

## Linear Equations Activity

### Overview

Linear equations play an integral role in any Algebra and Geometry classroom. It is imperative that students gain a firm understanding of how to use two **coordinates** to graph a line, determine the **slope** of the line, devise the **point-slope form** for the equation of the line, devise the **slope-intercept form** for the equation of a line, and devise the **standard form** for the equation of a line.

Using this VI, students have the opportunity to enter two coordinates and the corresponding information will automatically populate. The students will see the graph of the two coordinates, the line that is created by connecting those points, the slope, and the three forms of linear equations related to those points.

### Objectives

Students will develop a firm understanding of the relationship:

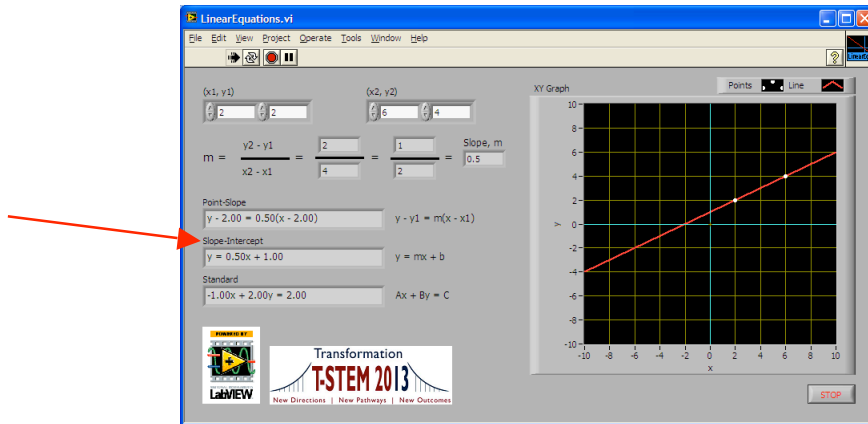
- Between the coordinates of two points and the slope of the line that is created by connecting those two points with a straight line.
- Between the coordinates of two points and the point-slope form of the equation of the line that is created by connecting those two points with a straight line.
- Between the coordinates of two points and the slope-intercept form of the equation of the line that is created by connecting those two points with a straight line.
- Between the coordinates of two points and the standard form of the equation of the line that is created by connecting those two points with a straight line.

### Standards (TEKS)

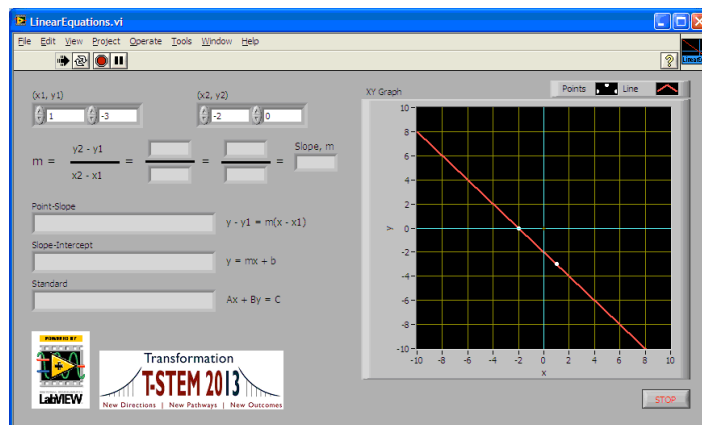
A.6A, B, C, D, E, F  
2A.1, 2A.2, 2A.3  
G.4, G.7A, B, C

### Activity

- 1) Open and run the VI.
- 2) Notice that the default **coordinates** are (2, 2) and (6, 4).
- 3) The slope of the line formed by joining these coordinates is calculated to be 0.5, or  $\frac{1}{2}$ .
  - a) What is another way that we can determine **slope**?
  - b) Could that method be used in this situation? Describe the process.
- 4) The **point-slope form** of the line is represented as  $y - 2 = 0.50(x - 2)$ . Is there an alternate version of the point-slope form of the line? If so, what is it?

