Lesson 6.2.6 – Two-Step Rational Inequalities

Lesson: 6.2.6 - Supplement
Two-Step Rational Inequalities

CC Standards

7.EE.4b  Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

b) Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p$, $q$, and $r$ are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

Objective
The student will solve two-step inequalities involving fractions and decimals and graph their solutions.

Mathematical Practices
#1 Make sense of problems and persevere in solving them.
#5 Use appropriate tools strategically.
#6 Attend to precision.
#7 Look for and make use of structure.

Teacher Input
Bellwork: Review bellwork.
Homework: Review important problems assigned the previous night.
Introduction: Introduce as directed on the PowerPoint.
Lesson: Teach as directed by PowerPoint. Look at each slide for additional comments and answers. Make sure students follow along in their notes.

Classwork
Page 4

Homework
Page 5

Extra Practice
Print from any of the 54 inequality worksheets located at:

Closure
Teacher selected.
Reminder…

1) You use the same steps when solving an inequality as you do when solving an equation. There are a few special things to consider with inequalities:

   a. When multiplying or dividing both sides of an inequality by a negative number, the symbol must be reversed (flipped). These symbols would need to be reversed:
      \[-2x + 5 > 15 \quad \frac{x}{-8} + 5 \leq 13\]
   b. You usually graph the solution set on a number line.

2) When an inequality contains fractions or decimals, you can clear those just like you do with an equation.

To clear a fraction:

Step 1
Look at all of the denominators and find the LCD.

Step 2
Multiply both sides of the inequality by the LCD.

To clear a decimal:

Step 1
Find the decimal with the most digits.

Step 2
Multiply both sides by that power of 10.

Guided Practice #1
\[-\frac{2}{3}x + \frac{5}{6} \leq 8\]

You Try #1
\[\frac{1}{2} - \frac{5}{6}y > \frac{3}{4}\]
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Guided Practice #2
\[
\frac{3}{8}x - \frac{2}{3} > \frac{7}{12}
\]

You Try #2
\[
\frac{3}{4}x - \frac{1}{8} \leq -\frac{1}{4}
\]

Guided Practice #3
\[
\frac{6}{7} < \frac{1}{7}a + \frac{53}{56}
\]

You Try #3
\[
\frac{4}{5} \geq \frac{1}{2}h + \frac{7}{10}
\]

Guided Practice #4
\[
10 - 6.4z < 2
\]

You Try #4
\[
6 + 7.8y \geq 23.16
\]
Lesson 6.2.6 – Two-Step Rational Inequalities

Classwork

Name_______________________________  Date________________  Period_____

1. Copy and complete: To clear the fractions in an equation, multiply each side of the equation by the \( \) of the fractions.

2. To clear the decimals in an equation, how do you determine what power of 10 to multiply each side of the equation by?

Solve each equation.

3. \( \frac{2}{3}n + 17 = \frac{5}{6} \)

4. \( \frac{2}{5} = \frac{5}{8}n - 4 \)

5. \( \frac{3}{4}n - \frac{1}{2} = \frac{7}{4} \)

6. \( 2.3m - 11 = -29.4 \)

7. \( 5.3m - 6 = -27.2 \)

8. \( -1.2m + 1.25 = 0.77 \)

Solve each inequality.

9. \( \frac{7}{13}x - 1 > \frac{1}{2} \)

10. \( \frac{4}{5} \geq \frac{2}{3} - \frac{2}{7}x \)

11. \( \frac{8}{15}x - \frac{17}{30} < \frac{7}{10} \)

12. Error Analysis  Describe and correct the error in clearing the fractions in the equation

\[
\frac{2}{3}x + 5 = \frac{5}{2} \]

\[
6\left(\frac{2}{3}x\right) + 5 = 6\left(\frac{5}{2}\right) \\
4x + 5 = 15
\]
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Name______________________________ Date______________ Period_____

Solve and Graph.

