

Objective Solving Inequalities with Inverse Operations

Warm-Up



Graph each inequality on a number line.

1.  $x > 7.5$

2.  $x \geq 4\frac{1}{5}$



3.  $x < 6.8$

4.  $x \leq 6$





Aaron wants to buy new football pads that cost \$55.00 at GoodSportsBuys.com. The online store charges \$11 for shipping on orders less than \$75. He also wants to buy some packages of eyeblock strips for \$4 each, but he does not want to pay more than the \$11.00 shipping fee.

1. Write and solve an inequality that describes the possible number of packages of eyeblock strips Aaron can purchase and still remain in the \$11.00 shipping fee category. Let  $p$  represent the number of packages of eyeblock strips. Explain your solution in terms of the problem situation.

You just solved a problem that involved setting up and solving a two-step inequality. Let's compare and contrast the strategies and solutions of an equation and inequality that are similar in structure.

2. Describe the steps you would take to solve the equation  $3x - 2 = 7$ . Then, solve the equation.

3. A set of possible solutions for each inequality is shown. Circle the solutions that make the inequality true. Then, list three additional solutions to the inequality.

a.  $3x - 2 \geq 7$

$\{-2, -1, 0, 1, 2, 3, 4, 5, 6, 7\}$

b.  $3x \geq 9$

$\{-2, -1, 0, 1, 2, 3, 4, 5, 6, 7\}$

c.  $x \geq 3$

$\{-2, -1, 0, 1, 2, 3, 4, 5, 6, 7\}$

4. What do you notice about the solutions you circled in Question 3, parts (a) through (c)?

5. What do you notice about the three additional solutions you wrote for each inequality?

6. Compare the sequence of the three inequalities to the steps you used to solve the equation in Question 2. What do you notice? Explain your reasoning.

7. Graph the solution set for  $3x - 2 \geq 7$ .

You can check your solution to an inequality by choosing a value that is in your solution set and substituting it into the original inequality. If that substituted value makes the inequality true, then you have verified a correct solution.

8. Choose a value from the solution set of the inequality  $3x - 2 \geq 7$ , and verify that it is a solution.

9. Analyze the solution strategy and solution for each inequality.

Ella



$$\begin{aligned} -\frac{1}{2}x + \frac{3}{4} &< 2 \\ -4\left(-\frac{1}{2}x + \frac{3}{4} < 2\right) \\ 2x - 3 &> -8 \\ 2x &> -5 \\ x &> \frac{-5}{2} \\ x &> -2.5 \end{aligned}$$

Describe the strategy that Ella used correctly.

Jeff



$$\begin{aligned} -12x + 20 &< 32 \\ \frac{-12x + 20}{-4} &< \frac{32}{-4} \\ 3x - 5 &< -8 \\ 3x &< -3 \\ x &< -1 \end{aligned}$$

Identify the error in Jeff's strategy and determine the correct solution.

10. Solve each inequality or equation, and show your work.  
Then, graph the solution set on a number line.

a.  $2x + 5 < -17$

b.  $97 \leq -8x + 1$

c.  $6.5x - 1.1 > 6.9$

d.  $10 < \frac{2x - 3}{5}$

e.  $18 > 2x + 7$

**LESSON 8.4c**  
**Be Greater Than****Objective****Solving Inequalities with Inverse Operations****Practice**

4. Carole has \$53.95 and she washes cars for \$8 each. Carole wants to attend a musical that costs \$145.75.
- Write and solve an inequality to determine the minimum number of cars Carole must wash to be able to buy the ticket to the musical.
  - Is the answer to the question that same as the solution to the inequality? Explain.
5. David has \$15 to spend at the gourmet candy store. He wants to buy gummy bears and jelly beans. Gummy bears are \$5.25 per pound and jelly beans are \$3.90 per pound. If David already has  $1\frac{3}{4}$  pounds of jelly beans, how many pounds of gummy bears can he buy? (Weights are measured to the nearest hundredth.) Write and solve an inequality to determine the maximum number of pounds of gummy bears David can buy.

**Practice**

Solve each inequality and graph the solution set on a number line.

1.  $7(4x + 9) - 13 \geq -87$

2.  $0.25(3 - x) < 0.375$

3.  $78 < -9x - 3(-56 + 12x)$

4.  $0.20x - 0.08(x - 10) \leq 24.80$