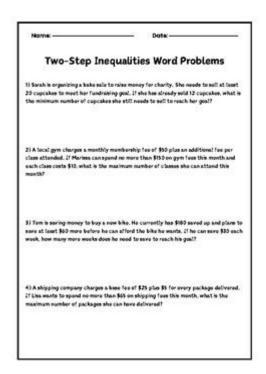# Two Step Inequality Word Problems Worksheet With Answers

Two Step Inequality Word Problems Worksheet with Answers

Inequalities play a crucial role in algebra and are essential for solving a variety of real-world problems. A two-step inequality is an inequality that requires two operations to isolate the variable. In this article, we will explore two-step inequality word problems, how to approach them, and provide a comprehensive worksheet with answers for practice. This resource is geared towards students who are learning to translate word problems into mathematical inequalities and solve them step by step.

Understanding Two-Step Inequalities

Before diving into word problems, it's important to understand what two-step inequalities are. A two-step inequality is typically expressed in the form:

- $ax + b < c$
- $ax + b > c$
- $ax + b \leq c$
- $ax + b \geq c$

Where:
- a is a coefficient,
- b is a constant,

- c is a constant, and
- x is the variable.

To solve a two-step inequality, the following steps are generally taken:

1. Isolate the term containing the variable by adding or subtracting a constant from both sides.
2. Divide or multiply both sides by a coefficient, remembering to reverse the inequality sign if multiplying or dividing by a negative number.

Common Scenarios for Two-Step Inequalities

Two-step inequalities can be used to represent a variety of scenarios. Here are some common contexts in which they may arise:

- Budgeting: Determining how much money can be spent given certain constraints.
- Measurements: Setting limits on lengths, weights, or other measurements.
- Comparative Analysis: Evaluating how one quantity compares to another within certain limits.

Strategies for Solving Word Problems

When faced with a word problem that can be modeled with a two-step inequality, consider the following strategies:

1. Read the Problem Carefully: Understand what is being asked and identify the key information.
2. Identify the Variable: Determine what variable you need to solve for.
3. Translate to Inequality: Convert the words into a mathematical inequality.
4. Solve the Inequality: Follow the steps for solving two-step inequalities.
5. Check Your Work: Substitute your solution back into the original context to ensure it makes sense.

Example Scenario

Let's consider a word problem to illustrate how to construct and solve a two-step inequality.

Problem: A local sports team is selling tickets for a game. The cost of a ticket is \$15. The team wants to ensure that they sell at least \$300 worth of tickets. How many tickets must they sell?

Step 1: Identify the Variable
Let x represent the number of tickets sold.

Step 2: Translate to Inequality
The total revenue from ticket sales must be at least $300, which can be expressed as:
$$ 15x \geq 300 $$

Step 3: Solve the Inequality
Dividing both sides by 15:
$$ x \geq 20 $$

Conclusion: The team must sell at least 20 tickets.

Two-Step Inequality Word Problems Worksheet

Below is a worksheet containing several two-step inequality word problems. Attempt to solve each problem, translating the scenario into an inequality, and then solving it step by step.

1. Problem 1: A bookstore sells novels for $12 each. If the owner wants to make at least $240 in sales, how many novels must they sell?

2. Problem 2: A concert hall has a seating capacity of 500. If they want to sell at least 300 tickets, how many tickets can they sell at a maximum to keep some seats empty?

3. Problem 3: A gym charges a monthly membership fee of $30. If they want to collect at least $900 in fees, how many members do they need?

4. Problem 4: A car rental company charges $25 per day to rent a car. If the company wants to earn at least $500 in one day, how many cars must they rent?

5. Problem 5: A toy store wants to offer a discount on its $50 toys. If they want to sell at least $200 worth of toys after the discount, what is the maximum discount they can offer per toy?

Answers to the Worksheet

Below are the solutions to the problems presented in the worksheet.

1. Answer 1:
Let (x) be the number of novels sold.
Inequality:
$$ 12x \geq 240 $$
Solving gives:
$$ x \geq 20 $$
The bookstore must sell at least 20 novels.

2. Answer 2:

Let x be the number of tickets sold.
Inequality:
$$ x \leq 500 - 300 $$
Solving gives:
$$ x \leq 200 $$
The concert hall can sell a maximum of 200 tickets to keep some seats empty.

3. Answer 3:
Let x be the number of members.
Inequality:
$$ 30x \geq 900 $$
Solving gives:
$$ x \geq 30 $$
The gym needs at least 30 members.

4. Answer 4:
Let x be the number of cars rented.
Inequality:
$$ 25x \geq 500 $$
Solving gives:
$$ x \geq 20 $$
The car rental company must rent at least 20 cars.

5. Answer 5:
Let d be the discount per toy.
Inequality:
$$ (50 - d)x \geq 200 $$
For maximum discount, assume they sell 4 toys.
$$ 4(50 - d) \geq 200 $$
Solving gives:
$$ 50 - d \geq 50 $$
$$ d \leq 0 $$
Thus, the maximum discount is $0 if selling 4 toys.

Conclusion

Two-step inequalities are foundational in algebra and provide a powerful tool for solving real-life problems. By understanding how to set up and solve these inequalities through word problems, students can enhance their problem-solving skills and mathematical reasoning. The worksheet provided is a valuable resource for practice and reinforcement of these concepts. As students become more comfortable with two-step inequalities, they will find that they can tackle a wide range of problems with greater confidence.

Frequently Asked Questions

What are two-step inequalities and how are they used in word problems?

Two-step inequalities involve finding a range of values that satisfy an inequality with two operations, such as addition or subtraction followed by multiplication or division. They are used in word problems to represent scenarios involving limits, such as budgeting or measuring quantities.

Can you provide an example of a two-step inequality word problem?

Sure! If a school has a budget of $300 for supplies and each box of supplies costs $15, how many boxes can they buy? The inequality would be $15x \leq 300$, where x is the number of boxes. Solving gives $x \leq 20$.

What strategies can help solve two-step inequality word problems effectively?

To solve these problems effectively, first, identify the variables and the relationships described. Translate the problem into an inequality, isolate the variable through inverse operations, and then interpret the solution in the context of the problem.

How can I check my answers for two-step inequality word problems?

To check your answers, substitute your solution back into the original inequality to see if it holds true. Additionally, test values within the solution range to ensure they satisfy the inequality.

What common mistakes should be avoided when solving two-step inequalities?

Common mistakes include reversing the inequality sign when multiplying or dividing by a negative number, misinterpreting the word problem, and forgetting to express the final answer in the context of the problem (e.g., using whole numbers when applicable).

Are there any online resources for practicing two-step inequality word problems?

Yes, there are many online resources, including educational websites like Khan Academy, IXL, and Math Is Fun, which offer worksheets, interactive exercises, and video tutorials for practicing two-step inequality word problems.

What is the importance of learning two-step

inequalities in math?

Learning two-step inequalities is crucial as they form the foundation for understanding more complex algebraic concepts. They enhance problem-solving skills and are applicable in various real-life situations like budgeting, planning, and decision-making.

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