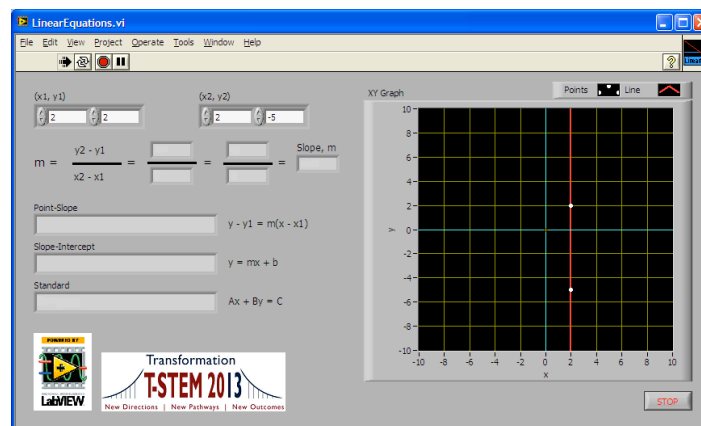


- 5) The **slope-intercept form** of the line is  $y = 0.50x + 1$ .
  - a) What does the **coefficient** of  $x$  represent? How do you know?
  - b) What does the constant represent? How do you know?
  - c) How could you use the picture of the graph of the line to determine the constant in the equation?
- 6) The **standard form** for the equation of the line is  $-1x + 2y = 2$ .
  - a) Is there a correlation between the values of the coefficient of  $x$ , the coefficient of  $y$  and the slope?
  - b) How could you use those coefficients to determine the slope of the line? Justify your answer.
  - c) How could you determine the  $y$ -intercept of the linear function using the coefficient of  $y$  and the constant? Justify your answer.
- 7) Let's practice:
  - a) Replace the default values of the coordinates with  $(1, -3)$  and  $(-2, 0)$ .



- b) What is the slope of the line?
- c) What is the point-slope form of the equation for the line? What is an alternate way to write the point-slope form of the equation for the line?
- d) What is the slope-intercept form of the line?

- i. What does the coefficient of  $x$  represent? How do you know?
  - ii. What does the constant represent? How do you know?
  - iii. How could you use the picture of the graph of the line to determine the constant in the equation?
- e) What is the standard form for the equation of the line?
- i. Is there a correlation between the values of the coefficient of  $x$  and the coefficient of  $y$  and the slope?
  - ii. How could you use those coefficients to determine the slope of the line? Justify your answer.
  - iii. How could you determine the  $y$ -intercept of the linear function using the coefficient of  $y$  and the constant? Justify your answer.
- 8) More practice:
- a) Replace the values of the coordinates with  $(-3, -3)$  and  $(2, 3)$ .
  - b) What is the slope of the line? How can that slope be represented as a fraction?
  - c) What is the point-slope form of the equation for the line? What is an alternate way to write the point-slope form of the equation for the line?
  - d) What is the slope-intercept form of the line?
    - i. What does the coefficient of  $x$  represent? How do you know?
    - ii. What does the constant represent? How do you know?
    - iii. How could you represent the constant as a fraction?
  - e) What is the standard form for the equation of the line?
    - i. Is there a correlation between the values of the coefficient of  $x$  and the coefficient of  $y$  and the slope?
    - ii. How could you use those coefficients to determine the slope of the line? Justify your answer.
    - iii. How could you determine the  $y$ -intercept of the linear function using the coefficient of  $y$  and the constant? Justify your answer.
- 9) Even more practice:
- a) Replace the values of the coordinates with  $(2, 2)$  and  $(2, -5)$ .



- b) What do you notice?

- c) What is the slope of the line?
  - d) What is the point-slope form of the line? Why do you think that is?
  - e) What is the slope-intercept form of the line? Why do you think that is?
  - f) What is the standard form of the line? What is different?
- 10) Still more practice:
- a) Replace the values of the coordinates with  $(4, 3)$  and  $(-7, 3)$ .
  - b) What do you notice?
  - c) What is the slope of the line?
  - d) What is the point-slope form of the line? What is a different way to write the point-slope form of the line?
  - e) What is the slope-intercept form of the line?
  - f) What is the standard form of the line? What is different?