**Sets & Steps**
Math Practice & Worked Solutions

## Algebra 1

# Two-Step Equations

Two-Step Equations | A1-U02-P04

96 problems · Four activity formats



**Topic focus**

Across 96 tasks this topic asks for exact value and verification, exact value with inverse order, exact value with unit and contextual check, first invalid step, corrected solution, and check, input, reverse path, and forward check and parameter value or feasibility classification.

**8 PDFs and a README; 50 buyer pages.**

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

Published by Tusils LLC.

**Algebra 1**

# Two-Step Equations

**Name:** _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

| | |
|---|---|
| Isolate $x$ in $-2x + 9 = -3$, preserving the equality at every step.<br><br>Bank label: _____ | Use this operation diagram: input $x$ → multiply by 3 → add 5 → output 17. Traverse the arrows backward to recover $x$, then run the machine forward as a check.<br><br>Bank label: _____ |
| Determine the value of $x$ that makes $7x + 2 = -19$ true. Show the two inverse operations.<br><br>Bank label: _____ | Isolate $x$ in $2x + 11 = 25$, preserving the equality at every step.<br><br>Bank label: _____ |
| Complete $5(-3) + k = -22$ so that the prescribed input $x = -3$ works. Determine $k$ and verify the resulting equality.<br><br>Bank label: _____ | Without skipping the check, solve $5x + 15 = 15$ and explain whether $x = 0$ works.<br><br>Bank label: _____ |
| Solve $9(x - 5) = -27$ by reversing the outer operation before the inner shift.<br><br>Bank label: _____ | Isolate $x$ in $(-\frac{7}{4})x + \frac{2}{3} = \frac{25}{6}$, preserving the equality at every step.<br><br>Bank label: _____ |

**Algebra 1**

# Two-Step Equations

**Name:** _____ **Date:** _____ **Class:** _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

| | |
|---|---|
| Solve $-3x - 6 = -24$. Keep the result exact and verify it in the original equation. | Solve $8x - 5 = -29$. Keep the result exact and verify it in the original equation. |
| The complete rule is input $x \to$ multiply by $-4 \to$ add $7 \to$ output 19. What input produced the stated output? Include the intermediate value in your verification. | Use the given equation $64 - 5x = 24$ for this initial-minus-use situation: $x$ measures operating intervals in hours; 64 is the initial amount and 5 is removed per unit of $x$. Recover $x$ and explain both inverse steps. |
| The conversion rule has already been modeled as $(\frac{9}{5})x + 32 = 77$; $x$ is the input temperature; the conversion multiplies by $\frac{9}{5}$ and then shifts by 32. Find the source value $x$ in degrees and check by converting forward. | Solve $-5(x - 4) = 35$ by reversing the outer operation before the inner shift. |

**Algebra 1**

# Two-Step Equations

**Name:** _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

---

**Incoming:** $-23$

A two-stage machine applies 'divide by 4' and then 'add 3'. Its output is 5. Recover the input and list the inverse steps in reverse order.

Your response: _____

**Incoming:** 8

The complete rule is input $x \to$ multiply by $\frac{1}{2} \to$ add $-3 \to$ output 2. What input produced the stated output? Include the intermediate value in your verification.

Your response: _____

**Incoming:** $\frac{23}{6}$

What value of $x$ satisfies $\frac{x+2}{7} = -3$? Show how the grouped quantity is isolated first.

Your response: _____

**Incoming:** $\frac{7}{4}$

Complete $\frac{\frac{11}{6} - \frac{5}{4}}{d} = \frac{7}{3}$ so that the prescribed input $x = \frac{11}{6}$ works. Determine $d$ and verify the resulting equality.

Your response: _____

**Incoming:** $\frac{8}{3}$

Use this operation diagram: input $x \to$ add 9 $\to$ divide by $-5 \to$ output $-2$. Traverse the arrows backward to recover $x$, then run the machine forward as a check.

Your response: _____

**Incoming:** 4

Determine the value of $x$ that makes $4x - 7 = 13$ true. Show the two inverse operations.

Your response: _____

**Algebra 1**

# Two-Step Equations

**Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

---

For $(\frac{3}{2})(x+4)=\frac{15}{2}$, Route A would multiply both sides by the reciprocal $\frac{2}{3}$ to isolate the group. Route $B$ would split the rational scale into numerator and denominator and undo those two factors separately. Carry out both valid routes, compare their intermediate arithmetic, and solve.

---

Two valid plans for $(\frac{5}{3})(x-2)=\frac{20}{3}$ are: A—multiply both sides by the reciprocal $\frac{3}{5}$ to isolate the group; $B$—split the rational scale into numerator and denominator and undo those two factors separately. Decide which better exposes the grouped quantity here and verify the common solution.

---

Inspect $\frac{x+5}{\frac{7}{4}}=-\frac{21}{4}$. Compare the valid full-group route (multiply both sides by the full divisor $\frac{7}{4}$) with the factor-by-factor route (rewrite division by the rational number as reciprocal multiplication, then undo that multiplier); report $x$ and the cleaner route.

---

For $(-\frac{3}{2})(x+6)=9$, Route A would multiply both sides by the reciprocal $-\frac{2}{3}$ to isolate the group. Route $B$ would split the rational scale into numerator and denominator and undo those two factors separately. Carry out both valid routes, compare their intermediate arithmetic, and solve.

# Two-Step Equations

## Full Worked Solutions - excerpt

### Worked example

**Problem.** Isolate $x$ in $-2x + 9 = -3$, preserving the equality at every step.

**Answer.** 6

**Explanation and check.**

First undo the full offset: the variable term equals $-12$. Its effective coefficient is $-2$, so division gives $x = 6$. Substitution in $-2x + 9 = -3$ reproduces $-3$.

---

### Worked example

**Problem.** Use this operation diagram: input $x \to$ multiply by $3 \to$ add $5 \to$ output $17$. Traverse the arrows backward to recover $x$, then run the machine forward as a check.

**Answer.** 4

**Explanation and check.**

Starting at $17$, subtract $5$ gives the prior stage value $12$; then divide by $3$ gives $x = 4$. Forward verification applies multiply by $3$ and add $5$ and returns $17$.