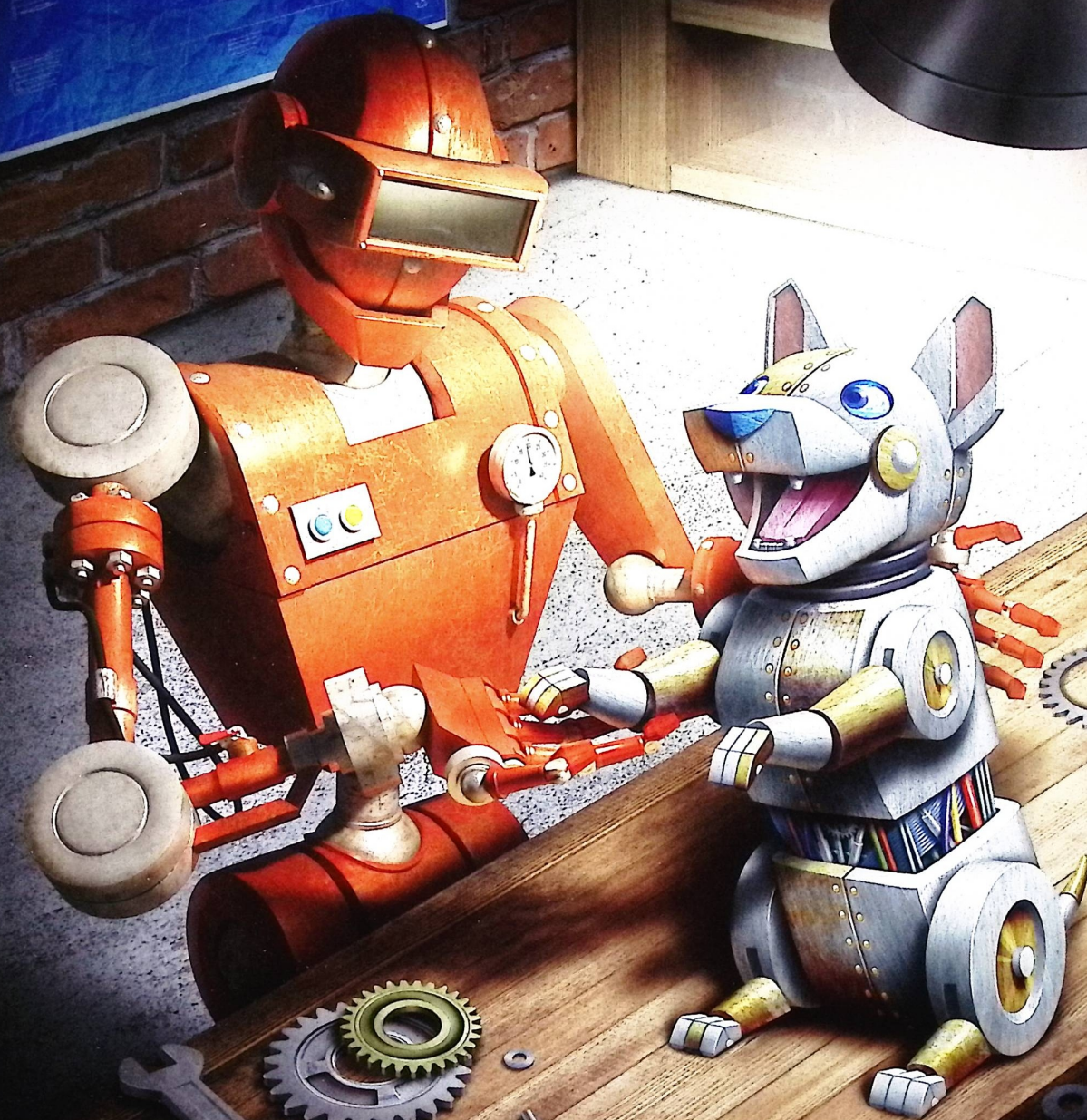


VOLUME 2



enVision[®] Mathematics

SAVVAS

CONTENTS

TOPICS

- 1 Rational Number Operations
- 2 Analyze and Use Proportional Relationships
- 3 Analyze and Solve Percent Problems
- 4 Generate Equivalent Expressions
- 5 Solve Problems Using Equations and Inequalities
- 6 Use Sampling to Draw Inferences About Populations
- 7 Probability
- 8 Solve Problems Involving Geometry

