Solving One-Step Equations

Solving one-step equations: Mistakes and missing information

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

An equation is a balance. Undo an operation on both sides. From $x + 7 = 19$, subtract 7 to get $x = 12$ and check $12 + 7 = 19$. From $4x = 28$, divide by 4 to get $x = 7$ and check $4(7) = 28$. Multiplication/division and addition/subtraction are inverse pairs.

Worked example

Show an inverse operation and check. Solve $x + 5 = 13$.

1. Apply -5 to both sides: $x + 5 - 5 = 13 - 5$.
2. Simplify: $x = 13 - 5 = 8$.
3. Substitute: $(8) + (5) = 13$, so both sides match.
Answer: $x = 8$.

Practice Problems

Show your thinking.

1. A student adds 8 to both sides instead of undoing addition. Correct the method. Solve $x + 8 = 21$.

2. A student subtracts another 7 to isolate x. Repair it. Solve $x - 7 = 11$.

3. Recover the missing factor. Solve $9x = 54$.

4. A student divides both sides by 5 again. Correct the inverse. Solve $\frac{x}{5} = 7$.

5. Recover the number hidden by the added fraction. Solve $x + \frac{3}{2} = 6$.

6. Check a claim that $x = 4$ and give the correct value. Solve $4x = 64$.

7. A student adds 8 rather than multiplying to undo division. Repair it. Solve $\frac{x}{8} = 4$.

8. Recover the unknown starting amount. Solve $x + 6 = 25$.

Answer Key

1. $x = 13$.
2. $x = 18$.
3. $x = 6$.
4. $x = 35$.
5. $x = \frac{9}{2}$.
6. $x = 16$.
7. $x = 32$.
8. $x = 19$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Apply -8 to both sides: $x + 8 - 8 = 21 - 8$.
2. Simplify: $x = 21 - 8 = 13$.
3. Substitute: $(13) + (8) = 21$, so both sides match.

Problem 2

1. Apply $+7$ to both sides: $x - 7 + 7 = 11 + 7$.
2. Simplify: $x = 11 + 7 = 18$.
3. Substitute: $(18) - (7) = 11$, so both sides match.

Problem 3

1. Divide both sides by 9: $\frac{9x}{9} = \frac{54}{9}$.
2. Simplify: $x = 54 \div 9 = 6$.
3. Substitute: $(6) \times (9) = 54$, so both sides match.

Problem 4

1. Multiply both sides by 5: $5\left(\frac{x}{5}\right) = 5 \cdot 7$.
2. Simplify: $x = 7 \times 5 = 35$.
3. Substitute: $(35) \div (5) = 7$, so both sides match.

Problem 5

1. Apply $-\frac{3}{2}$ to both sides: $x + \frac{3}{2} - \frac{3}{2} = 6 - \frac{3}{2}$.
2. Simplify: $x = 6 - \frac{3}{2} = \frac{9}{2}$.
3. Substitute: $(\frac{9}{2}) + (\frac{3}{2}) = 6$, so both sides match.

Problem 6

1. Test $x = 4$: $4(4) = 16$, which does not equal 64.
2. Divide both sides by 4: $\frac{4x}{4} = \frac{64}{4}$.
3. Simplify: $x = 64 \div 4 = 16$.
4. Substitute: $(16) \times (4) = 64$, so both sides match.

Problem 7

1. Multiply both sides by 8: $8\left(\frac{x}{8}\right) = 8 \cdot 4$.
2. Simplify: $x = 4 \times 8 = 32$.
3. Substitute: $(32) \div (8) = 4$, so both sides match.

Problem 8

1. Apply -6 to both sides: $x + 6 - 6 = 25 - 6$.
2. Simplify: $x = 25 - 6 = 19$.
3. Substitute: $(19) + (6) = 25$, so both sides match.

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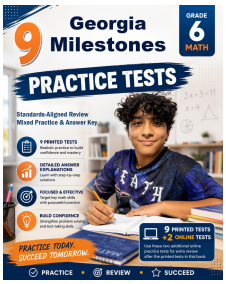

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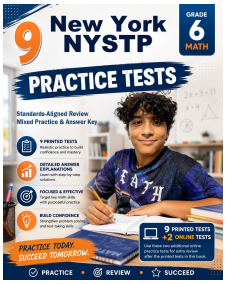

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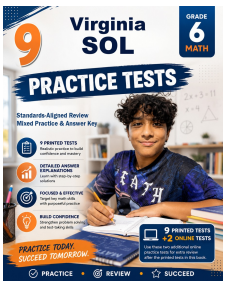

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