

SECTION 1.2 VARIABLES ON THE NUMBER LINE

Name: Key Date: _____ Period: _____

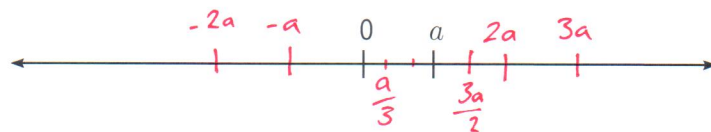
Vocabulary

DEFINITION	EXAMPLE
Variable <i>a symbol used to represent an unknown value</i>	<i>a, b, y, x, S</i>
Additive Inverse <i>for any number n, $n + (-n) = 0$</i>	<i>$3 + (-3) = 0$ $-1 + (-(-1)) = 0$</i>

EXPLORATION 1

The number a is located on the number line below. Locate and label the points that represent the indicated expressions involving a . Use string or a ruler to help locate these points. Plot a point that represents each of the following:

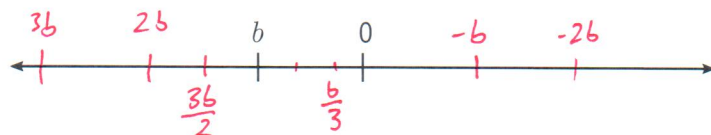
$$2a, 3a, -a, -2a, \frac{3a}{2}, \frac{a}{3}$$



EXPLORATION 2

Suppose b is a number that is located on the number line as seen below. Plot and label the points that represents each of the following:

$$2b, 3b, -b, -2b, \frac{3b}{2}, \frac{b}{3}$$



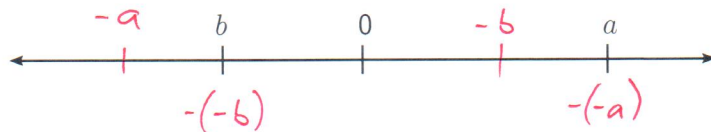
Compare Explorations 1 and 2. How are the results similar? In what ways are they different?

Answers will vary. a is positive but b is negative, a and -a are on opposite sides of 0, as are b and -b, 2 times the variable is twice as far from 0, etc.

PROBLEM 1

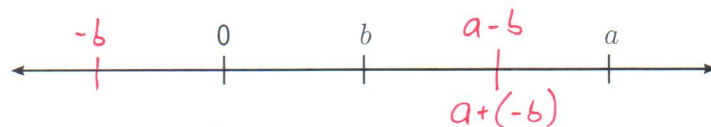
On the number line below, the numbers a and b are marked. Locate and plot the point that represents each of the following:

$$-a, \quad -(-a), \quad -b, \quad -(-b).$$



EXPLORATION 3

On the number line below, the numbers a and b are marked.



1. Use the number line model to locate and plot the point $a - b$.
2. Locate and plot the point $-b$.
3. Locate and plot the point $a + (-b)$. What do you notice? $a - b = a + (-b)$

PROBLEM 3

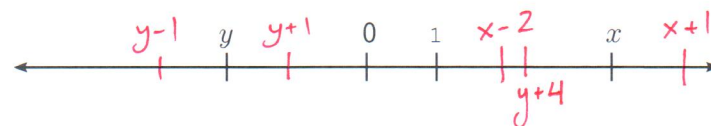
Rewrite each of the following subtraction problems as an addition problem and then compute the sum.

1. $10 - 3$ $10 + (-3) = 7$
2. $5 - (-2)$ $5 - (-2) = 5 + 2 = 7$
3. $-2 - (-4)$ $-2 + 4 = 2$
4. $-14 - 5$ $-14 + (-5) = -19$

