

Solving Two-Step Equations & Checking Solutions — Teacher copy

Answers and suggested responses

Welcome to your practice sheet! Today, we will practice solving two-step equations and verifying our answers. Remember: whatever operation you perform on one side of the equation, you must also perform on the other side to keep it balanced. Always check your solution by substituting it back into the original equation.

Worked Example: Solving & Checking

To solve a two-step equation, isolate the variable term first, then solve for the variable. Always check your solution by substituting it back into the original equation.

Equation: $3x - 4 = 11$

Step 1: Isolate the variable term (add 4 to both sides):

$$3x - 4 + 4 = 11 + 4 \implies 3x = 15$$

Step 2: Solve for the variable (divide both sides by 3):

$$\frac{3x}{3} = \frac{15}{3} \implies x = 5$$

Step 3: Check your solution (substitute $x = 5$ back into the original equation):

$$3(5) - 4 = 15 - 4 = 11 \quad \checkmark \text{ (It checks!)}$$

Part I: Solve and Check

1. Solve and check: $2x + 7 = 15$ (4 pts)

Answer: Solve:

$$2x + 7 = 15$$

$$2x = 8$$

$$x = 4$$

Check:

$$2(4) + 7 = 8 + 7 = 15 \text{ (Correct)}$$

2. Solve and check: $5 - 3y = 17$ (4 pts)

Answer: Solve:

$$5 - 3y = 17$$

$$-3y = 12$$

$$y = -4$$

Check:

$$5 - 3(-4) = 5 + 12 = 17 \text{ (Correct)}$$

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3. Solve and check: $\frac{w}{4} - 6 = -2$ (4 pts)

Answer: Solve:

$$w/4 - 6 = -2$$

$$w/4 = 4$$

$$w = 16$$

Check:

$$16/4 - 6 = 4 - 6 = -2 \text{ (Correct)}$$

4. Solve and check: $-8a + 12 = -4$ (4 pts)

Answer: Solve:

$$-8a + 12 = -4$$

$$-8a = -16$$

$$a = 2$$

Check:

$$-8(2) + 12 = -16 + 12 = -4 \text{ (Correct)}$$

Part 2: Error Analysis

5. Marcus attempted to solve the equation $4x - 9 = 15$. His work is shown below:

$$4x - 9 = 15$$

$$4x = 6 \quad (\text{Step 1})$$

$$x = 1.5 \quad (\text{Step 2})$$

a) Identify the error Marcus made and explain why it is incorrect.

b) Solve the equation correctly and check your solution. (6 pts)

Answer: a) Marcus subtracted 9 from 15 instead of adding 9 to both sides in Step 1. He should have added 9 to isolate the variable term, giving $4x = 24$.

b) Correct Solve:

$$4x - 9 = 15$$

$$4x = 24$$

$$x = 6$$

Correct Check:

$$4(6) - 9 = 24 - 9 = 15 \text{ (Correct)}$$

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Part 3: Word Problems

6. A rental car company charges a flat fee of \$35 plus \$0.15 per kilometre driven. If Sarah's total bill was \$62, write and solve an equation to find the number of kilometres, m , she drove. Check your solution. (5 pts)

Answer: Equation: $35 + 0.15m = 62$

Solve:

$$0.15m = 27$$

$$m = 180 \text{ kilometres}$$

Check:

$$35 + 0.15(180) = 35 + 27 = 62 \text{ (Correct)}$$

7. James bought a notebook for \$4 and 6 identical pens. He spent a total of \$13. Write and solve an equation to find the cost, p , of each pen. Check your solution. (5 pts)

Answer: Equation: $6p + 4 = 13$

Solve:

$$6p = 9$$

$$p = \$1.50$$

Check:

$$6(1.50) + 4 = 9 + 4 = 13 \text{ (Correct)}$$