

Solve The Following Equation. For Full Marks Your Answer(s) Should Be Rounded To The Nearest Cent. X

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Introduction

In the realm of mathematics, solving equations accurately is fundamental to understanding and applying mathematical concepts effectively. Whether you're tackling algebraic expressions, quadratic equations, or financial calculations, precision is key—especially when the final answer demands rounding to the nearest cent. This is particularly important in financial contexts such as budgeting, accounting, and investment analysis, where even a small discrepancy can lead to significant differences in outcome.

In this comprehensive guide, we'll explore the process of solving various types of equations, with a focus on ensuring answers are rounded correctly to the nearest cent. We'll delve into different methods, common pitfalls, and practical tips to help you achieve full marks in your assignments or exams. By the end of this article, you'll be equipped with the skills needed to solve equations confidently and accurately, ensuring your answers meet the required precision standards.

Understanding the Importance of Rounding to the Nearest Cent

Before diving into solving equations, it's essential to understand why rounding to the nearest cent matters. The cent, which is one-hundredth of a dollar, is the smallest common unit in U.S. currency and many other currencies that use dollars and cents.

Why Round to the Nearest Cent?

- Financial Accuracy: Precise figures are crucial in financial transactions to prevent discrepancies.
- Standard Practice: Most financial reports, invoices, and budgets display amounts rounded to two decimal places.
- Legal and Regulatory Compliance: Certain financial regulations require amounts to be rounded appropriately.
- Clarity and Simplicity: Rounded figures are easier to interpret and compare.

When to Round

- Final Answer Only: Typically, rounding is performed after solving the equation to ensure the most accurate result.
- During Calculations: In some cases, intermediate steps can retain more decimal places to

prevent rounding errors, but the final answer should always be rounded to two decimal places.

Types of Equations Commonly Encountered

Solving equations involves various types, each requiring specific techniques. Here, we'll focus on the most common:

1. Linear Equations

Equations where the variable appears to the first power, e.g., $2x + 5 = 15$.

2. Quadratic Equations

Equations where the highest exponent of the variable is 2, e.g., $ax^2 + bx + c = 0$.

3. Rational Equations

Equations involving fractions, e.g., $(1/x) + 3 = 5$.

4. Word Problems

Real-world problems that translate into algebraic equations requiring interpretation and solution.

Step-by-Step Approach to Solving Equations

A systematic approach ensures accuracy and consistency. Here's a general method:

Step 1: Understand the Equation

- Identify the type of equation.
- Determine what is being asked (e.g., find x).

Step 2: Isolate the Variable

- Use algebraic operations to get the variable on one side.
- Simplify both sides as needed.

Step 3: Solve for the Variable

- Apply appropriate techniques (factoring, quadratic formula, cross-multiplication, etc.).

Step 4: Calculate the Numerical Value

- Perform calculations carefully, using a calculator to avoid errors.

Step 5: Round to the Nearest Cent

- Round the solution to two decimal places.
- Ensure the answer is formatted correctly, especially in financial contexts.

Solving Specific Types of Equations

1. Solving Linear Equations

Example:

Solve for x : $3x + 7 = 22$

Solution Steps:

1. Subtract 7 from both sides: $3x = 15$
2. Divide both sides by 3: $x = 15 / 3 = 5.0$
3. Rounded to the nearest cent: \$5.00

2. Solving Quadratic Equations

Example:

Solve for x : $x^2 - 4x - 5 = 0$

Solution Steps:

1. Factor the quadratic: $(x - 5)(x + 1) = 0$
2. Set each factor to zero:

$$- x - 5 = 0 \rightarrow x = 5$$

$$- x + 1 = 0 \rightarrow x = -1$$

3. Final solutions: $x = 5$ and $x = -1$

4. When dealing with real-world applications, negative solutions might be invalid (e.g., negative prices). Here, both are solutions, but consider context.

Financial context example:

If the solution involves monetary calculations, ensure to round to the nearest cent:

Suppose the solution yields $x = 5.678$, then rounded: \$5.68

3. Solving Rational Equations

Example:

Solve for x : $(2/x) + 3 = 7$

Solution Steps:

1. Subtract 3 from both sides: $2/x = 4$
2. Multiply both sides by x : $2 = 4x$
3. Divide both sides by 4: $x = 2 / 4 = 0.5$
4. Rounded to the nearest cent: \$0.50

Handling Word Problems and Real-World Equations

Word problems often involve translating textual information into algebraic equations. Here's a step-by-step method:

Step 1: Read Carefully

Identify what is known and what needs to be found.

Step 2: Define Variables

Assign variables to unknown quantities.

Step 3: Translate into an Equation

Express the relationships mathematically.

Step 4: Solve the Equation

Use appropriate techniques.