EXPLORATION 4

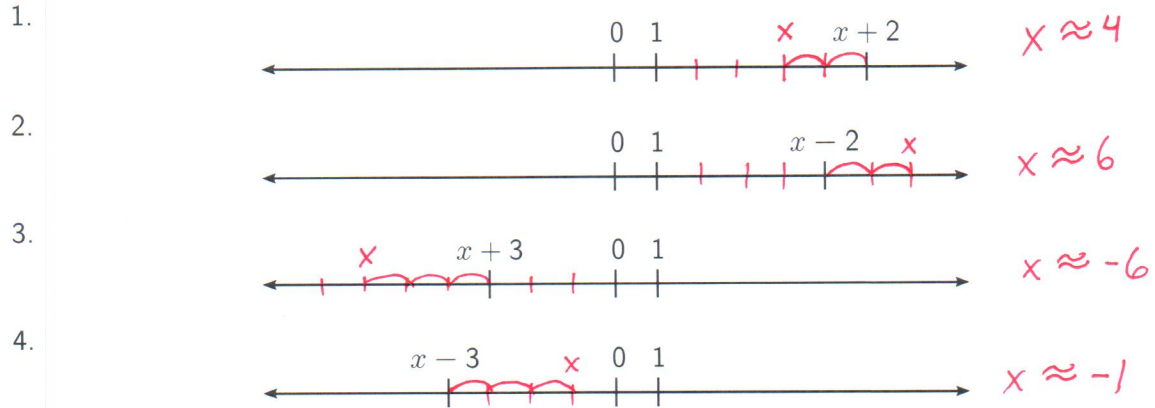
Both x and y are numbers located on the number line below. Plot a point that represents each of the following expressions on the number line below:

$$x + 1, \quad x - 2, \quad y + 1, \quad y + 4, \quad y - 1.$$



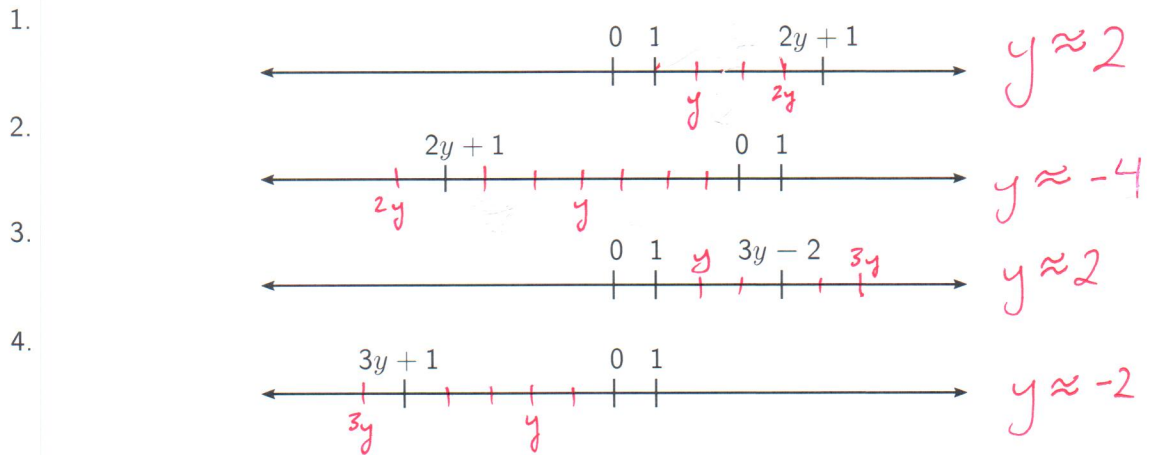
EXPLORATION 5

In each of the problems below, locate the point that represents x . Explain how you determine your answer. Estimate the value of x from its location. In each of the following explorations, 0 and 1 are marked. *Answers will vary based on accuracy of student scaling.*



PROBLEM 4

In each of the problems below, locate the point that represents y . Estimate the value of y from its location. *Answers will vary.*



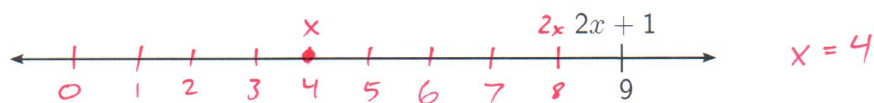
PROBLEM 5

In each of the following problems, assume that this line segment gives the length 1 unit:

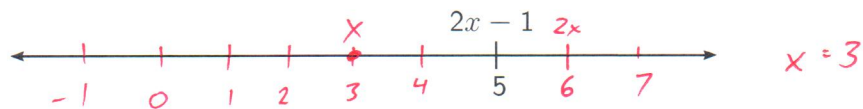


The given expression equals a numerical value. Locate the points that represent the numbers x and 0. Estimate the value of x by its location. Use the value of x in the expression to check your work.

1. $2x + 1$ is the same as 9:



2. $2x - 1$ is equal to 5:



SUMMARY (What I learned today)
