Write Two-Step Equations

45-minute instructional plan | Minnesota 2007 standards: 7.2.4.1 (equations in context); 7.2.3.1 (equivalent expressions)

Learning objectives

• Define a variable and identify its units.

• Represent fixed and repeated quantities with a diagram.

• Write two-step equations with rational numbers and grouping symbols.

• Explain how every term relates to the situation.

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

An expression describes a quantity; an equation says two quantities are equal.

$$3x + 4 \qquad 3x + 4 = 25$$

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 writes 5(p–2) = 55 as 5p–2 = 55. Is the new equation equivalent?

$$5(p - 2) = 5p - 10$$

The discount is repeated on every kit; distribute 5 to both terms.

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. One-half of n increased by 3 equals –5.

$$\frac{n}{2} + 3 = -5$$

2. A taxi costs $3.50 per mile plus a $5 booking fee; the bill is $26.

$$3.5m + 5 = 26$$

3. Six boxes cost b dollars each, minus one $7 coupon. Total: $53.

$$6b - 7 = 53$$

4. Four sandwiches, each reduced by $1 from price s, cost $24 in total.

$$4(s - 1) = 24$$

5. Two and a half times x, decreased by 3, equals 12.

$$2.5x - 3 = 12$$

Group challenge

Four identical items have original price p dollars each; every item is discounted $2. Shipping is $5 and the bill is $41. Write two equivalent equations and explain why they agree.

$$4(p - 2) + 5 = 41 \quad \Leftrightarrow \quad 4p - 3 = 41$$

Additional practice — if time allows

A store buys eight identical folders, each reduced by $0.75 from its marked price f. The total after a $4 shipping fee is $54.

$$8(f - 0.75) + 4 = 54$$

Exit ticket

Three notebooks cost n dollars each. A one-time $2 coupon applies to the order, followed by $8 shipping. The final bill is $39. Write an equation; do not solve.

$$3n - 2 + 8 = 39$$

Teaching note

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