Step 5: Interpret the Result

Ensure the answer makes sense in context.

Example:

Problem:

A store sells a product for \$ x per unit. After selling 50 units, the total revenue is \$1,250. Find the price per unit, rounded to the nearest cent.

Solution:

1. Define variable: x = price per unit
2. Write equation: $50x = 1250$
3. Solve: $x = 1250 / 50 = 25.0$
4. Rounded to the nearest cent: \$25.00

Tips for Accurate Calculations and Rounding

- Use a calculator for all arithmetic operations to minimize errors.
- Keep extra decimal places during calculations to preserve precision.
- When rounding, look at the third decimal place:
 - If it's 5 or more, round up.
 - If it's less than 5, round down.
- Always round your final answer to two decimal places.

Common Mistakes to Avoid

- Rounding too early: Rounding intermediate steps can introduce errors; always perform calculations first, then round the final answer.
- Ignoring units: Always include dollar signs and specify the unit (e.g., dollars, cents).
- Misinterpreting negative solutions: Check if negative solutions are valid in real-world contexts.
- Incorrect order of operations: Follow PEMDAS (Parentheses, Exponents, Multiplication and Division, Addition and Subtraction).

Practical Examples with Detailed Solutions

Example 1: Simple Linear Equation

Solve for x: $4x + 9.75 = 25.25$

Solution:

1. Subtract 9.75 from both sides:

$$4x = 25.25 - 9.75 = 15.50$$

2. Divide both sides by 4:

$$x = 15.50 / 4 = 3.875$$

3. Round to the nearest cent:

\$3.88

Example 2: Compound Equation with Multiple Steps

Solve for x: $(3/4)x + 2.25 = 7.75$

Solution:

1. Subtract 2.25 from both sides:

$$\left(\frac{3}{4}\right)x = 7.75 - 2.25 = 5.50$$

2. Multiply both sides by $\frac{4}{3}$ to isolate x :

$$x = (5.50) \left(\frac{4}{3}\right) = (5.50 \cdot 4) / 3 = 22 / 3 \approx 7.3333$$

3. Round to the nearest cent:

\$7.33

Final Tips for Achieving Full Marks

- Show all steps clearly: Partial credit is often awarded for method, so demonstrate your process.
- Double-check calculations: Verify each step, especially division and multiplication.
- Use consistent rounding: Round only at the end to avoid compounding errors.
- Read the question carefully: Ensure that your answer matches what's asked, including units and rounding requirements.

Conclusion

Mastering the art of solving equations and accurately rounding answers to the nearest cent is essential in both academic and practical financial contexts. Whether you're dealing with straightforward linear equations, more complex quadratics, or real-world word problems, a systematic approach ensures precision and clarity. Remember to perform calculations carefully, keep extra decimal places during intermediate steps, and always round your final answer to two decimal places. Doing so will help you secure full marks and develop a strong foundation for more advanced mathematical problem-solving.

By applying these strategies and tips, you'll be well-equipped to tackle any equation confidently and precisely, ensuring your answers are accurate and professionally presented.

Frequently Asked Questions

Solve the equation $3x + 5 = 14$ for x , rounding your answer to the nearest cent.

$$x = 3.00$$

Find the value of x in the equation $2.5x - 4.2 = 7.8$, rounded to the nearest cent.

$$x = 4.80$$

Solve for x : $7x + 3 = 2x + 15$, rounded to the nearest cent.

$$x = 3.00$$

Determine x in the equation $0.8x - 1.2 = 2.4$, rounded to the nearest cent.

$$x = 4.50$$

Solve the equation $5(x - 2) = 2x + 3$ for x , rounding to the nearest cent.

$$x = 4.33$$

Find x in the equation $4.2x + 1.8 = 9.0$, rounded to the nearest cent.

$$x = 1.93$$

Solve for x : $(x/3) + 2 = 5$, rounded to the nearest cent.

$$x = 9.00$$

Determine the value of x in the equation $9.6 - 2.4x = 3.6$, rounded to the nearest cent.

$$x = 2.00$$

Additional Resources

Solve The Following Equation. For Full Marks Your Answer(s) Should Be Rounded To The Nearest Cent. x is a common instruction in mathematics and finance problems, emphasizing the importance of precise calculation and accurate rounding. Whether you're tackling algebraic equations, financial calculations, or scientific problems, understanding how to approach solving equations methodically is essential for achieving correct results. This guide aims to provide a comprehensive, step-by-step approach to solving equations, ensuring you can confidently arrive at the correct answer and properly round it to the nearest cent.

Understanding the Importance of Solving Equations Correctly

Before diving into the mechanics of solving equations, it's important to recognize why accuracy matters. In many real-world applications—such as budgeting, investment analysis, or scientific measurement—small errors can lead to significant discrepancies. Rounding to the nearest cent (or the nearest hundredth) ensures consistency and precision, especially when dealing with monetary values.

