Solve Two-Step Equations

45-minute instructional plan | Minnesota 2007 standards: 7.2.4.1

Learning objectives

• Explain why the same operation preserves equality.

• Undo the constant, then the coefficient.

• Solve equations with integers, decimals, and fractions.

• Check solutions by substitution.

Suggested 45-minute sequence

0–5 min	Review and quick check
5–8 min	Why the lesson matters / real-life launch
8–11 min	Read the learning objectives
11–18 min	Explore model and vocabulary
18–30 min	Guided examples and error analysis
30–38 min	Independent practice
38–43 min	Group reasoning
43–45 min	Independent exit ticket

Core concept

Use inverse operations on both sides. Check your result.

$$4x + 9 = 37 \quad \Rightarrow \quad 4x = 28$$

Teaching prompts

• Ask students to name the unknown and units before manipulating the equation or inequality.

• Ask: Which steps preserve the solution set, and why?

Common misconception / correction

A student solves 4x + 7 = 39 by dividing both sides by 4 first and says x + 7 = 9.75. What went wrong?

$$4x + 7 = 39 \Rightarrow 4x = 32 \Rightarrow x = 8$$

The +7 is not multiplied by 4. Subtract 7 from both sides before dividing.

Differentiation and assessment

Support: pre-label the variable, highlight fixed versus repeated quantities, and provide an annotated example. Extension: require a second representation or a reasoned equivalence argument.

Assessment: a correct exit response with justified steps suggests readiness for the next lesson; otherwise use an additional model and one follow-up problem.

Worked answer key

1. Solve 4p + 7 = 39.

$$p = 8$$

2. Solve three-fifths of x minus 2 equals 10.

$$\frac{3}{5}x - 2 = 10 \Rightarrow x = 20$$

3. Solve –2n + 9 = –5.

$$n = 7$$

4. Solve 1.5h + 4.5 = 18.

$$h = 9$$

5. Solve x/4 – 2.5 = 3.5.

$$\frac{x}{4} - 2.5 = 3.5 \Rightarrow x = 24$$

Group challenge

Tickets cost $2.25 each plus a one-time $9 order fee. The final bill is $36. Write and solve an equation for the number of tickets.

$$2.25t + 9 = 36 \Rightarrow t = 12$$

Additional practice — if time allows

Solve an equation with a negative coefficient: –1.5x + 2 = –10.

$$-1.5x + 2 = -10 \Rightarrow x = 8$$

Exit ticket

Solve 2.5x – 6 = 11.5, and show a substitution check.

$$2.5x - 6 = 11.5 \Rightarrow x = 7$$

Teaching note

Ask students to justify their methods. Use incorrect answers to identify the next instructional step.