

Module 5 Lesson 4

Math Lab: Linear Forms

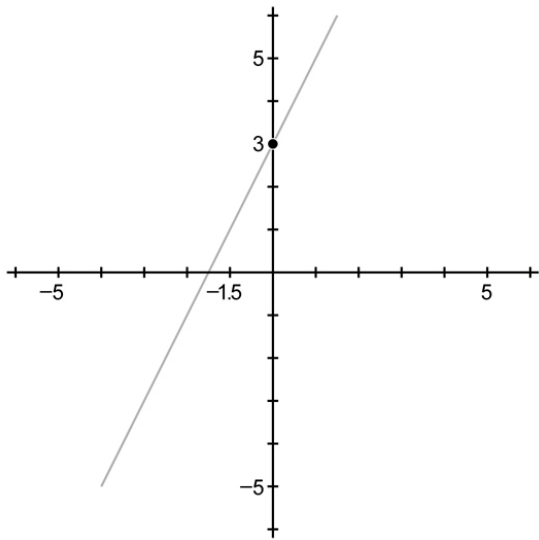
For this activity, we will be using the Desmos graphing site.
Go to <https://www.desmos.com/calculator>.

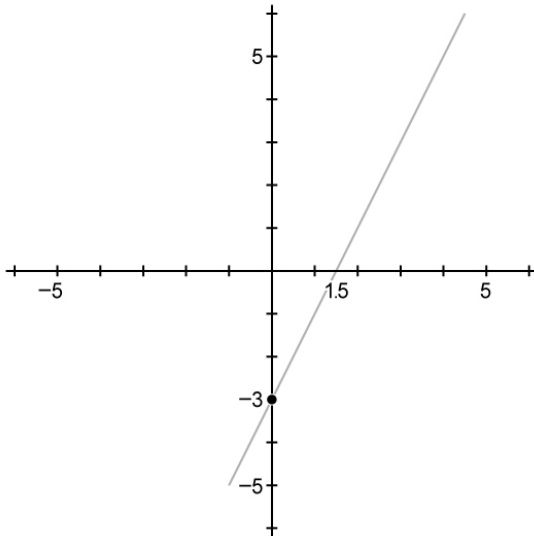
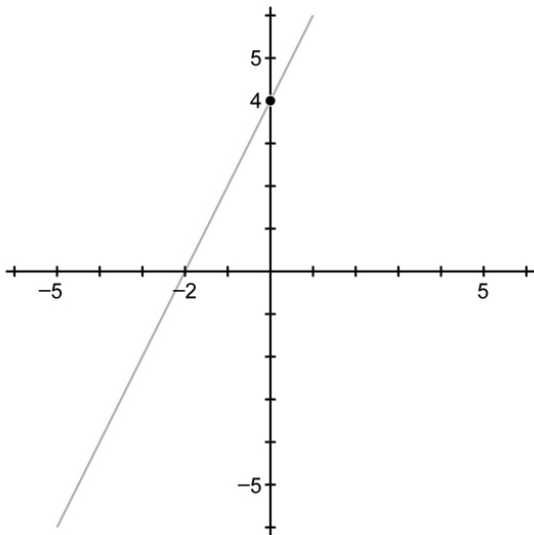
You will use it to observe how the familiar slope-intercept equation relates to the possibly less familiar slope-point equation and general equation.

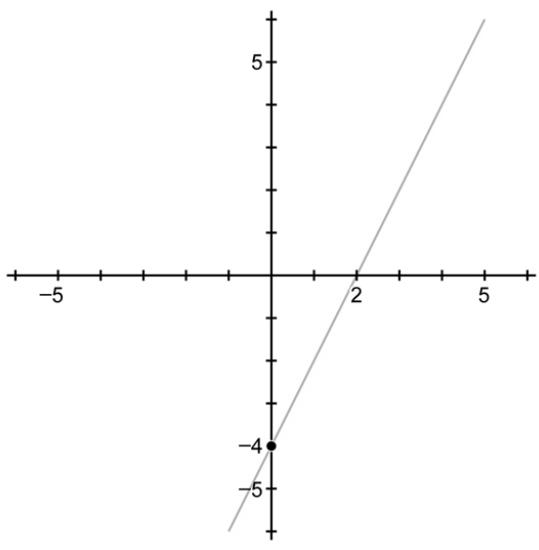
Part A

Use the Desmos graphing calculator to create the specified graphs that follow for the slope-intercept equation. Then type in the equation for slope-point form and general form in lines 2 and 3. Note what happens graphically.

See if you can figure out how the equations in these two columns relate to the points on the corresponding graph. Later in the lesson, you will explore this connection.

