# First 5 Minutes — Review Question

**GRADE 7 • TOPIC 5 • LESSON 5.2 | 5 points • Work independently**

## Lesson 5.2 • Solve Two-Step Equations

# Write an equation: 5 times x plus 8 equals 38.

1. Show each step in your notebook.
2. Explain the operation or rule you used.

# Real-Life Connection & Key Concepts



## Essential question

**When is solving a two-step equation useful?**

## Solve & Discuss It!

Let c, s and t represent a circle, square and triangle. Elizabeth's clues are 4c + t = 2s + t; 3t + 2c = 2c + s; s + 2c = 6t. How are the shapes related?

## What we will learn

Use models and equality properties, solve rational-coefficient equations, check solutions and compare algebraic with arithmetic reasoning.

## Definitions & rules

Addition/Subtraction Property of Equality: add or subtract the same value on both sides.

Multiplication/Division Property: multiply or divide both sides by the same nonzero value.

Check by substitution.

# Example 1 — Solve Two-Step Equations

GRADE 7 • TOPIC 5 • LESSON 5.2 | Guided example • Model and explain

## Problem

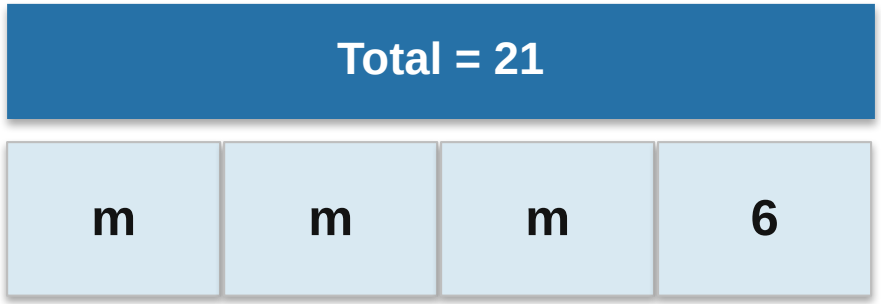
Nala and two friends spend $21 on three movie tickets and $6 popcorn. How much is each ticket, m?

## Worked solution

21 = 3m + 6.

21 − 6 = 3m → 15 = 3m.

15 ÷ 3 = m → $5 per ticket.




**Undo addition/subtraction first, then multiplication/division; do the same to both sides.**

# Example 2 — Solve Two-Step Equations



**Problem**

Jon has $21.61 on a gift card. Each song costs $1.29. After buying songs, $10 remains. How many songs, d, did he buy?

**Worked solution**

$21.61 - 1.29d = 10.$

$-1.29d = -11.61.$

$d = 9$ songs.

**Undo addition/subtraction first, then multiplication/division; do the same to both sides.**

# Example 3 — Solve Two-Step Equations

GRADE 7 • TOPIC 5 • LESSON 5.2 | Guided example • Model and explain

## Problem

There are 18 trumpet players, 2 more than one fourth of the entire band. How many students, b, are in the band?

## Worked solution

$(\frac{1}{4})b + 2 = 18.$

$(\frac{1}{4})b = 16.$

$b = 4 \times 16 = 64$ students.

**Undo addition/subtraction first, then multiplication/division; do the same to both sides.**

**Whole band = b**




**One fourth + 2 = 18**

# Individual Work

**GRADE 7 • TOPIC 5 • LESSON 5.2 | 10 minutes total • 10 points**

**Complete all five tasks. Show your reasoning.**

**6. (p. 273)** Solve $4x - 12 = 16$.

7. (p. 273) Solve $\frac{t}{5} + 2 = 17$.

**8. (p. 273)** A bar model shows 3 equal parts x, minus 5, equals 7. Write and solve an equation.

# Individual Work — continued

GRADE 7 • TOPIC 5 • LESSON 5.2 | 10 minutes total • 10 points

**Finish the remaining problems. Check your work.**

**9. (p. 273)** Solve $3x - 38 = 10$.

**10. (p. 273)** Solve $0.5p - 3.45 = -1.2$.

# Individual Work — Answer Key



**Undo addition/subtraction first, then multiplication/division; do the same to both sides.**

**6. (p. 273)**

Add 12 to both sides: $4x = 28$. Divide both sides by 4: $x = 7$. Check: $4(7) - 12 = 16$.

**7. (p. 273)**

Subtract 2: $\frac{t}{5} = 15$. Multiply both sides by 5: $t = 75$. Check: $\frac{75}{5} + 2 = 17$.

**8. (p. 273)**

Three equal bars $x$ total $7 + 5 = 12$: $3x - 5 = 7 \rightarrow 3x = 12 \rightarrow x = 4$.

**9. (p. 273)**

Add 38: $3x = 48$. Divide by 3: $x = 16$. Check: $3(16) - 38 = 10$.

**10. (p. 273)**

Add 3.45: $0.5p = 2.25$. Divide by 0.5: $p = 4.5$. Check: $2.25 - 3.45 = -1.20$.

# Group Work

**GRADE 7 • TOPIC 5 • LESSON 5.2 | 8 minutes total • 10 points**

**Work together. Each person must contribute a solution.**

**12. (p. 274)** Four friends went to the movies and bought $6.25 popcorn. Total cost was $44.25. Write and solve for the ticket price m; draw a model.

**13. (p. 274)** Oliver says $2x + 4 = 10$ has solution $x = 7$. Find the correct solution and explain his possible mistake.

# Group Work — continued

GRADE 7 • TOPIC 5 • LESSON 5.2 | 8 minutes total • 10 points

**Agree on a solution and be ready to explain it.**

**14. (p. 274)** Solve $4.9x - 1.9 = 27.5$. Name the two properties of equality used.

**15. (p. 274)** Five people ate meatballs at a party, 11 fewer than one third of the total guests. Write and solve for x guests; give an equivalent one-step equation.

# Group Work — Answer Key

GRADE 7 • TOPIC 5 • LESSON 5.2 | Discuss and justify

**Undo addition/subtraction first, then multiplication/division; do the same to both sides.**

**12. (p. 274)**

$4m + 6.25 = 44.25 \rightarrow 4m = 38 \rightarrow m =$ \$9.50. Model: four equal m sections plus a \$6.25 section.

**13. (p. 274)**

$2x + 4 = 10 \rightarrow 2x = 6 \rightarrow x = 3$. Oliver may have added 4 instead of subtracting.

**14. (p. 274)**

Add 1.9 to both sides: $4.9x = 29.4$. Divide by 4.9: $x = 6$. Addition and Division Properties of Equality.

**15. (p. 274)**

$\frac{x}{3} - 11 = 5 \rightarrow \frac{x}{3} = 16 \rightarrow x = 48$. One-step equivalent: $\frac{x}{3} = 16$.

# Exit Ticket

**GRADE 7 • TOPIC 5 • LESSON 5.2 | 2 minutes • Independent check**

**Before you leave, solve this problem.**

**Solve $-\left(\frac{3}{4}\right)x + 2 = -7$.**

Show your work.

Write the answer with the correct units or graph, if needed.