

Part IV:

*(Expressions and Equation--inequalities, and
Number Sense--operations with fractions)*

**Saturday Tutoring
Mathematics Program**

Name: _____

6th Grade

Saturday Tutoring Program 6th Grade Mathematics Practice. Saturday, March 22, 2014.

Objective: SWBA to understand solving an equation or inequality as a process of answering the question:

1. Which values from a specified set, if any, make the equation or inequality true?
2. Use substitution to determine whether a given number in a specified set makes an equation or inequality true **(6. EE.5)**.
3. How can I transfer my knowledge of solving equations to solve inequalities?

Introduction/Vocabulary:

An inequality is a mathematical sentence that contains $>$ or $<$ to compare or describe a range of values. Some inequalities use the symbols \leq or \geq . The symbol \leq is read is less than or equal to. The symbol \geq is read is greater than or equal to.

Inequalities can be graphed on a number line. **An open or closed dot is used to indicate where they begin.** An **arrow to the left or to the right** is used to show that they continue in the indicated direction. An **open circle** is used with inequalities having $<$ or $>$. A **closed circle** is used with inequalities having \leq or \geq .

The arrow points in the direction of the inequality sign. For Instance:

$$d \leq -2$$

Draw a number line. Place a closed circle on -2, draw a line and an arrow to the left.



$$d > 2$$

Draw a number line. Place an open circle on 2, draw a line and an arrow to the right.



Mini-Lesson:

To solve inequalities, use inverse operations to undo each operation in reverse order of the order of operations, and when I multiply or divide by a negative number, I must switch the inequality sign in order to keep the original boundary or parameter or condition of the inequality left and right sides.

Let me demonstrate to you how to solve an inequality using my knowledge of solving equations.

Problem 1: Solve the inequality below. Graph the solution set on a number line.

$$9 < r + 5$$

$9 < r + 5$ Write the inequality
 $\underline{-5} \quad \underline{-5}$ Subtraction Property of Inequality
 $4 < r$ or $r > 4$ Simplify
Graph the solution set.



Problem 2: Solve the inequality below. Graph the solution set on a number line.

$$x - 7 \geq -4$$

$x - 7 \geq -4$ Write the inequality
 $\underline{+7} \quad \underline{+7}$ Addition Property of Inequality
 $x \geq 3$ Simplify
Graph the solution set.



Guided Practice:

Problem 3: Solve the inequality below. Graph the solution set on a number line.

$$4x - 2 \leq 18$$

$$\begin{array}{r} 4x - 2 \leq 18 \\ +2 \quad +2 \\ \hline 4x \leq 20 \\ \frac{4x}{4} \leq \frac{20}{4} \\ x \leq 5 \end{array}$$

Write the inequality.
Addition Property of Inequality
Simplify.
Division Property of Inequality
Simplify.

Graph the solution set.



Problem 4: Solve the inequality below. Graph the solution set on a number line.

$$\frac{t}{-7} \leq -3$$

$$\begin{array}{r} \frac{t}{-7}(-7) \geq -3(-7) \quad \text{Multiplication Property of Inequality} \\ t \geq 21 \quad \text{Simplify} \end{array}$$

Graph the solution set.

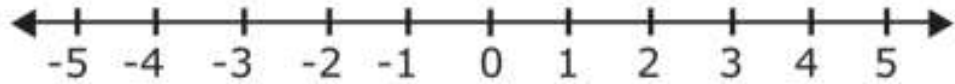


When we multiply or divide by a negative number, we must switch the inequality sign. Why?

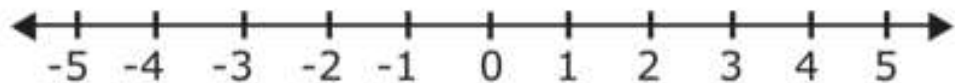
Independent Practice:

Directions: For problems 1-4, graph each inequality on the given number line.

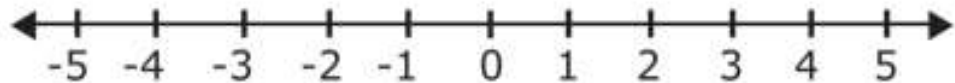
1. $x < -3$



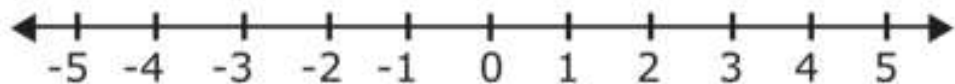
2. $x > -5$



3. $n \leq 2$



4. $1 \leq n$



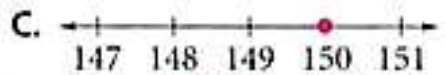
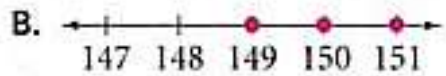
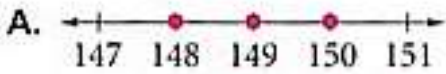
5. What is the value of the expression below?

$$\frac{11}{12} - \left(\frac{1}{2} - \frac{1}{3} \right)$$

Show your work.