Equation	Slope-Intercept Form $y = mx + b$	Slope-Point Form $y - y_1 = m(x - x_1)$	General Form $Ax + By + C = 0$
$y = 2x + 3$ 	$m = 2$ $b = 3$	$y - 3 = 2x$	$2x - y + 3 = 0$

$y = 2x - 3$ 	$m = 2$ $b = -3$	Equation in point-slope form. $y + 3 = 2x$	Equation in general form. $2x - y - 3 = 0$
$y = 2x + 4$ 	$m = 2$ $b = 4$	Equation in point-slope form. $y - 4 = 2x$	Equation in general form. $2x - y + 4 = 0$

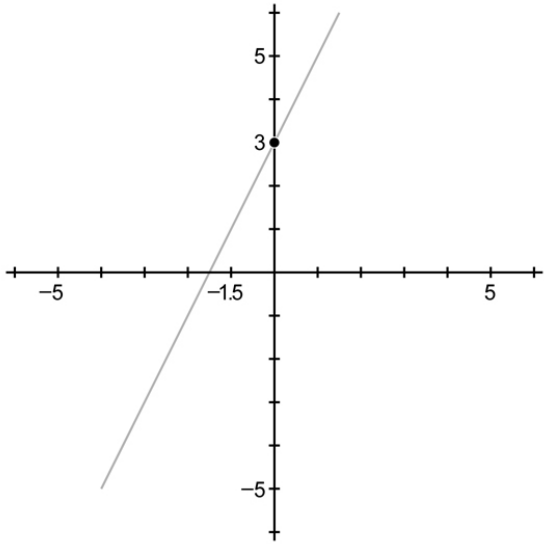
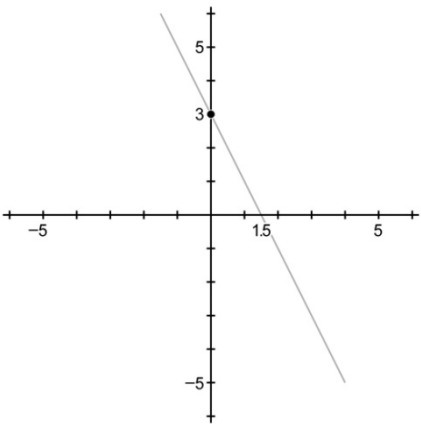
$y = 2x - 4$ 	$m = 2$ $b = 4$	Equation in point-slope form. $y + 4 = 2x$	Equation in general form. $x - y - 4 = 0$
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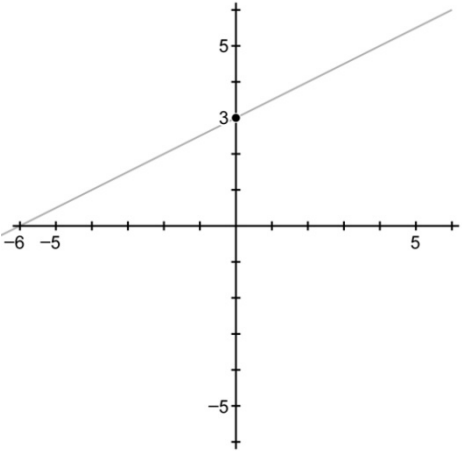
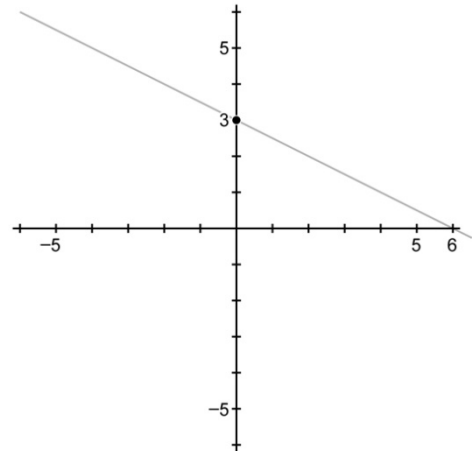
Analysis

1. Examine the four graphs in the previous table. What aspects of these graphs remain the same?
2. What aspects of all four graphs are different?
3. Why do the three different equations give you the same graph?

Part B

This time, it is your turn to predict what the equations for slope-point form and general form are. Fill in the chart below and verify your answers using the Desmos calculator.

Equation	Slope-Intercept Form $y = mx + b$	Slope-Point Form $y - y_1 = m(x - x_1)$	General Form $Ax + By + C = 0$
$y = 2x + 3$ 	$m =$ $b =$	Write the equation in point-slope form.	Write the equation in general form.
$y = -2x + 3$ 	$m =$ $b =$	Write the equation in point-slope form.	Write the equation in general form.

$y = \frac{1}{2}x + 3$ 	$m =$ $b =$	Write the equation in point-slope form.	Write the equation in general form. HINT: It is more common to make all of the coefficients to be integers; so if there is a decimal or a fraction, every term is multiplied by a value that will make all terms integers. In this case, multiply each term by 2.
$y = -\frac{1}{2}x + 3$ 	$m =$ $b =$	Write the equation in point-slope form.	Write the equation in general form.

Analysis

- Examine the four graphs in the table. What aspects of these graphs remain the same?
- What aspects of all four graphs are different?

6. Why does the general form have different numbers in it when compared with the slope-intercept and slope-point equation?