

Multi-Step Equations with Variables on Both Sides

Name: _____ Date: _____

LEARNING OBJECTIVE

The student will solve equations with variables and constants on both sides using a balance model and inverse operations.

MATERIALS NEEDED

- Balance scale or homemade balance from Week 3
- 20 small identical objects
- 2 small cups (labeled 'x')
- Notebook paper
- Pencil

HANDS-ON ACTIVITY

1. Model the equation $3x + 2 = x + 8$ by placing 3 x-cups plus 2 objects on the left side and 1 x-cup plus 8 objects on the right side of your balance.
2. Remove 1 x-cup from BOTH sides to get all the variables on one side, and record this step on paper.
3. Remove 2 objects from BOTH sides to isolate the remaining variable terms, recording this step as well.
4. Divide the remaining objects evenly between the remaining x-cups to find the value of one x, and record the final solution.
5. Solve one additional multi-step equation on paper only (without the balance) to show you can do it symbolically: $5x - 3 = 2x + 9$.

QUESTIONS

1. Solve $3x + 2 = x + 8$, showing every step.
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2. Solve $5x - 3 = 2x + 9$, showing every step.
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3. Why is it helpful to move all the variable terms to one side before solving?
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4. Check your solution to $3x + 2 = x + 8$ by substituting $x = 3$ into both sides.