Integers and Rational Numbers

Topic Opener	2
STEM Project	4
Review What You Know	5
Math Literacy Activity	6
Pick a Project	7
1-1 Relate Integers and Their Opposites	9
1-2 Understand Rational Numbers	15
1-3 Add Integers	21
1-4 Subtract Integers	27
1-5 Add and Subtract Rational Numbers	33
Mid-Topic Checkpoint	39
Mid-Topic Performance Task	40
1-6 Multiply Integers	41
1-7 Multiply Rational Numbers	47
1-8 Divide Integers	53
1-9 Divide Rational Numbers	59
1-10 Solve Problems with Rational Numbers	65
3-Act Mathematical Modeling: Win Some, Lose Some	71
Topic Review	75
Fluency Practice Activity	81

Analyze and Use Proportional Relationships

Topic Opener	82
STEM Project	84
Review What You Know	85
Math Literacy Activity	86
Pick a Project	87
2-1 Connect Ratios, Rates, and Unit Rates	89
2-2 Determine Unit Rates with Ratios of Fractions	95
2-3 Understand Proportional Relationships: Equivalent Ratios	101
2-4 Describe Proportional Relationships: Constant of Proportionality	107
Mid-Topic Checkpoint	113
Mid-Topic Performance Task	114
3-Act Mathematical Modeling: Mixin' It Up	115
2-5 Graph Proportional Relationships	119
2-6 Apply Proportional Reasoning to Solve Problems	125
Topic Review	131
Fluency Practice Activity	135

Analyze and Solve Percent Problems

Topic Opener	136
STEM Project	138
Review What You Know	139
Math Literacy Activity	140
Pick a Project	141
3-1 Analyze Percents of Numbers	143
3-2 Connect Percent and Proportion	149
3-3 Represent and Use the Percent Equation	155
Mid-Topic Checkpoint	161
Mid-Topic Performance Task	162
3-4 Solve Percent Change and Percent Error Problems	163
3-Act Mathematical Modeling: The Smart Shopper	169
3-5 Solve Markup and Markdown Problems	173
3-6 Solve Simple Interest Problems	179
Topic Review	185
Fluency Practice Activity	189

Generate Equivalent Expressions









Topic Opener	190
STEM Project	192
Review What You Know	193
Math Literacy Activity	194
Pick a Project	195
4-1 Write and Evaluate Algebraic Expressions	197
4-2 Generate Equivalent Expressions	203
4-3 Simplify Expressions	209
4-4 Expand Expressions	215
4-5 Factor Expressions	221
Mid-Topic Checkpoint	227
Mid-Topic Performance Task	228
3-Act Mathematical Modeling: I've Got You Covered	229
4-6 Add Expressions	233
4-7 Subtract Expressions	239
4-8 Analyze Equivalent Expressions	245
Topic Review	251
Fluency Practice Activity	255

Solve Problems Using Equations and Inequalities

Topic Opener	256
enVision® STEM Project	258
Review What You Know	259
Math Literacy Activity	260
Pick a Project	261
5-1 Write Two-Step Equations	263
5-2 Solve Two-Step Equations	269
5-3 Solve Equations Using the Distributive Property	275
Mid-Topic Checkpoint	281
Mid-Topic Performance Task	282
5-4 Solve Inequalities Using Addition or Subtraction	283
5-5 Solve Inequalities Using Multiplication or Division	289
 3-Act Mathematical Modeling (Digital Downloads)	295
5-6 Solve Two-Step Inequalities	299
5-7 Solve Multi-Step Inequalities	305
Topic Review	311
Fluency Practice Activity	315

Use Sampling to Draw Inferences About Populations

Topic Opener	316
enVision® STEM Project	318
Review What You Know	319
Math Literacy Activity	320
Pick a Project	321
6-1 Populations and Samples	323
6-2 Draw Inferences from Data	331
Mid-Topic Checkpoint	339
Mid-Topic Performance Task	340
6-3 Make Comparative Inferences About Populations	341
6-4 Make More Comparative Inferences About Populations	347
3-Act Mathematical Modeling (Raising Money)	353
Topic Review	357
Fluency Practice Activity	361

