Edgenuity

Warm-Up | Solving Two-Step Inequalities

Lesson Question

Lesson Goals

Solve two-step _____.

Solve real-world problems involving two-step inequalities.

Interpret _____ to problems involving two-step inequalities.

Words to Know

Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.

_____	properties of inequality	A. to separate from other substances; to place apart so as to be alone
_____	solution set	B. rules that allow you to perform operations on both sides of an inequality without changing the solution set
_____	inverse operations	C. the value or values that make an equation or inequality true
_____	isolate	D. operations that “undo” each other, such as addition and subtraction or multiplication and division

Warm-Up | Solving Two-Step Inequalities

Solving a Two-Step Equation

Solve $2x - 8.4 = -7.8$.

$$2x - 8.4 = -7.8$$
$$+8.4 \quad +8.4$$
$$2x = \square$$
$$\frac{2x}{\square} = \frac{0.6}{2}$$
$$x = 0.3$$

Now let's check our answer to see if it works.

$$2(\square) - 8.4 = -7.8$$
$$0.6 - \square = -7.8$$
$$\square = -7.8$$

Instruction | Solving Two-Step Inequalities

Slide 2

Solving Two-Step Inequalities

To solve a two-step inequality:

1. Use the [ ] or subtraction property of inequality to [ ] the variable term.
2. Use the multiplication or [ ] property of inequality to isolate the variable.
3. [ ] the **solution set**.
4. Check the solution.

Inequalities with Positive Coefficients

Find the solution set of $3x + 11 < 50$ using **inverse operations** and **properties of inequality**.

1. Use the [ ] property of inequality to isolate the variable term.

$$3x + 11 < 50$$
$$-11 \quad -11$$
$$3x < \square$$

2. Use the division property of inequality to isolate the variable.

$$\frac{3x}{\square} < \frac{39}{3}$$
$$x < 13$$

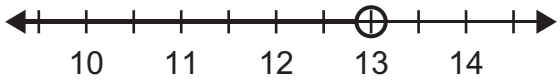
Instruction | Solving Two-Step Inequalities

Slide 2

Inequalities with Positive Coefficients

3. Graph the solution set.

The solution set has all values strictly less than $\square$.



4. Check the solution.

Choose a value for x that is less than 13.

$$3(\square) + 11 < 50$$

$$36 + 11 < 50$$

$$47 \quad \square \quad 50$$

Check 13.

$$3(13) + 11 < 50$$

$$\square + 11 < 50$$

$$50 < 50$$

50 is not less than 50, which means 13 is not a solution. That's why we use an open circle at 13.

Instruction | Solving Two-Step Inequalities

Slide 4

Inequalities with Negative Coefficients

Solve $15 < -2x + 5$.

1. Use the subtraction property of inequality to isolate the variable term.

$$15 < -2x + 5$$
$$15 - 5 < -2x + 5 - 5$$
$$10 < -2x$$

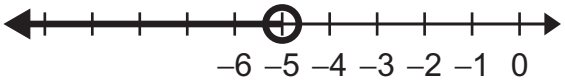
2. Use the [ ] property of inequality to isolate the variable.

$$\frac{10}{-2} < \frac{-2x}{\square}$$
$$-5 > x$$

3. Graph the solution set.

Graph $x < -5$.

So I'm going to have an [ ] circle at –5.



4. Check the solution.

$$15 < -2(\square) + 5$$
$$15 < 12 + 5$$
$$15 < \square$$

Instruction | Solving Two-Step Inequalities

Slide 4

Inequalities Involving Fractions

Solve $-\frac{4}{3}x - \frac{1}{6} \leq 2$

1. Use the addition property of inequality to isolate the variable term.

$$-\frac{4}{3}x - \frac{1}{6} \leq 2$$

$$-\frac{4}{3}x - \frac{1}{6} + \square \leq 2 + \frac{1}{6}$$

$$-\frac{4}{3}x \leq \square + \frac{1}{6}$$

$$-\frac{4}{3}x \leq \frac{13}{6}$$

2. Use the division property of inequality to isolate the variable.

$$\left(\square\right)\left(-\frac{4}{3}x\right) \leq \left(\frac{13}{6}\right)\left(-\frac{3}{4}\right)$$

$$x \geq \square$$

$$x \geq -\frac{13}{8}$$

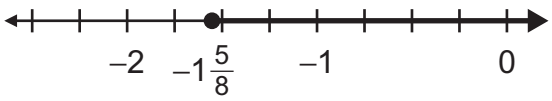
$$x \geq \square$$

Instruction | Solving Two-Step Inequalities

Slide 4

Inequalities Involving Fractions

3. Graph the solution set.



4. Check the solution.

Check a value greater than $-1\frac{5}{8}$.

$$-\frac{4}{3}(\square)-\frac{1}{6}\leq 2$$

$$-\frac{1}{6}\leq 2$$

Instruction | Solving Two-Step Inequalities

Slide 7

Solving a Problem Involving a Maximum

The budget for costumes and decorations for the winter performance at Burke Middle School is $400. Costumes for students cost $15 each. The decorations cost $150. How many students can be in the show?

- variable: x = number of ☐
- inequality: Total Cost ≤ ☐

$$150 + 15x \leq 400$$

Use the subtraction property of inequality.

$$150 - \square + 15x \leq 400 - 150$$

$$15x \leq 250$$

Now use the division property of inequality.

$$\frac{15x}{\square} \leq \frac{250}{15}$$

$$x \leq \frac{50}{3}$$

$$x \leq \square$$

So, the possible number of students are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.

Slide 9

Solving a Problem Involving a Minimum

A manufacturer wants to keep more than 500 cans of tomato paste in the company's inventory. Currently, 744 cans are in stock. A distributor wants to buy some in cases of 14. How many cases can the manufacturer sell while keeping the desired inventory?

- variable: x = numbers of cases
- Inequality: Current inventory – Cases sold > Minimum inventory

$$744 - 14x > \square$$

$$744 - \square - 14x > 500 - 744$$

$$-14x > -244$$

$$\frac{-14x}{-14} > \frac{-244}{\square}$$

$$x < \square$$

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

These represent all the possible solutions to this problem.

Summary | Solving Two-Step Inequalities

Lesson Question

How can you solve two-step inequalities?

Answer

2 Review: Key Concepts

- To solve two-step inequalities, use inverse operations and properties of inequality.
- To solve real-world problems involving two-step inequalities:
  - identify the [ ],
  - write an inequality,
  - solve the inequality,
  - [ ] the solution in the context of the problem.

Summary | Solving Two-Step Inequalities

Use this space to write any questions or thoughts about this lesson.