Part IV:

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

Saturday Tutoring
Mathematics Program

Name:_____

7th Grade

Saturday Tutoring Program 7th Grade Mathematics Practice. Saturday, March 22, 2014.

Objective: SWBA to:

1. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and rare specific rational numbers **(7.EE.4b)**
2. Graph the solution set of the inequality and interpret it in the context of the problem.
3. Graph the solution on a number line

Introduction/Vocabulary:

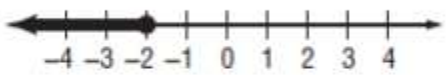
An inequality is a mathematical sentence that contains **>** or **<** to compare or describe a range of values. Some inequalities use the symbols **≤** or **≥**. The symbol ≤ is read is less than or equal to. The symbol **≥** is read is greater than or equal to.

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 ≤ or ≥**.**

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

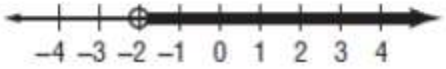
$d \leq -2$

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.



Saturday Tutoring Program 7th Grade Mathematics Practice. Saturday, March 22, 2014.

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
$-5 \quad -5$ 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
$+7 \quad +7$ 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.

$$4x - 2 \le 18$$

$4x - 2 \le 18$	Write the inequality.
$+2 \quad +2$	Addition Property of Inequality
$4x \quad \le 20$	Simplify.
$\frac{4x}{4} \quad \le \frac{20}{4}$	Division Property of Inequality
$x \le 5$	Simplify.

Graph the solution set.

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

$\frac{t}{-7}(-7) \ge -3(-7)$	Multiplication Property of Inequality
$t \ge 21$	Simplify

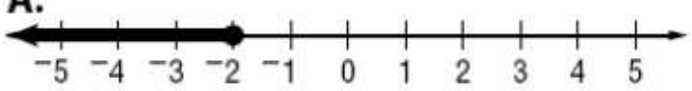
Graph the solution set.

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

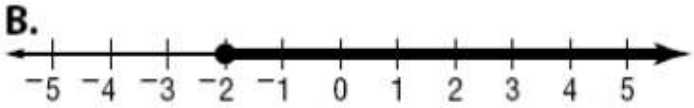
Independent Practice:

1. Which graph shows the solution set for the inequality $-2x - 2 \leq 6$?

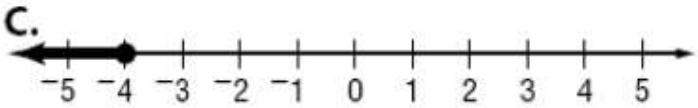
A.



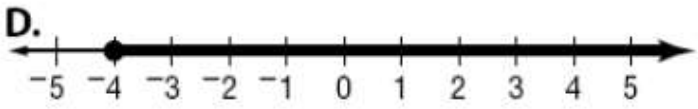
B.



C.



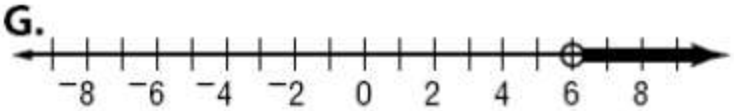
D.



2. Which graph shows the solution set for the inequality $\frac{p}{4} > 2$?

F.

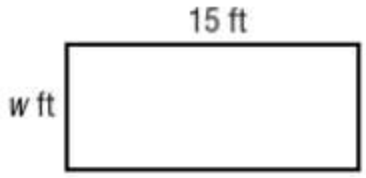
G.



H.

I.

3. Vinny is clearing a rectangular space for a garden. The length of the garden will be 15 feet as shown below.



Vinny wants the area of the garden to be at least 120 square feet. He writes the inequality $15w \geq 120$ to find w, the width for his garden. Which inequality shows the solution set for $15w \geq 120$?

A. $w \geq 6$
B. $w \geq 8$
C. $w \geq 12$
D. $w \geq 15$

4. Which inequality has the solution set shown on the graph below?

F. $-5x + 1.5 < -6$
G. $-5x - 1.5 > -6$
H. $6x - 7 > -16$
I. $6x + 7 < -16$

5. 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 $2.50g \leq 15$?

