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LEARNING OBJECTIVE: We will write the equation of a line given two points. (G8M4L19)

ACTIVATING PRIOR KNOWLEDGE:

We can convert from slope-intercept to standard form

$y = \frac{2}{3}x + \frac{8}{3}$	$y = \frac{4}{5}x + 8$

CONCEPT DEVELOPMENT:

We can graph lines if we know…	**We can write equations if we know…**
Standard form of a linear equation Find x- and y- intercepts. Connect points	The graph of the line. Identify y-int., find the slope $\frac{\text{RISE}}{\text{RUN}}$
Slope intercept form of a linear equation Graph y-intercept. Use slope to graph the next point.	The slope of the line and the *y*-intercept. WRITE in $y = mx + b$ form.

We can also write the equation for a line if we know any two points on the line (or even one point and a slope)…we just need to determine the slope and figure out the y-intercept.

Example: Write an equation for the line that passes through the points $(1, -2)$ and $(3, 5)$.

1. Determine the slope by using the slope formula

2. Find the y-intercept.

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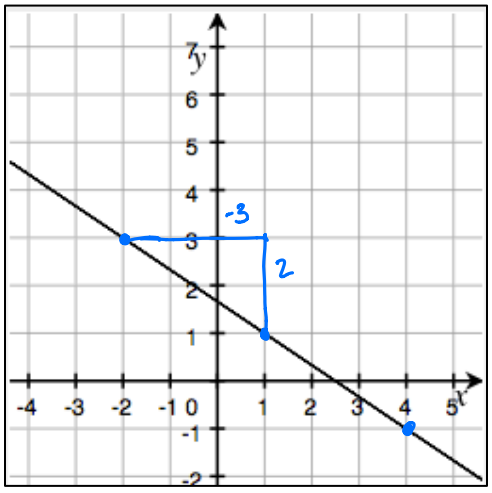
Guided Practice:

Steps for Writing Equations When Given Two Points

1. Determine the slope by using the slope formula or by looking closely at graph of the line.
2. In your slope-intercept form ($y = mx + b$), substitute your slope (m) and a point (x, y) to solve for the y-=intercept *(b)*.
3. Rewrite in slope-intercept form.
4. Rewrite in standard form.

Write an equation for the following line:



$y = mx + b$

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

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

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

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

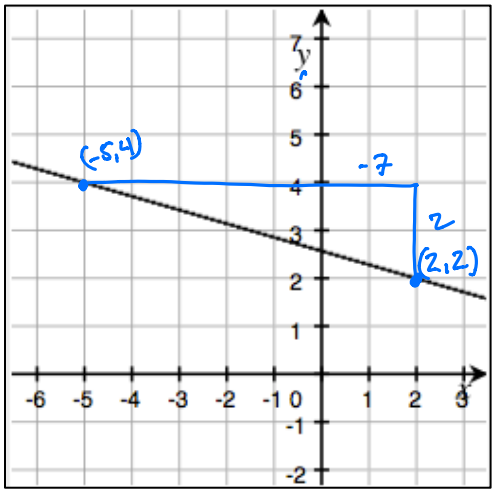
$y = -\frac{2}{3}x + \frac{1}{3}$

Slope-Intercept: $y = -\frac{2}{3}x + \frac{5}{3}$

Standard Form: $3\left(\frac{2}{3}x + y = \frac{5}{3}\right)$

$2x + 3y = 5$

Write an equation for the following line:



$m = -\frac{2}{7}$

$y = mx + b$

$y = -\frac{2}{7}x + b$

$2 = -\frac{2}{7}(2) + b$

$2 = -\frac{4}{7} + b$

$\frac{18}{7} = b$

Slope-Intercept: $y = -\frac{2}{7}x + \frac{18}{7}$

$7\left(\frac{2}{7}x + y = \frac{18}{7}\right)$

Standard Form: $2x + 7y = 18$

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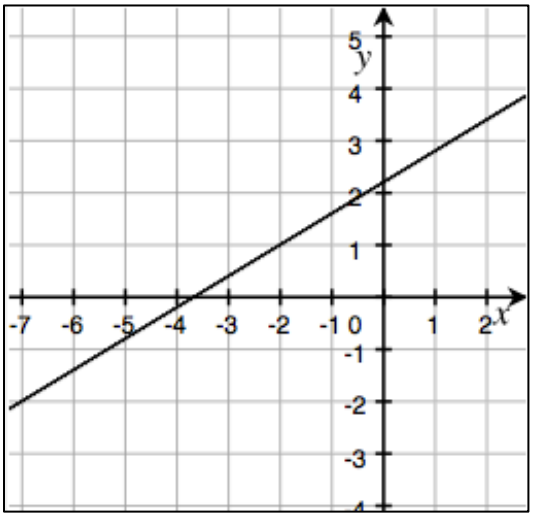
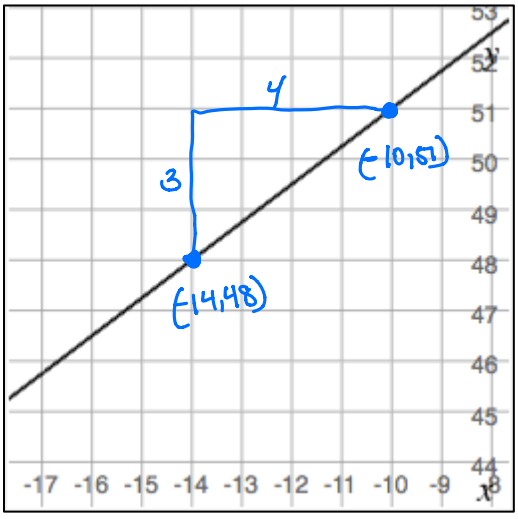
Write an equation for the following line:



Slope-Intercept:

Standard Form:

Write an equation for the following line:



$y = \frac{3}{4}x + b$

$48 = \frac{3}{4}(-14) + b$

$48 = -\frac{21}{2} + b$

$\frac{96}{2} = -\frac{42}{2} + b$

$b = \frac{117}{2} = 58.5$

Slope-Intercept: $y = \frac{3}{4}x + \frac{117}{2}$

$-\frac{3}{4}x \quad -\frac{3}{4}x$

$-4\left(-\frac{3}{4}x + y = \frac{117}{2}\right)$

Standard Form: $3x - 4y = -234$

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Write the equation of the line that passes through the points $(-4, 5)$ and $(2, 3)$.

(x_1, y_1) (x_2, y_2)

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-5}{2-(-4)} = \frac{-2}{6} = -\frac{1}{3}$

$m = -\frac{1}{3}$ $y = mx + b$

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

$+\frac{2}{3} \quad +\frac{2}{3}$

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

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

$3\left(\frac{1}{3}x + y = \frac{11}{3}\right)$

$x + 3y = 11$

Write the equation of the line that passes through the points $(-1, -3)$and $(2, -2)$.

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

$y = \frac{1}{3}x + b$

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

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

$-\frac{8}{3} = b$

$y = \frac{1}{3}x - \frac{8}{3}$

$-3\left(-\frac{1}{3}x + y = -\frac{8}{3}\right)$

$x - 3y = 8$

Write the equation of the line that passes through the points (12,12) and (14, 2).

$y = -5x + 72$

$5x + y = 72$

Write the equation of the line that passes through the points $(-3, 2)$ and $(2, -13)$.

$y = -3x - 7$

$3x + y = -7$

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Independent Practice:

Do Problem Set from Lesson 21.

Closure:

What is the minimum information you need to have in order to determine the equation for a line?

Teacher Notes:

Lesson 21 in ENY
Do IM Peaches and plums