

## Lesson 12: Linear Equations in Two Variables

### Classwork

#### Opening Exercise

Emily tells you that she scored 32 points in a basketball game. Write down all the possible ways she could have scored 32 with only two- and three-point baskets. Use the table below to organize your work.

Number of Two-Pointers	Number of Three-Pointers

Let  $x$  be the number of two-pointers and  $y$  be the number of three-pointers that Emily scored. Write an equation to represent the situation.

**Exploratory Challenge/Exercises**

1. Find five solutions for the linear equation  $x + y = 3$ , and plot the solutions as points on a coordinate plane.

$x$	Linear Equation: $x + y = 3$	$y$

2. Find five solutions for the linear equation  $2x - y = 10$ , and plot the solutions as points on a coordinate plane.

$x$	Linear Equation: $2x - y = 10$	$y$

3. Find five solutions for the linear equation  $x + 5y = 21$ , and plot the solutions as points on a coordinate plane.

$x$	Linear Equation: $x + 5y = 21$	$y$

4. Consider the linear equation  $\frac{2}{5}x + y = 11$ .

a. Will you choose to fix values for  $x$  or  $y$ ? Explain.

b. Are there specific numbers that would make your computational work easier? Explain.

- c. Find five solutions to the linear equation  $\frac{2}{5}x + y = 11$ , and plot the solutions as points on a coordinate plane.

$x$	Linear Equation: $\frac{2}{5}x + y = 11$	$y$

5. At the store, you see that you can buy a bag of candy for \$2 and a drink for \$1. Assume you have a total of \$35 to spend. You are feeling generous and want to buy some snacks for you and your friends.
- a. Write an equation in standard form to represent the number of bags of candy,  $x$ , and the number of drinks,  $y$ , that you can buy with \$35.

- b. Find five solutions to the linear equation from part (a), and plot the solutions as points on a coordinate plane.

$x$	Linear Equation:	$y$

**Lesson Summary**

A linear equation in two-variables  $x$  and  $y$  is in standard form if it is of the form  $ax + by = c$  for numbers  $a$ ,  $b$ , and  $c$ , where  $a$  and  $b$  are both not zero. The numbers  $a$ ,  $b$ , and  $c$  are called constants.

A solution to a linear equation in two variables is the ordered pair  $(x, y)$  that makes the given equation true. Solutions can be found by fixing a number for  $x$  and solving for  $y$  or fixing a number for  $y$  and solving for  $x$ .

**Problem Set**

1. Consider the linear equation  $x - \frac{3}{2}y = -2$ .
  - a. Will you choose to fix values for  $x$  or  $y$ ? Explain.
  - b. Are there specific numbers that would make your computational work easier? Explain.
  - c. Find five solutions to the linear equation  $x - \frac{3}{2}y = -2$ , and plot the solutions as points on a coordinate plane.

$x$	Linear Equation: $x - \frac{3}{2}y = -2$	$y$

2. Find five solutions for the linear equation  $\frac{1}{3}x + y = 12$ , and plot the solutions as points on a coordinate plane.
3. Find five solutions for the linear equation  $-x + \frac{3}{4}y = -6$ , and plot the solutions as points on a coordinate plane.
4. Find five solutions for the linear equation  $2x + y = 5$ , and plot the solutions as points on a coordinate plane.
5. Find five solutions for the linear equation  $3x - 5y = 15$ , and plot the solutions as points on a coordinate plane.