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LEARNING OBJECTIVE: We will use similar triangles to create the slope-intercept form of a line and transform the standard form of linear equations to the slope intercept form of linear equations. (G8M4L16)

ACTIVATING PRIOR KNOWLEDGE:

We can draw graphs of linear equations.

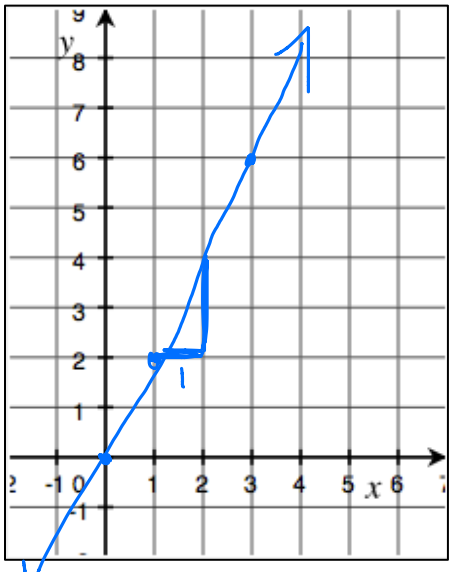
Find 3 solutions to the equation $y = 2x$ and graph the solutions. Draw a line and find the slope of the line.

Point 1: (1, 2)

Point 2: (0, 0)

Point 3: (3, 6)

$\frac{6-2}{3-1} = \frac{4}{2} = 2$



Slope: $m = 2$

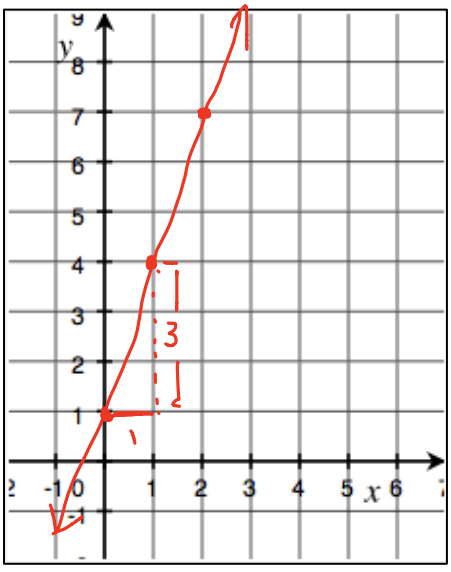
Find 3 solutions to the equation $y = 3x + 1$ and graph the solutions. Draw a line and find the slope of the line.

Point 1: (0, 1)

Point 2: (1, 4)

Point 3: (2, 7)

$m = \frac{7-4}{2-1} = \frac{3}{1}$



Slope: $m = 3$

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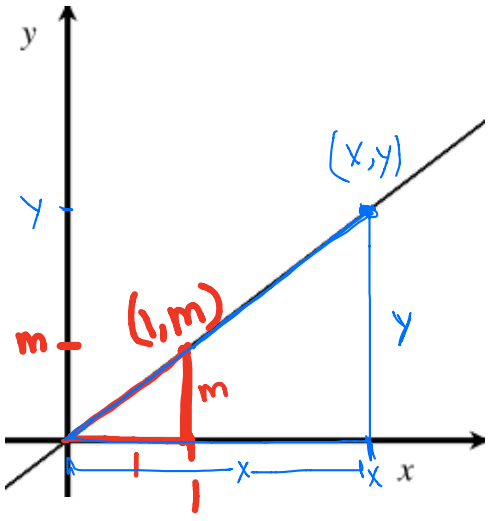
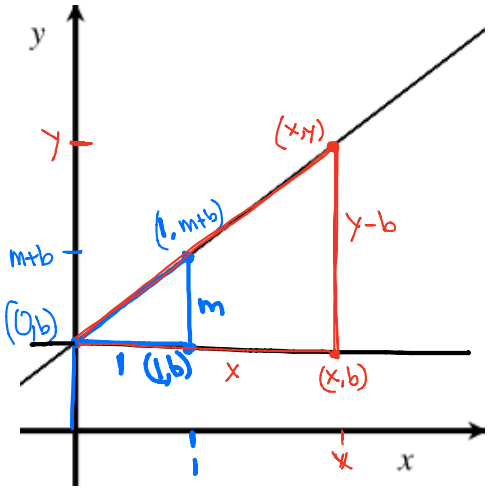
Concept Development:

Prove that the graph of the line $y = mx$ has the slope m	Prove that the graph of the line $y = mx + b$ has the slope m.
	
$\frac{y}{m} \times \frac{x}{1}$ $y = mx$ m = slope The slope of the graph of $y = mx$ is m!!	$\frac{y-b}{m} \times \frac{x}{1}$ $y - b = mx$ $+b \quad +b$ $y = mx + b$ The slope of the graph of $y = mx + b$ is m

SLOPE-INTERCEPT FORM OF A LINE

$$y = mx + b$$

$y = 3x + 1$ (Slope, y-int.)

$y = -\frac{1}{2}x + \frac{3}{4}$ (Slope, y-int.)

$y = -4x - 5$ (Slope, y-int.)

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GUIDED PRACTICE:

Steps for Identifying Slope using Slope Intercept Form ($y = mx + b$)

1. Read the situation carefully and write your equation in slope intercept form.
2. If necessary, manipulate equation written in standard form to solve for y and put into slope intercept format.
3. The slope will be the coefficient of the *x*-variable (or *m*)

Jessica is training for a marathon. She runs 4 miles in 28 minutes. Assume she runs at a constant rate. Write an equation to represent the total distance *(y)* she can run in *x* minutes.

