TOPIC 8

LESSON 8.1c

First Among Equals

Objective

Reasoning with Equal Expressions

Warm-Up

Rewrite each number as an addition, subtraction, multiplication, or division expression. Use each operation once.

1. 10

2. 50

EXPLORE 4

Identifying Solutions

Mr. Gilbes will provide a link to the digital activity

There are Equation Cards and Solution Cards are placed inside the interactive activity. Select the Equation card and place it on each solution box. The Solution Cards are shaded blue.

Match the Equation Cards with the Solution Cards.

$\frac{x}{3} + 10 = 20$	$0x = 0$	$\frac{x}{4} = \frac{1}{4}x$	$x + 4 = 4 + x$	$x + 0 = x$	$x \cdot 1 = x$	$\frac{10}{x} = 0.1$	$45 = 5x$	$\frac{x}{10} = 0.1$	$x + 3.5 = 14.25$
$29 = x \cdot 29$	$10x = 30$	$5 = x + 5$	$\frac{x}{9} = 2$	$x - 5 = x - 4$	$11 + x = 11$	$\frac{5}{8} = x + \frac{1}{2}$	$x + 1 = x$	$1x + 6 = 9$	$\frac{1}{8}x = 8$

$x = 0$	$x = 0.1$	$x = \frac{1}{8}$	$x = \frac{1}{4}$	$x = 1$	$3 = x$	$6 = x$ (six)	$9 = x$ (nine)

$x = 10.75$	$x = 18$	$30 = x$	$64 = x$	$x = 100$	infinite solutions	no solutions

1. Match the Equation Cards with the Solution Cards.
Explain how you identified each solution.

2. Which equation(s) have no solutions?
Explain how you know.

3. Which equation(s) have an infinite number of solutions?
Explain how you know.

Equations that have an infinite number of solutions are equations that are true no matter what value you assign to the variable. These kinds of equations often describe important properties of numbers. Consider each property.

• The **Zero Property of Multiplication** states that the product of any number and 0 is 0.

• The **Identity Property of Multiplication** states that the product of any number and 1 is the number.

• The **Identity Property of Addition** states that the sum of any number and 0 is the number.

4. Study the Equation Cards.
a. Which equation(s) states the Zero Property of Multiplication?

b. Which equation(s) states the Identity Property of Multiplication?

c. Which equation(s) states the Identity Property of Addition?

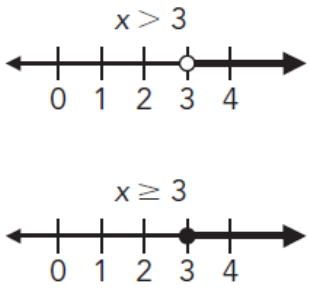
5. Three of the Solution Cards did not match any of the Equation Cards. Write equations that have those values as solutions.

EXPLORE 5

Inequalities

You can use a number line to represent inequalities. The graph of an inequality in one variable is the set of all points on a number line that make the inequality true. The set of all points that make an inequality true is the solution set of the inequality.

1. Consider the graphs of the inequalities $x > 3$ and $x \geq 3$.

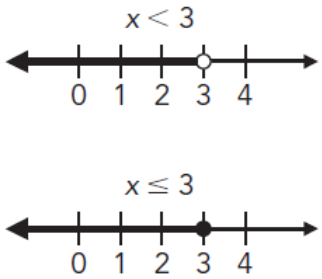


a. Describe each number line representation.

b. Describe the solution set for each inequality.

c. How does the solution set of the inequality $x \geq 3$ differ from the solution set of$x > 3$?

2. Consider the graphs of the inequalities $x < 3$ and $x \leq 3$.



a. Describe each number line representation.

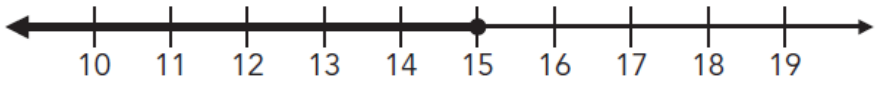
b. Describe the solution set for each.

c. How does the solution set of the inequality $x < 3$ differ from the solution set of $x \leq 3$?