Step-by-Step Guide to Solving Equations

Solving equations systematically involves a series of steps that help isolate the variable of interest, often denoted as X . Here's an outline of a typical process:

1. Understand the Equation

- Identify the type of equation: linear, quadratic, exponential, etc.
- Determine the variable(s): here, focus on X .
- Note the constants and coefficients.

2. Simplify Both Sides of the Equation

- Combine like terms.
- Simplify fractions or expressions as needed.
- Remove parentheses through distribution.

3. Isolate the Variable

- Use inverse operations to move constants and coefficients.
- For linear equations, aim to get X alone on one side.
- For more complex equations, consider substitution or quadratic formulas.

4. Solve for the Variable

- Perform the necessary calculations.
- Be cautious with negative signs and order of operations.

5. Round the Answer to the Nearest Cent

- Use appropriate rounding rules:
- If the thousandths place is 5 or more, round up.
- If less than 5, round down.

- Ensure the answer has two decimal places.

Common Types of Equations and Their Solutions

Different equations require different strategies. Below are common types with brief solutions.

Linear Equations

Form: $ax + b = c$

Solution Steps:

- Subtract b from both sides: $ax = c - b$
- Divide both sides by a: $x = (c - b) / a$
- Round to two decimal places.

Example:

Solve $2X + 5 = 15$

- $2X = 15 - 5 = 10$
- $X = 10 / 2 = 5.00$

Quadratic Equations

Form: $ax^2 + bx + c = 0$

Solution Methods:

- Factoring
- Completing the square
- Quadratic formula: $X = [-b \pm \sqrt{b^2 - 4ac}] / (2a)$

Example:

Solve $X^2 - 4X + 3 = 0$

- Use quadratic formula:
- $a=1, b=-4, c=3$
- Discriminant: $(-4)^2 - 4(1)(3) = 16 - 12 = 4$
- $\sqrt{\text{Discriminant}} = 2$
- $X = [4 \pm 2] / 2$
- Solutions:
- $X = (4 + 2) / 2 = 6/2 = 3.00$

$$- X = (4 - 2) / 2 = 2/2 = 1.00$$

Exponential and Logarithmic Equations

Strategy:

- Use logarithmic identities or exponential functions to linearize the equations.
- Isolate the variable by applying inverse functions.

Practical Example: Solving a Financial Equation

Suppose you're asked to solve the following financial problem:

"A sum of money grows at an annual interest rate of 5%. If the total amount after 3 years is \$1,159.27, what was the initial principal? Round your answer to the nearest cent."

This is a compound interest problem, often expressed as:

$$A = P(1 + r)^t$$

Where:

- A = final amount (\$1,159.27)
- P = principal (initial amount)
- r = annual interest rate (5% or 0.05)
- t = time in years (3)

Step-by-Step Solution:

1. Identify knowns:

- A = 1,159.27
- r = 0.05
- t = 3

2. Rewrite the equation to solve for P:

$$- P = A / (1 + r)^t$$

3. Calculate $(1 + r)^t$:

$$- (1 + 0.05)^3 = 1.05^3$$

4. Compute 1.05^3 :

- $1.05 \cdot 1.05 = 1.1025$
- $1.1025 \cdot 1.05 \approx 1.1576$

5. Calculate P:

- $P = 1,159.27 / 1.1576 \approx 1,001.87$

6. Round to the nearest cent:

- The principal is approximately \$1,001.87

Ensuring Accurate Rounding

When the problem instructs to round to the nearest cent, it's crucial to apply proper rounding rules:

- Look at the third decimal place.
- If it is 5 or more, round the second decimal up.
- If less than 5, leave the second decimal as is.

Example:

- Calculated answer: 1001.8667

- Rounded answer: \$1,001.87

Tips for Accurate and Efficient Problem Solving

- Double-check your calculations to minimize errors.
- Use a calculator with sufficient decimal precision.
- Be mindful of negative signs and order of operations.
- When dealing with financial data, always round to two decimal places at the end.
- For complex equations, consider algebraic substitutions or graphical methods if appropriate.

Conclusion

Successfully solving the equation and rounding the answer to the nearest cent requires a clear understanding of algebraic principles, careful calculation, and adherence to rounding rules. Whether working through a simple linear equation or a complex financial calculation, following a structured approach ensures accuracy and confidence in your results.

Remember, practice makes perfect—so regularly tackle different types of equations to sharpen your skills and develop an intuitive grasp of problem-solving strategies.

Mastering the art of solving equations and rounding to the nearest cent is a vital skill that bridges theoretical mathematics and practical applications, empowering you to handle real-world problems with precision and professionalism.

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