First 5 Minutes — Review Question

GRADE 7 • TOPIC 5 • LESSON 5.1 | 5 points • Work independently

Lesson 5.1 • Write Two-Step Equations

Evaluate 3x − 7 when x = 5.

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

Real-Life Connection & Key Concepts

Essential question

How does an equation show the relationship between variables and other quantities?

Explore It!

Tucker has 3 more than twice Marley's number of golf balls. Let m represent Marley's collection. Make a table and write an expression for Tucker's collection.

What we will learn

Define variables; translate stories into two-step equations; interpret coefficients, constants and grouped quantities.

Definitions & rules

A variable represents an unknown quantity.

A coefficient multiplies a variable; a constant does not change.

Two-step equations contain two operations on the unknown. Identify what each term means.

Example 1 — Write Two-Step Equations

GRADE 7 • TOPIC 5 • LESSON 5.1 | Guided example • Model and explain

Problem

Tucker has 159 golf balls, which is 3 more than twice Marley's collection. Let m be Marley's number of golf balls. Write an equation.

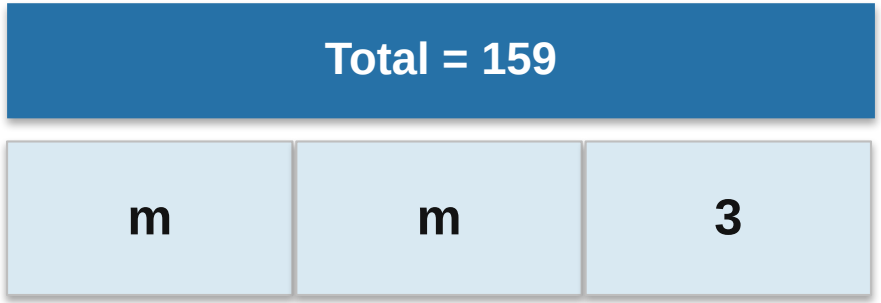
Worked solution

Twice Marley's collection = 2m.

3 more = 2m + 3.

Tucker's collection: 159 = 2m + 3.

Define the variable, translate each operation, and equate the expression to the total.



Example 2 — Write Two-Step Equations

Problem

A box of 50 bats weighs w ounces. A baseball weighs 5.25 oz, which is 25.75 oz less than a bat. Write an equation in w.

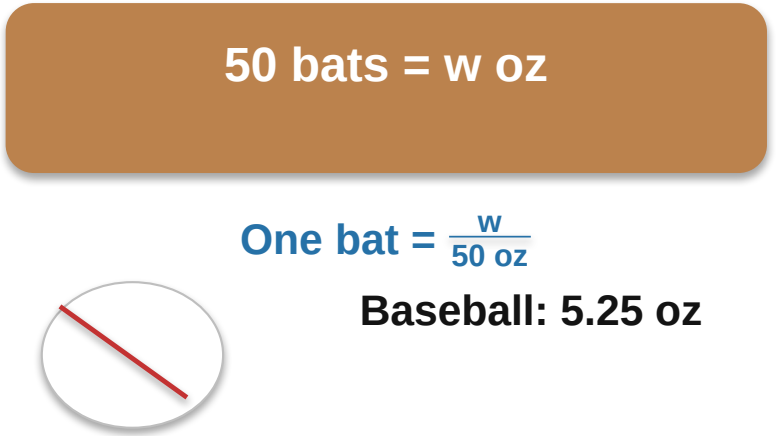
Worked solution

Weight of a bat = $\frac{w}{50}$.

Baseball weight = bat weight − 25.75.

$5.25 = \frac{w}{50} - 25.75$.

Define the variable, translate each operation, and equate the expression to the total.



Example 3 — Write Two-Step Equations

Problem

Claire buys 8 tickets for $104 after getting $3 off each ticket. Let x be the original ticket price. Which equation works: 3(x − 8) = 104, 8x − 3 = 104, or 8(x − 3) = 104?

Worked solution

Discounted cost per ticket = x − 3.

Multiply by 8 tickets.

Correct equation: 8(x − 3) = 104.

Define the variable, translate each operation, and equate the expression to the total.

Individual Work

GRADE 7 • TOPIC 5 • LESSON 5.1 | 10 minutes total • 10 points

Complete all five tasks. Show your reasoning.

7. (p. 267) A 15-lb crate and oranges weighing 0.38 lb each total 24.5 lb. Write an equation for g oranges.

8. (p. 267) One fourth of a number x minus 3 is 12. Write an equation.

9. (p. 267) Three tables seat n people each; there are 7 others and 37 people altogether. Write an equation.

Individual Work — continued

GRADE 7 • TOPIC 5 • LESSON 5.1 | 10 minutes total • 10 points

Finish the remaining problems. Check your work.

10. (p. 267) Four friends each pay $12.75 plus a tip t. The total is $61. Write an equation.

11. (p. 267) 4⅕ units at cost c each, with a 55¢ coupon, cost $3.23. Write an equation.

Individual Work — Answer Key

Define the variable, translate each operation, and equate the expression to the total.

7. (p. 267)

Crate = 15 lb; oranges = 0.38g lb. Equation: 24.5 = 15 + 0.38g.

8. (p. 267)

One fourth of x, then subtract 3: $\frac{x}{4} - 3 = 12$.

9. (p. 267)

Three tables of n plus 7 others: 3n + 7 = 37.

10. (p. 267)

Meal and tip for each friend: 4(12.75 + t) = 61.

11. (p. 267)

Cost before coupon = 4⅕c = 4.2c; 55¢ = $0.55. Equation: 4.2c − 0.55 = 3.23.

Group Work

GRADE 7 • TOPIC 5 • LESSON 5.1 | 8 minutes total • 10 points

Work together. Each person must contribute a solution.

12. (p. 267) Create a situation represented by $\frac{g + 3}{6} = 15$.

15. (p. 268) Life expectancy is 80.2 years and increases 0.4 year every 5 years. Write an equation and find the value after 10 years.

Group Work — continued

Agree on a solution and be ready to explain it.

16. (p. 268) Five times a number minus 13 equals 12. Write an equation and find the number.

17. (p. 268) Write an equation for three groups each with r red items and 30 other items, totaling 135. Describe another situation for the equation.

Group Work — Answer Key

GRADE 7 • TOPIC 5 • LESSON 5.1 | Discuss and justify

Define the variable, translate each operation, and equate the expression to the total.

12. (p. 267)

Example: g pencils plus 3 more are divided equally among 6 students, each receiving 15: $\frac{g + 3}{6} = 15$.

15. (p. 268)

Two 5-year intervals. L = 80.2 + 2(0.4) = 81.0 years. Equivalently, L − 80.2 = 0.8.

16. (p. 268)

Write 5x − 13 = 12. Add 13: 5x = 25. Divide by 5: x = 5. Check: 5(5) − 13 = 12.

17. (p. 268)

3r + 3(30) = 135. Another model: three boxes each containing r red items plus 90 yellow items, 135 total.

Exit Ticket

GRADE 7 • TOPIC 5 • LESSON 5.1 | 2 minutes • Independent check

Before you leave, solve this problem.

A $10 discount is applied to four items costing x each; total $42. Write an equation.

Show your work.

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