Topic Opener	362
enVision® STEM Project	364
Review What You Know	365
Math Literacy Activity	366
Pick a Project	367
 Understand Likelihood and Probability	369
 Understand Theoretical Probability	375
 Understand Experimental Probability	381
 Use Probability Models	387
Mid-Topic Checkpoint	393
Mid-Topic Performance Task	394
 3-Act Mathematical Modeling (Photo Finish)	395
 Determine Outcomes of Compound Events	399
 Find Probabilities of Compound Events	405
 Simulate Compound Events	411
Topic Review	417
Fluency Practice Activity	423

Solve Problems Involving Geometry

Topic Opener	424
enVision® STEM Project	426
Review What You Know	427
Math Literacy Activity	428
Pick a Project	429
8-1 Solve Problems Involving Scale Drawings	431
8-2 Draw Geometric Figures	437
8-3 Draw Triangle with Given Conditions	443
8-4 Solve Problems Using Angle Relationships	451
8-5 Solve Problems Involving Circumference of a Circle	457
Mid-Topic Checkpoint	463
Mid-Topic Performance Task	464
8-6 Solve Problems Involving Area of a Circle	465
8-7 3-Act Mathematical Modeling (Whole Lotta Dough)	471
8-7 Describe Cross Sections	475
8-8 Solve Problems Involving Surface Area	481
8-9 Solve Problems Involving Volume	487
Topic Review	493
Fluency Practice Activity	499



Explore It!



Marley collects golf balls. His neighbor Tucker collects 3 more than twice as many golf balls as Marley.

Lesson 5-1

Write Two-Step Equations



Go Online

I can...

represent a problem with a two-step equation.



A. How can you use a table to represent the number of golf balls in Marley's collection, m , and the number of golf balls in Tucker's collection?

B. How can you use an algebraic expression to represent the number of golf balls in Tucker's collection?

Focus on math practices

Look for Relationships How do the terms of the expression you wrote in Part B relate to the values in the table?

? Essential Question

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



VISUAL
LEARNING



ASSESS

EXAMPLE 1



Write a Two-Step Equation to Represent a Situation

Scan for
Multimedia



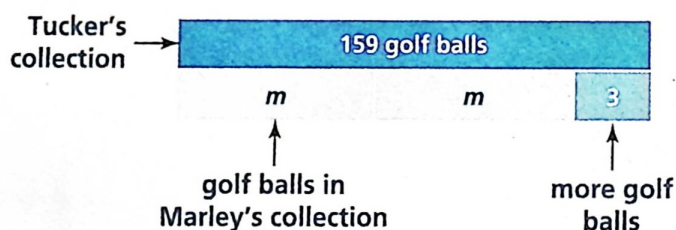
What equation can be used to represent the numbers of golf balls in Marley's and Tucker's collections?

Model with Math

How can an equation represent a given situation?



Use a bar diagram to represent the situation.



Use the bar diagram to write an equation.

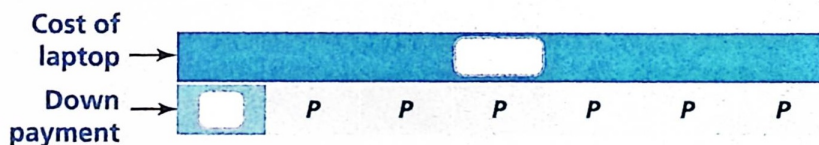
$$\begin{array}{rclcl} \text{Tucker's collection} & = & \text{twice Marley's collection} & + & \text{more golf balls} \\ 159 & = & 2m & + & 3 \end{array}$$

The equation $159 = 2m + 3$ can be used to represent Marley's and Tucker's golf ball collections.



Try It!

Cole buys a new laptop for \$335. He makes a down payment of \$50 and pays the rest in 6 equal monthly payments, p . What equation represents the relationship between the cost of the laptop and Cole's payments?



$$\text{cost} = \boxed{} + \boxed{} \times \text{monthly payment}$$

$$\boxed{} = \boxed{} + \boxed{} \times \boxed{}$$

$$\boxed{} = \boxed{}$$

Convince Me! Why are both multiplication and addition used in the equation that represents Cole's monthly payments?

EXAMPLE 2



Write More Two-Step Equations



ACTIVITY



ASSESS

A baseball weighs 25.75 ounces less than a bat. Write an equation that represents the relationship between the weights of a baseball and a bat in terms of the weight of the box, w .

weight of one baseball	=	weight of one bat	-	difference in weight
5.25	=	$\frac{\text{weight of box}}{\text{number of bats in box}}$	-	25.75
5.25	=	$\frac{w}{50}$	-	25.75

The box contains
50 bats and
weighs w ounces.