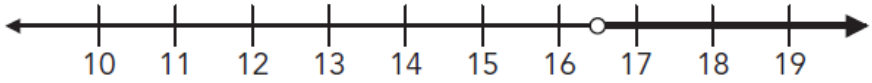
The solution to any inequality can be represented on a number line by a ray. A ray begins at a starting point and goes on forever in one direction.
A closed circle means that the starting point is part of the solution set of the inequality. An open circle means that the starting point is not part of the solution set of the inequality.

3. Write the inequality represented by each graph.

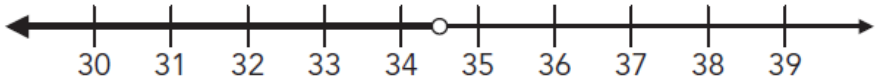
a.



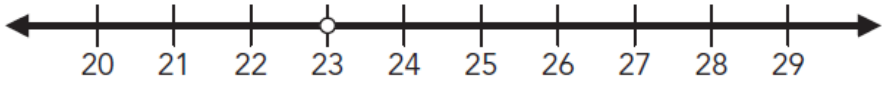
b.



c.

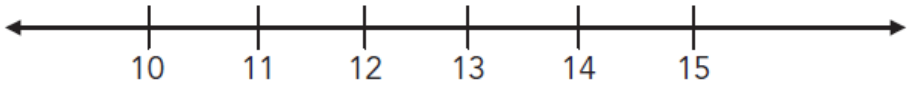


d.

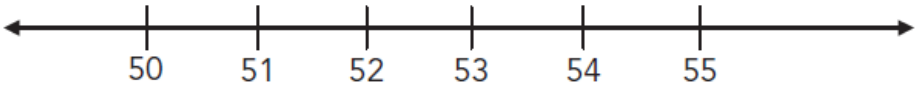


4. Graph the solution set for each inequality.

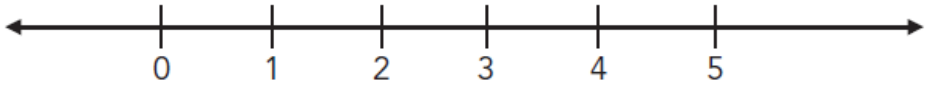
a. $x \leq 14$



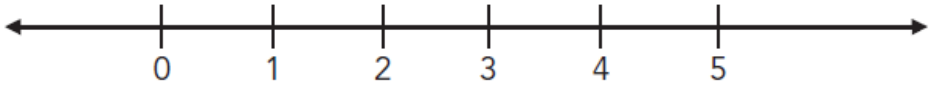
b. $x < 55$



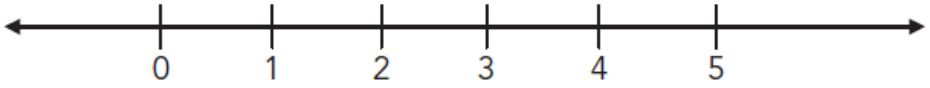
c. $2\frac{1}{2} \leq x$



d. $x > 3.3$



e. $x \neq 4.2$



5. Consider the inequalities in Questions 1 through 4.

a. How many solutions does each inequality have?

b. Can you write an inequality that has no solutions? Explain.

c. Can you write an inequality that has just one solution?
Explain your reasoning.

6. Explain the meaning of each sentence in words. Then, define a variable and write a mathematical statement to represent each statement. Finally, sketch a graph of each inequality.

a. The maximum load for an elevator is 2900 lbs.

b. A car can seat up to 8 passengers.

c. No persons under the age of 18 are permitted.

d. You must be at least 13 years old to join.

Name: _____ Date: _____ Class: _____

Homework HW

LESSON 8.1c
First Among Equals

Objective

Reasoning with Equal Expressions

Practice

Use the Order of Operations to evaluate each numeric expression.

1. $4^2 \cdot 3$

2. $3^3 - 14 \div 2 + 5$

3. $17 - 23$

4. $144 \div 6^2 \cdot 8 + 2^2$

5. $32 \div 42$

6. $2^4 - 3 \cdot 5 + 9$

7. $9 + 5^2 - 2 \cdot 3^2$

8. $11^2 - 7 \cdot 6 - 4^3 \div 2$