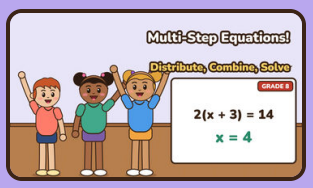
HAKILLO KIDS · TEACHER GUIDE · VIRGINIA SOL EDITION · GRADE 8 · LESSON 3

Multi-Step Equations



VIRGINIA SOL (2023)
8.PFA.4

VIDEO LENGTH
4:49 · Common Core edition also available

WATCH THE LESSON FREE
hakillokids.org/math/grade-8#G8-03

PRACTICE ONLINE
learn.hakillokids.org · videos stop for each question, scored automatically

8.PFA.4 The student will write and solve multistep linear equations in one variable, including problems in context that require the solution of a multistep linear equation in one variable.

Materials: Algebra tiles, whiteboards.

Students will

- Use the distributive property to solve equations.
- Combine like terms before solving.
- Solve equations with variables on both sides.
- Distribute to every term inside parentheses.

Key words

distributive property	a(b + c) = ab + ac
like terms	terms with the same variable part
variables on both sides	an x term on each side of the equal sign
inverse operations	operations that undo each other

Before the video 2 minutes

Show 2(x + 3) = 14 with algebra tiles. Ask: “What does the 2 outside the parentheses mean?”

What happens in the video

0:00	Welcome and today's goal: multi-step equations
0:20	2(x + 3) = 14: distribute, then solve, x = 4
0:39	3x + 2x - 4 = 21: combine, then solve, x = 5
0:59	5x + 3 = 2x + 12: x = 3
1:18	Spot the mistake: distribute to both terms
1:44	Your turn! Students answer during each pause (see below)
4:29	Recap and goodbye

Spot the mistake at 1:18

> **Sam:** Two times x plus five, equals eighteen. Distribute: two x plus five equals eighteen!
> **Ivy:** Hmm... did the two multiply the five too?
> **Mia:** It multiplies both terms. Two x plus ten equals eighteen. Two x equals eight, so x equals four.
> **Sam:** Oops! Distribute to every term. Four!

- Ask: “Did the 2 multiply the 5 too?” (It must.)
- Model 2(x + 5) with algebra tiles: two groups of x + 5.
- Solve 2x + 10 = 18: x = 4.

Your-turn pauses students answer out loud, then the characters give the answer

TIME	QUESTION	ANSWER IN THE VIDEO
1:45	Three times x minus two, equals twelve. What is x?	Six! Three x minus six equals twelve.
2:02	Four x plus x equals twenty-five. What is x?	Five! Five x equals twenty-five.
2:18	Six x minus two equals four x plus eight. What is x?	Five! Two x equals ten.
2:34	Two times x plus four, equals twenty. What is x?	Six!
2:49	Seven x plus three minus two x equals twenty-three. What is x?	Four! Five x plus three equals twenty-three.
3:06	Five times x minus one, equals three x plus seven. What is x?	Six! Five x minus five equals three x plus seven.
3:25	x plus nine equals four x. What is x?	Three! Nine equals three x.
3:40	Three times two x plus one, equals twenty-seven. What is x?	Four! Six x plus three equals twenty-seven.
3:57	Eight x minus three x plus two equals seventeen. What is x?	Three!
4:12	Four times x plus two, equals two x plus twenty. What is x?	Six! Two x equals twelve.

Tip: pause the video a little longer on any question your class finds hard, and ask a student to explain how they know.

After the video: talk about it

1. What is your first step when you see parentheses?
2. Why do we move the x terms to one side?
3. Solve 3(x - 2) = x + 8 and check.

Go further

Equation creation: students start with x = 3 and build a multi-step equation by doing the same steps to both sides, then trade.

Answer key for the practice page

1. x = 5
2. x = 6
3. x = 4
4. x = 3
5. x = 7
6. 30 + 10m = 15m, m = 6 months

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HAKILLO KIDS · GRADE 8 · LESSON 3 · PRACTICE

Multi-Step Equations

Name: _____ **Date:** _____

1. **3(x + 4) = 27**

   Answer: _____

2. **4x + 2x - 5 = 31**

   Answer: _____

3. **7x - 4 = 3x + 12**

   Answer: _____

4. **2(3x - 1) = 16**

   Answer: _____

5. **5(x - 2) = 2x + 11**

   Answer: _____

6. **Gym A costs $30 plus $10 per month. Gym B costs $15 per month. After how many months do they cost the same? Write and solve an equation.**

   Answer: _____

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