EQUATIONS, INEQUALITIES, AND FUNCTIONS 6

Name:_____Key_____   Date:_____   Period:_____

SECTION 6.3 Equations and Inequalities on Number Lines

VOCABULARY

DEFINITION	EXAMPLE
Inequality: A statement that one expression is always less than (or greater than) another	$3 < 7$ $x > -2$

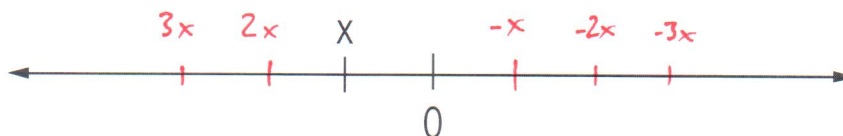**Big Idea:** How do we solve an equation on the number line?

EXPLORATION 1:

Suppose a and x are numbers located on the number line as seen below. Locate and label the points that represent the indicated numbers. Use string to act out how you determine your answer.

1. Plot points that represents each of the following: 2a, 3a, -a, -2a, -3a
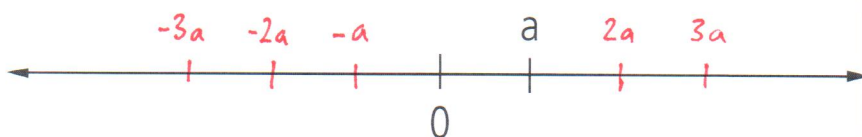
2. Plot points that represents each of the following: 2x, 3x, -x, -2x, -3x

3. Compare the results from parts 1 and 2. What do you notice?

$-$(something) is on the opposite side of 0 from (something). If x is negative, $-x$ is positive.
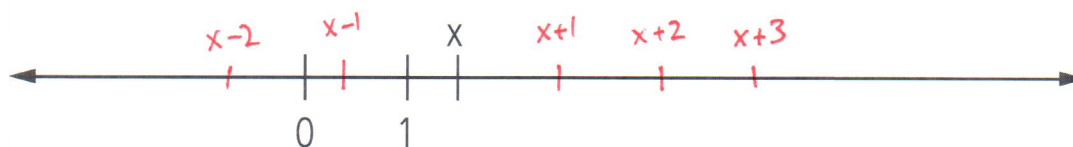
233

EXPLORATION 2:

Part A: Suppose x is a number that is located on the number line as seen below. Locate and label the points that represent the indicated expressions. The numbers 0 and 1 are also labeled. The length of the line segment below is 1:
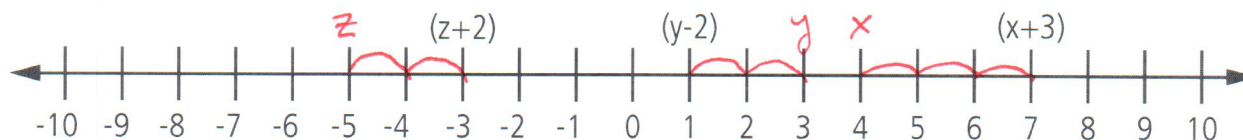
$$\vdash\!\!\!-\!\!\!-\!\!\!\dashv$$
$$\mathbf{0} \quad \mathbf{1}$$

Plot a point that represents each of the following expressions:

$x + 1, \quad x + 2, \quad x + 3, \quad x - 1, \quad x - 2$

Part B: Suppose we know the location of each of the expressions as indicated on the number line below. Find the locations for x, y, and z. Explain how you locate each of these points on the number line.

$z + 2 = -3$

$z + 2 - 2 = -3 - 2$

$z = -5$

$y - 2 = 1$

$y - 2 + 2 = 1 + 2$

$y = 3$

$x + 3 = 7$

$x + 3 - 3 = 7 - 3$

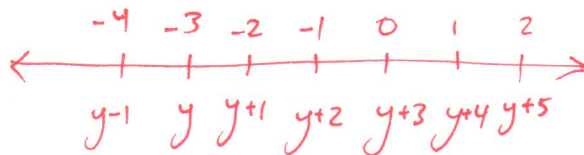$x = 4$

PROBLEMS

Use the number line to solve each of the following equations:
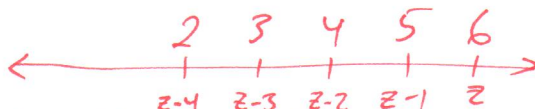
a. $x + 3 = 5$
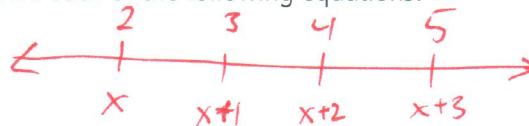
$x = 2$

b. $y + 5 = 2$

$y = -3$

c. $z - 4 = 2$

$z = 6$

d. Discuss how solving these equations on the number line compares with the balance scale method.

Balance scale : remove (subtract) or add blocks to both sides
Number line : add or subtract along the number line.

Recall that an equation is a statement that two expressions are equivalent. A statement that one expression is always less than (or greater than) another is called an **inequality**.

EXAMPLE 1: Translate the following into mathematical expressions

1.   The number of apples, A, consumed is more than twice the number of bananas, B.

$A > 2B$

2.   Jack's age, J, is less than 40 years. $J < 40$

EXAMPLE 2:

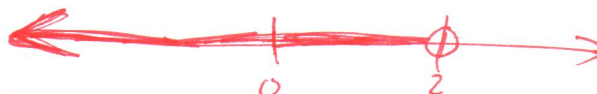Draw a number line and represent the set S of all numbers x such that $x < 3$.

Draw a number line and represent the set T of all numbers x such that $-2 \le x$.

If we start with an inequality, such as $x + 3 < 5$, determine what numbers x satisfy this inequality?

Represent the inequality on the number line.

$x + 3 < 5$
$x + 3 - 3 < 5 - 3$
$x < 2$

235

SUMMARY (What I learned in this section)

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