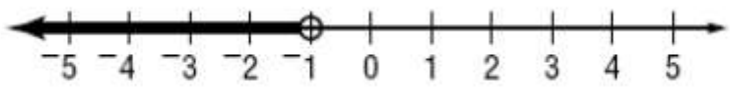
A.

B.

C.

D.

6. The graph below shows the solution set of an inequality.



Which of the following inequalities does NOT have the solution set shown in the graph?

A. $-4x + 5 > 9$

B. $3x + 7 < 4$

C. $2x + 5 > 3$

D. $5x - 2 < -7$

7. Simplify the following expression:

$$4 + 5 \times \frac{3}{5} - \frac{6}{7} \div \frac{5}{7} + 8$$

Show your work.

8. To make a fruit salad, Shelley wants to buy a watermelon for \$5.80 and some apples for \$0.75 each. She can spend at most \$10.00. She writes the inequality below to find a, the number of apples she can buy.

What is the greatest number of apples Shelley can buy?

$5.80 + 0.75a \leq 10.00$

Show your work.

9. Justin joined a video club for a flat rate of \$50 for the year. He must pay \$2 per video rental. He has a total of \$86 to spend on video rentals.
Justin used the following inequality to determine how many videos he could rent.

$$50 + 2r \leq 86$$

How many videos can he rent?

a. $r \leq 72$
b. $r \leq 68$
c. $r \leq 18$
d. $r \geq 36$

10. Austin saved $455 from his pay and joined a golf club to improve his game. He paid a $100 membership fee and also pays $15 for each round of golf he plays.

Austin used the following inequality to determine the number of rounds of golf he could play.

$$100 + 15r \leq 455$$

What is the maximum number of rounds of golf Austin can play?

Show your work:

Answer: _____

11. By United States law, any food labeled "reduced fat" must have at least 25% less fat per serving than the regular version of that food. The inequality below can be used to calculate the allowable fat content of a food labeled "reduced fat."

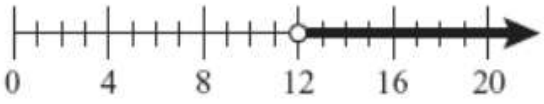
$$x \leq \frac{3}{4}y$$

where:

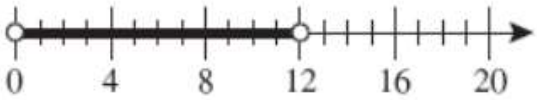
x = the number of fat grams per serving in the "reduced fat" food
y = the number of fat grams per serving in the regular-version food

One serving of regular crunchy peanut butter has 16 grams of fat. Which number line represents all possible numbers of fat grams that may be in one serving of "reduced fat" crunchy peanut butter while meeting the requirements of U.S. law?

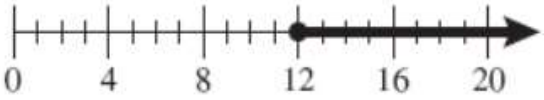
A.



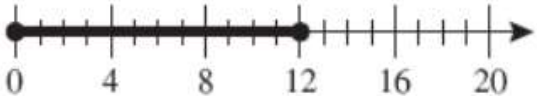
C.



B.



D.



12. A rental company charges $15 plus $4 per hour to rent a moped. If Billy does not want to spend more than $27 for his rental, write and solve an inequality to find how many hours he can rent the moped and not spend more than $27. Interpret the solution.

Show your work:

13. Simplify:

$$\frac{5}{8}\cdot\left(\frac{2}{3}+\frac{1}{6}\right)$$

Show your work:

14. Simplify:

$$\frac{-5+(-3)(-6)}{(-2)^2+(-3)^2}$$

Show your work:

15. What value of x satisfies the following inequity?

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

Show your work:

Answer: _____

17. Simplify:

$$\frac{3}{14} \div \left(\frac{5}{8} - \frac{1}{4} \right) + \frac{2}{7} =$$

Show your work:

Answer: _____