$\frac{y}{x} = \frac{4 \text{ miles}}{28 \text{ minutes}}$

$y = \frac{4}{28}x$

$y = \frac{1}{7}x$

$m = \frac{1}{7}$

Jessica can run $\frac{1}{7}$ mile in 1 minute

Four boxes of pencils cost $5.00. Write an equation that represents the total cost of pencils (*y*) for *x* number of boxes of pencils.

$\frac{y = \text{cost}}{x = \#\text{of boxes}} = \frac{5}{4}$

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

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

A box of pencils costs $1.25

Aidan has $35 in his savings account. Each week he plans on depositing $20. Write an equation that represents the amount of money (*y*) he will have saved after *x* weeks.

$y = mx + b$

$y = 20x + 35$

20: weekly deposit; 35: Starting amt.

$m = 20$

y-int = 35

It costs $100 to sign up for cell phone service, and then the monthly charge for talk and data each month is $75. Write an equation that represents the total cost of cell phone service (*y*) for *x* months.

$y = mx + b$

$y = 75x + 100$

75: monthly; 100: One time charge

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Solve the following equation for y and identify the slope: STANDARD FORM $9x - 3y = 15$ $-9x \quad -9x$ $\frac{-3y}{-3} = \frac{-9x+15}{-3}$ $y = 3x - 5$ $m = 3$	Solve the following equation for y and identify the slope: STANDARD FORM $6x - 8y = 48$ $+8y \quad +8y$ $6x = 8y + 48$ $-48 \quad -48$ $\frac{6x-48}{8} = \frac{8y}{8}$ SLOPE INTERCEPT $\frac{3}{4}x - 6 = y$ $y = \frac{3}{4}x - 6$ $m = \frac{3}{4}$
Solve the following equation for y and identify the slope: $2x + 3y = -6$ $-2x \quad -2x$ $\frac{3y}{3} = \frac{-2x-6}{3}$ $y = -\frac{2}{3}x - 2$ $m = -\frac{2}{3}$	Solve the following equation for y and identify the slope: $5x + 9y = 8$ $-5x \quad -5x$ $\frac{9y}{9} = \frac{-5x+8}{9}$ $y = -\frac{5}{9}x + \frac{8}{9}$

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Independent Practice:

Mr. Rogove has 143,000 coins already for the coin drive. If his awesome students contribute 3,231 coins each day, how many coins *(y)* will he have after *x* days.	Rachel had $300 in her savings account. Each month she deposited $45 from her allowance. Write an equation that represents her balance in dollars (y) after *x* months.
Solve the following equation for *y* and identify the slope: $-7x + 4y = 16$	Solve the following equation for *y* and identify the slope: $3x - 8y = 32$ $m = \frac{3}{8}$
Solve the following equation for *y* and identify the slope: $4x + 15y = -60$	Solve the following equation for *y* and identify the slope: $x - 4y = -17$

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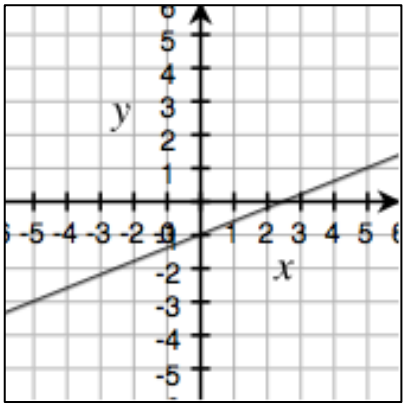
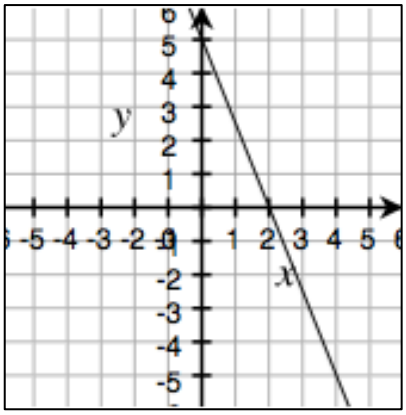
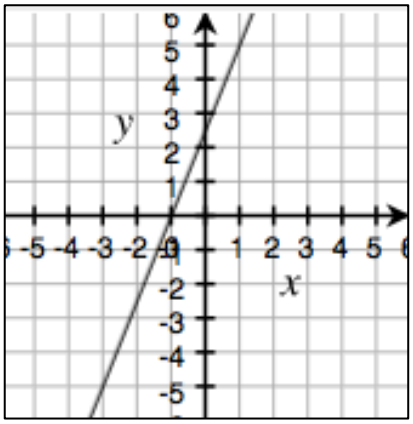
Match the equations with the graphs.

1. $5x + 2y = 10$	i. $y = \frac{5}{2}x + \frac{5}{2}$	A. 
2. $-5x + 2y = 5$	ii. $y = \frac{2}{5}x - 1$	B. 
3. $2x - 5y = 5$	iii. $y = -\frac{5}{2}x + 5$	C. 

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Closure:

Solve for *y* and identify the slope of the line:

$$ax + by = c$$

Teacher Notes:

Lesson 17 from Module 4, grade 8

Khan Identifying the slope of a line due 12/16