One baseball
weighs 5.25 oz.

The equation $5.25 = \frac{w}{50} - 25.75$ can be used to represent the relationship between the weights of a baseball and a bat.



Try It!

Marcia and Tamara are running a race. Marcia has run 4 kilometers. Tamara has completed $\frac{3}{4}$ of the race and is 2.5 kilometers ahead of Marcia. Write an equation that represents the relationship between the distances each girl has run. Let k represent the total length of the race in kilometers.

EXAMPLE 3



Interpret Quantities and Operations in Equations

Claire bought 8 tickets for a total cost of \$104. She had used a coupon code to get \$3 off each ticket. Let x be the original cost of each ticket. Which of the following equations correctly represents the situation?

$$3(x - 8) = 104$$

Total cost

\$3 discount times the
difference of 8 tickets
and the cost per ticket

$$8x - 3 = 104$$

Total cost

8 tickets times the cost
per ticket minus a total
discount of \$3

$$8(x - 3) = 104$$

Total cost

8 tickets times the
difference of the cost
per ticket and \$3.

The equation $8(x - 3) = 104$ represents this situation.



Try It!

At the mall, Claire buys a hat that is 60% off and socks that are reduced to \$5.49. She spends a total of \$9.49. Let x represent the cost of the hat. Which of the following equations correctly represents Claire's shopping trip?

$$0.4x + 5.49 = 5.09$$

$$0.4x + 5.49 = 9.49$$

$$0.6x + 9.49 = 5.49$$



You can write an equation with more than one operation to represent a situation.

$$3(x + 5) = 24$$

This two-step equation uses multiplication and addition.

$$\frac{x}{4} - 15 = 18$$

This two-step equation uses division and subtraction.

Do You Understand?

1. **Essential Question** How does an equation show the relationship between variables and other quantities in a situation?

2. **Use Structure** Do the equations $\frac{1}{5}x + 2 = 6$ and $\frac{1}{5}(x + 2) = 6$ represent the same situation? Explain.

3. How do you decide which operations to use when writing an equation?

Do You Know How?

4. Rita started the day with r apps. Then she deleted 5 apps and still had twice as many apps as Cora has. Write an equation that represents the number of apps each girl has.



5. Write a problem that could be represented by the equation $5n - 6 = 19$.
6. Kayleigh babysat for 11 hours this week. That was 5 fewer than $\frac{2}{3}$ as many hours as she babysat last week, h . Write an equation to represent the number of hours she babysat each week.

Name: _____

Practice & Problem Solving



Scan for
Multimedia



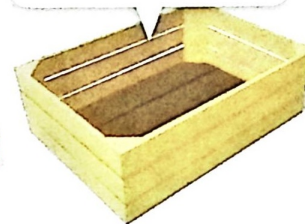
7. A farmer ships oranges in wooden crates. Suppose each orange weighs the same amount. The total weight of a crate filled with g oranges is 24.5 pounds. Write an equation that represents the relationship between the weight of the crate and the number of oranges it contains.

$$24.5 = \boxed{} + \boxed{} \times \boxed{}$$

0.38 lb



empty crate: 15 lb



8. Jordan wrote the following description: Three fewer than one fourth of x is 12. Write an equation to represent the description.

9. At a graduation dinner, an equal number of guests were seated at each of 3 large tables, and 7 late-arriving guests were seated at a smaller table. There were 37 guests in all. If n represents the number of people seated at each of the large tables, what equation represents the situation?

10. Last night, 4 friends went out to dinner at a restaurant. They split the bill evenly. Each friend paid \$12.75 for his or her meal and each left the same amount for a tip, t . The total dinner bill including the tip was \$61. What equation could you use to describe the situation?

11. Mia buys $4\frac{1}{5}$ pounds of plums. The total cost after using a coupon for 55¢ off her entire purchase was \$3.23. If c represents the cost of the plums in dollars per pound, what equation could represent the situation?

For 12 and 13, use the equation shown at the right.

12. Describe a situation that the equation could represent.

$$\frac{g + 3}{6} = 15$$

13. **Reasoning** Would the situation you wrote for Problem 12 work if the denominator in the equation were doubled? Explain why or why not.