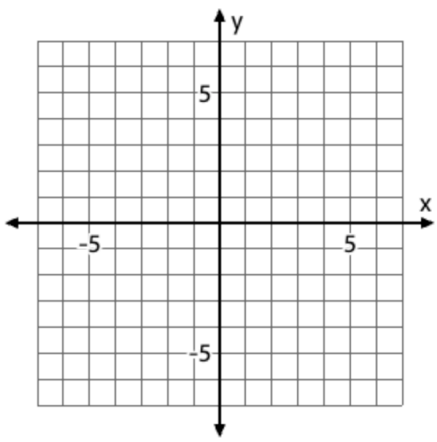
Vocabulary

- slope — a quantitative measurement of the steepness of a line **or** a ratio of change in output to change in input.
- parallel lines — two lines on the same plane that never intersect
- perpendicular lines — two lines that intersect at 90 degrees (a right angle)

Finding Slope from Two Points: (x_1, y_1) **and** (x_2, y_2) $\quad m = \frac{y_2 - y_1}{x_2 - x_1}$

Slope Facts	*Ex: slope through (–2, 0) and (3, 1)*	*You try: slope through (–5, –6) and (2, 8)*
m > 0: line rises left to right m < 0: line falls left to right m = 0: line is horizontal m is undefined: line is vertical		

Graphing with Slope-Intercept Form $y = mx + b$

Ex: graph y = 2x + 1	*Ex: graph y = 3, graph x = -6*	*You try: graph* $y = -\frac{3}{2}x + 2$
		

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Point-Slope Form

Use this form when you know a slope and one point on the line.

Given slope m and a point (x_1, y_1) $\quad y - y_1 = m(x - x_1)$

Directions: Write the equation of the line in slope-intercept form using the given information.

Ex: slope 3 through (1, −2)	***You try: slope 2 through (3, −7)***

Parallel and Perpendicular Lines

Parallel	***Perpendicular***
Same slope: $m_1 = m_2$	Negative reciprocal slopes: $m_1 = \dfrac{-1}{m_2}$
Ex: line(s) through (2, −1), parallel/perp. to 2x − 3y = 5	***You try: line(s) through (−4, 1), parallel/perp. to 5x − 3y = 8***

Application: NIKE Sales Model

NIKE's annual sales y (in billions) can be modeled by y = 2.5t + 17.8, where t = 3 represents 2013.

$y = 2.5t + 17.8$

Use the model to estimate sales in year t = 5 (interpolation — between known data points).

You try: estimate sales at t = 9 (extrapolation — beyond the known data).

Section 1.3 Summary — Can you...

☐ Graph a line using slope and y-intercept?

☐ Find the slope through two points?

☐ Write an equation using point-slope form?

☐ Identify parallel and perpendicular lines?

☐ Use a linear model to interpolate/ extrapolate?

Formulas at a Glance — Section 1.3

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

$$y = mx + b$$

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