KEY CONCEPT

Like two-step equations, solving two-step inequalities involves carrying out two different operations—addition or subtraction, and multiplication or division. Unlike two-step equations, which have a single solution, two-step inequalities have multiple solutions.

Do You Understand?

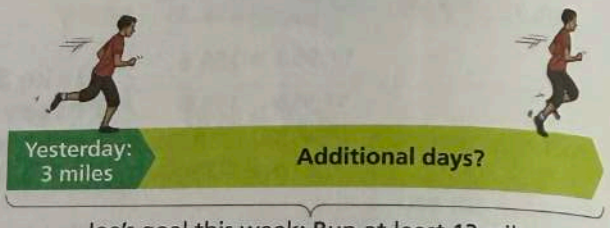
1. **Essential Question** How is solving a two-step inequality similar to and different from solving a two-step equation?

2. **Reasoning** What is the difference between the number of solutions for a two-step equation and for a two-step inequality? MP.2

3. Why are inverse relationships between operations used to solve two-step inequalities?

Do You Know How?

4. Joe ran 3 miles yesterday and wants to run at least 12 miles this week. Write an inequality that can be used to determine the additional number of days Joe must run this week if each run is 3 miles. Then solve the inequality.



Joe's goal this week: Run at least 12 miles

$3 + 3x \geq 12$

$x \geq 3$

5. Solve $4 + 6.5x < 36.5$.

$x < 5$.

6. Tomas has $1,000 to spend on a vacation. His plane ticket costs $348.25. If he stays 5.5 days at his destination, how much can he spend each day? Write an inequality and then solve.

$348.25 + 5.5x \leq 1000$

$x \leq 118.50$

7. Solve $12 - \frac{3}{5}x > 39$.

$x > -45$

Name: _____

PRACTICE TUTORIAL

Practice & Problem Solving

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Leveled Practice For 8 and 9, fill in the boxes to write and solve each inequality.

8. Eight less than the product of a number n and $\frac{1}{5}$ is no more than 95.

$\frac{1}{5}n$ ○ 8 ≤ 95

$\frac{1}{5}n$ ≤ 103

n ≤ 515

9. Seven more than the quotient of a number b and 45 is greater than 5.

$\frac{b}{45}$ + 7 ○ 5

$\frac{b}{45}$ > −2

b > −90

10. Solve the inequalities and compare.

a. Solve $2x + 6 < 10$.

$2x < 4$, $x < 2$

b. Solve $-2x + 22 < 18$.

$-2x < -4$; $x > 2$

c. Which is the correct comparison of solutions for $2x + 6 < 10$ and $-2x + 22 < 18$?

Ⓐ The inequalities have some common solutions.

Ⓑ The inequalities have one common solution.

Ⓒ The inequalities have no common solutions.

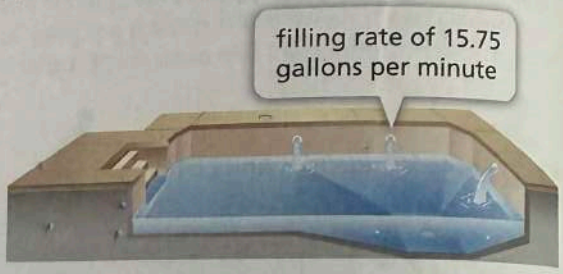
Ⓓ The inequalities have the same solutions.

11. Make Sense and Persevere Talia has a daily budget of $94 for a car rental. Write and solve an inequality to find the greatest distance Talia can drive each day while staying within her budget. MP.1

12. Model with Math A manager needs to rope off a rectangular section for a private party. The length of the section must be 7.6 meters. The manager can use no more than 28 meters of rope. What inequality could you use to find the possible width, w, of the roped-off section? MP.4

13. Higher Order Thinking Andrea went to the store to buy a sweater that was on sale for 40% off the original price. It was then put on clearance at an additional 25% off the sale price. She also used a coupon that saved her an additional $5. Andrea did not spend more than $7.60 for the sweater. What are the possible values for the original price of the sweater?

14. A pool can hold 850 gallons. It now has 598 gallons of water and is being filled at the rate shown. How many more minutes, m, can water continue to flow into the pool before it overflows? Write and solve an inequality.

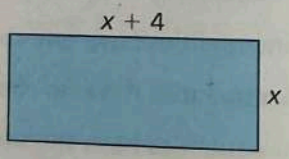


Assessment Practice

15. Use the rectangle diagram at the right.

PART A

Write and solve an inequality to find the values of x for which the perimeter of the rectangle is less than 120.



PART B

Based on your answer to Part A, are there any values that can be eliminated from the solution set? Explain.

16. Write and solve the inequality.

$\frac{4}{7}$ times a number minus 8.5 is no more than 11.5.