

## Solving Inequalities Worksheet Questions and Answers PDF

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### Part 1: Building a Foundation

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Which of the following symbols represents "less than or equal to"?

*Hint: Think about the symbols used in inequalities.*

- >
- <
- ≥
- ≤ ✓

■ The correct symbol for 'less than or equal to' is ≤.

Which of the following are types of inequalities? (Select all that apply)

*Hint: Consider the different forms inequalities can take.*

- Linear Inequalities ✓
- Quadratic Inequalities ✓
- Exponential Inequalities ✓
- Rational Inequalities ✓

■ Linear, Quadratic, Exponential, and Rational are all types of inequalities.

Explain what it means to solve an inequality. How is it different from solving an equation?

*Hint: Consider the nature of the solutions in both cases.*

**Solving an inequality involves finding a range of values that satisfy the inequality, while solving an equation finds specific values.**

**List the four main inequality symbols and provide a brief description of each.**

*Hint: Think about the symbols you use in inequalities.*

1. Symbol: <

**Less than**

2. Symbol: >

**Greater than**

3. Symbol:  $\leq$

**Less than or equal to**

4. Symbol:  $\geq$

**Greater than or equal to**

The four main symbols are:  $<$  (less than),  $>$  (greater than),  $\leq$  (less than or equal to), and  $\geq$  (greater than or equal to).

## Part 2: Comprehension and Interpretation

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**When solving the inequality  $3x - 5 > 7$ , what is the first step?**

*Hint: Think about how to isolate the variable.*

- Add 5 to both sides ✓
- Subtract 5 from both sides
- Divide both sides by 3
- Multiply both sides by 3

The first step is to add 5 to both sides of the inequality.

**Which of the following statements are true about inequalities? (Select all that apply)**

*Hint: Consider the properties of inequalities when performing operations.*

- Multiplying both sides by a negative number reverses the inequality sign. ✓
- Adding the same number to both sides of an inequality changes the inequality sign.
- Inequalities can be represented on a number line. ✓
- Dividing both sides by a positive number keeps the inequality sign the same. ✓

True statements include that multiplying by a negative reverses the sign, and inequalities can be represented on a number line.

**Describe how you would graph the solution to the inequality  $x \leq 4$  on a number line.**

*Hint: Think about how to represent the endpoint and the direction of the line.*

You would place a closed dot on 4 and shade to the left to indicate all values less than or equal to 4.

### Part 3: Application and Analysis

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Solve the inequality  $2x + 3 \leq 11$  and choose the correct solution.

Hint: Isolate  $x$  by performing inverse operations.

- $x \leq 4$  ✓
- $x \geq 4$
- $x \leq 5$
- $x \geq 5$

The correct solution is  $x \leq 4$ .

Which of the following are solutions to the inequality  $x^2 - 4x < 0$ ? (Select all that apply)

Hint: Consider the roots of the equation and the intervals they create.

- $x = 0$  ✓
- $x = 2$  ✓
- $x = 4$
- $x = -1$

The solutions are  $x = 0$  and  $x = 2$ .

A store offers a discount such that the total cost  $C$  of an item after discount is less than \$50. If the original price is \$60 and the discount is represented by  $d$ , write an inequality to represent this situation and solve for  $d$ .

Hint: Think about how to express the total cost in terms of the discount.

| The inequality is  $60 - d < 50$ , which simplifies to  $d > 10$ .

Consider the compound inequality  $1 < 2x + 3 \leq 7$ . What is the solution for  $x$ ?

Hint: Break the compound inequality into two parts to solve.

- $1 < x \leq 2$
- $-1 < x \leq 2$  ✓
- $1 < x < 2$
- $-1 < x < 2$

| The solution is  $-1 < x \leq 2$ .

Explain how you would solve the inequality  $(x+1)/(x-2) > 3$ . What steps would you take to ensure all solutions are valid?

Hint: Consider how to eliminate the fraction and check for extraneous solutions.

| You would first multiply both sides by  $(x-2)$  and then solve the resulting inequality, checking for values that make the denominator zero.

## Part 4: Evaluation and Creation

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Evaluate the following scenario: If a car must travel at least 60 miles per hour but no more than 80 miles per hour, which inequality best represents this speed range?

Hint: Think about how to express the range of speeds.

- $60 < x < 80$
- $60 \leq x \leq 80$  ✓
- $60 > x > 80$
- $60 \geq x \geq 80$

The correct inequality is  $60 \leq x \leq 80$ .

Which of the following inequalities could represent a scenario where a company's profit  $P$  is at least \$10,000 but less than \$50,000? (Select all that apply)

Hint: Consider how to express the minimum and maximum profit.

- $10000 \leq P < 50000$  ✓
- $10000 < P \leq 50000$
- $10000 \leq P \leq 50000$
- $10000 < P < 50000$  ✓

The inequalities that represent this scenario are  $10000 \leq P < 50000$  and  $10000 < P < 50000$ .

Create a real-world problem involving a quadratic inequality. Describe the problem and solve the inequality, explaining each step.

Hint: Think about a scenario that can be modeled with a quadratic expression.

An example could be a projectile motion problem where the height is modeled by a quadratic inequality.