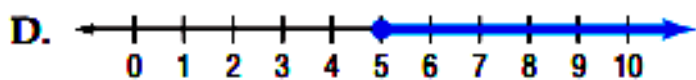
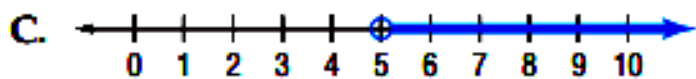
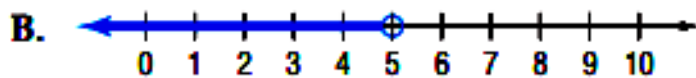
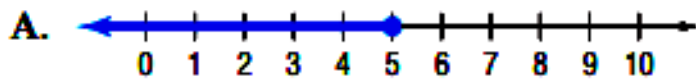
Answer: \$ _____

6. Fire codes require that no more than 150 persons occupy a conference room. Which graph includes a room count in possible violation of the fire codes?



7. Which of the following graphs represents the inequality?

$$x \geq 5$$

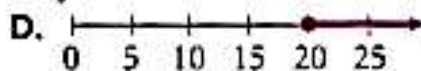


8. Employees must work at least 20 years in a company in order to receive full benefits upon retirement. Which inequality or graph does NOT describe this situation?

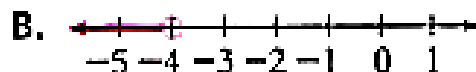
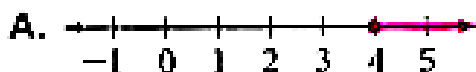
A. $y \geq 20$

C. $20 \leq y$

B. $y > 20$



9. Which graph represents all real number solutions of $x + 4 \geq 8$?



10. Which expression has the **greatest** value?

F. $3^3 2^3$

G. $3^2 2^4$

H. $3^3 2^2$

I. $3^2 2^3$

11. Which expression is equal to $2^1 \cdot 6^2$?

A. $4^2 \cdot 3^1 \cdot 2^0$

B. $4^2 \cdot 3^1 \cdot 2^1$

C. $3^2 \cdot 2^3$

D. $2^2 \cdot 4^2$

12. Simplify the fraction below:

$$7\frac{1}{4} - 3\frac{5}{6}$$

Show your work:

Answer: _____

13. Simplify

$$\frac{1}{3} + \frac{3}{5} \div \frac{9}{10} =$$

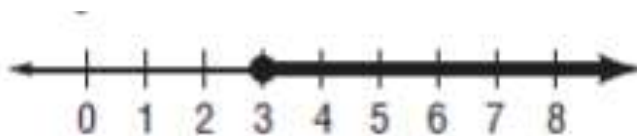
Show your work:

14. Simplify

$$\left(6 - \frac{4}{3}\right) \times \frac{11}{2}$$

Show your work:

15. Write an inequality to represent the diagram shown below. Use x as the variable.



Answer: _____

Explain how you determined your expression.

16. What value of x satisfies the following inequity?

$$4(2x - 3) > 20$$

Show your work:

Answer: _____

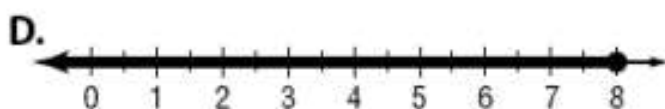
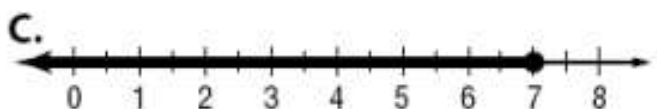
17. Neil solved an inequality and graphed the solution set as shown below.



Which inequality did Neil solve and graph?

- A. $2x \leq 7$
- B. $x + 2.5 \geq 6$
- C. $x - 7 < 1.5$
- D. $4x > 14$

18. Kaitlin belongs to an online video game club that charges \$2.50 for each game she downloads. Since she can spend no more than \$15 per month, she writes and solves the inequality $2.50g \leq 15$ to find g , the number of games she can download per month. Which graph shows the solution set for the inequality $2.50g \leq 15$?



EE

19. Write an inequality to represent the diagram shown below. Use y as the variable.



Answer: _____