1) $-\frac{11}{15} x + \frac{4}{5} \geq \frac{1}{3}$

2) $-\frac{4}{11} z - 1 > -\frac{8}{11}$

3) $\frac{5}{6} n - \frac{1}{5} < -\frac{8}{15}$

4) $\frac{1}{2} x - \frac{1}{6} x \leq 5$

5) $\frac{n}{5} - \frac{3n}{10} > \frac{1}{5}$

6) $0.5a + 8.75 \geq 13.25$
Answer Keys
Reminder…

3) You use the same steps when solving an inequality as you do when solving an equation. There are a few special things to consider with inequalities:

   c. When multiplying or dividing both sides of an inequality by a negative number, the symbol must be reversed (flipped). These symbols would need to be reversed:
      \[-2x + 5 > 15\]
      \[-\frac{x}{b} + 5 \leq 13\]
   d. You usually graph the solution set on a number line.

4) When an inequality contains fractions or decimals, you can clear those just like you do with an equation.

To clear a fraction:

**Step 1**
Look at all of the denominators and find the LCD.

**Step 2**
Multiply both sides of the inequality by the LCD.

To clear a decimal:

**Step 1**
Find the decimal with the most digits.

**Step 2**
Multiply both sides by that power of 10.

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**Guided Practice #1**

\[-\frac{2}{3}x + \frac{5}{6} \leq 8\]

\[x \geq -10 \frac{3}{4}\]

**You Try #1**

\[\frac{1}{2} - \frac{5}{6}y > \frac{3}{4}\]

\[y < -\frac{3}{10}\]
**Guided Practice #2**

\[
\frac{3}{8} x - \frac{2}{3} > \frac{7}{12} \quad x > \frac{10}{3} \text{ or } 3 \frac{1}{3}
\]

**You Try #2**

\[
\frac{3}{4} x - \frac{1}{8} \leq -\frac{1}{4} \quad x \leq -\frac{1}{6}
\]

**Guided Practice #3**

\[
\frac{6}{7} < \frac{1}{7} a + \frac{53}{56} \quad a > -\frac{5}{8}
\]

**You Try #3**

\[
\frac{4}{5} \geq \frac{1}{2} h + \frac{7}{10} \quad h \leq \frac{1}{5}
\]

**Guided Practice #4**

\[
10 - 6.4z < 2 \quad z > 1.25
\]

**You Try #4**

\[
6 + 7.8y \geq 23.16 \quad y \geq 2.2
\]
Lesson 6.2.6 – Two-Step Rational Inequalities

Classwork

Name_______________________________________ Date_____________ Period_____

1. Copy and complete: To clear the fractions in an equation, multiply each side of the equation by the LCD of the fractions.

2. To clear the decimals in an equation, how do you determine what power of 10 to multiply each side of the equation by? **Look at the number of digits in the equation (or inequality) and pick the one with the most digits. Multiply by that power of 10.**

Solve each equation.

3. \( \frac{2}{3}n + 17 = \frac{5}{6} - \frac{97}{4} \)

4. \( \frac{2}{5} = \frac{5}{6}n - 4 \)

5. \( \frac{3}{4}n - \frac{1}{2} = \frac{7}{4} \)

6. \( 2.3m - 11 = -29.4 \)

7. \( 5.3m - 6 = -27.2 \)

8. \( -1.2m + 1.25 = 0.77 \)

Solve each inequality.

9. \( \frac{7}{13}x - 1 > \frac{1}{2} \)

10. \( \frac{4}{5} \geq \frac{2}{3} - \frac{2}{7}x \)

11. \( \frac{8}{15}x - \frac{17}{30} < \frac{7}{10} \)

12. **Error Analysis** Describe and correct the error in clearing the fractions in the equation.

\[ \frac{2}{3}x + 5 = \frac{5}{2} \]

\[ 6\left(\frac{2}{3}x\right) + 5 = 6\left(\frac{5}{2}\right) \]

\[ 4x + 5 = 15 \]
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Homework

Name__________________________________ Date_________ Period_____

Solve and Graph.

1) \(-\frac{11}{15}x + \frac{4}{5} \geq \frac{1}{3}\) \(x \leq \frac{7}{11}\)

2) \(-\frac{4}{11}z - 1 > -\frac{8}{11}\) \(z < -\frac{3}{4}\)

3) \(\frac{5}{6}n - \frac{1}{5} < -\frac{8}{15}\) \(n < -\frac{2}{5}\)

4) \(\frac{1}{2}x - \frac{1}{6}x \leq 5\) \(x \leq 15\)

5) \(\frac{n}{5} - \frac{3n}{10} > \frac{1}{5}\) \(n < -2\)

6) \(0.5a + 8.75 \geq 13.25\) \(a \geq 9\)