Name _____ Date _____

LESSON 5.4

Study Guide

For use with pages 263–267

CA Standards AF 4.2

GOAL Solve equations using multiplication and division.

VOCABULARY

Multiplication Property of Equality

Multiplying each side of an equation by the same nonzero number produces an equivalent equation.

Division Property of Equality

Dividing each side of an equation by the same nonzero number produces an equivalent equation.

EXAMPLE 1 Solving an Equation Using Multiplication

$\frac{x}{7} = 6$	Original equation
$\frac{x}{7} \cdot 7 = 6 \cdot 7$	Multiply each side by 7. (Multiplication property of equality)
$x = 42$	Simplify.
✓Check $\frac{42}{7} = 6$ ✓	Substitute 42 for x in original equation.

EXAMPLE 2 Solving Equations Using Division

a. $52 = 13x$	Original equation
$\frac{52}{13} = \frac{13x}{13}$	Divide each side by 13. (Division property of equality)
$4 = x$	Simplify.
b. $6x = -20.4$	Original equation
$\frac{6x}{6} = -\frac{20.4}{6}$	Divide each side by 6. (Division property of equality)
$x = -3.4$	Simplify.

Exercises for Examples 1 and 2

Solve the equation. Check your solution.

1. $3 = \frac{x}{4}$ **2.** $\frac{y}{8} = -2$ **3.** $\frac{x}{4.5} = 16$

4. $6x = 72$ **5.** $28 = 4x$ **6.** $5b = 55$

7. $-7h = 56$ **8.** $9.6 = 2.4z$ **9.** $8h = 20$

Name _____ Date _____

LESSON 5.4

Study Guide *continued*

For use with pages 263–267

EXAMPLE 3 Writing and Solving an Equation

Arlene bought 6 notebooks for school. The total cost of the notebooks was \$10.74 before tax. How much was each notebook?

Solution

Let x be the cost of one notebook. Write a verbal model.

Total cost	=	Number of notebooks	·	Cost of one notebook

$10.74 = 6x$ Write an algebraic model.

$\frac{10.74}{6} = \frac{6x}{6}$ Divide each side by 6.

$1.79 = x$ Simplify.

Answer: The cost of each notebook was \$1.79.

EXAMPLE 4 Writing a Repeating Decimal as a Fraction

Write $0.\overline{27}$ as a fraction.

(1) Let $x = 0.\overline{27}$, or 0.272727....

(2) The number has 2 repeating digits, so multiply each side by 100. So, $100x = 27.272727....$

(3) Subtract x from $100x$.

$$\begin{array}{r} 100x = 27.2727227.... \\ -x = -0.272727.... \\ \hline 99x = 27 \end{array}$$

(4) Solve for x. Simplify. $x = \frac{27}{99}$ or $\frac{3}{11}$

Answer: The decimal $0.\overline{27}$ is equivalent to the fraction $\frac{3}{11}$.

Exercises for Examples 3 and 4

10. You are helping your aunt plan her daughter's wedding. There are 176 people attending the wedding. There are 8 chairs to a table at the reception. How many tables are needed?

Write the decimal as a fraction.

11. $0.\overline{5}$ **12.** $0.\overline{36}$ **13.** $0.\overline{19}$

Name _____ Date _____

Lesson 5.5

LESSON 5.5

Study Guide

For use with pages 269-275

CA Standards
AF 1.1
AF 4.1

GOAL Solve two-step equations.

EXAMPLE 1 Solving Two-Step Equations

a. $3x + 2 = 14$

$3x + 2 - 2 = 14 - 2$

$3x = 12$

$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

Answer: The solution is 4.

Check: $3(4) + 2 \stackrel{?}{=} 14$

$14 = 14$ ✓

b. $4x - 1 = 19$

$4x - 1 + 1 = 19 + 1$

$4x = 20$

$\frac{4x}{4} = \frac{20}{4}$

$x = 5$

Answer: The solution is 5.

Check: $4(5) - 1 \stackrel{?}{=} 19$

$19 = 19$ ✓

Exercises for Example 1

Solve the equation. Check your solution.

1. $2x - 3 = 11$ **2.** $8x + 1 = 17$ **3.** $-10 + 3x = 5$

EXAMPLE 2 Multiple Choice Practice

Mrs. Jones rented a moving van for \$30 a day plus \$.15 per mile. Her bill for a four day rental was \$132. How many miles did she drive?

A 12 mi **B** 40 mi **C** 80 mi **D** 180 mi

Solution

Write a verbal model. Let m represent the number of miles.

Total cost = Number of days · Cost per day + Cost per mile · Number of miles

$132 = 4 \cdot 30 + 0.15m$ Write an algebraic model.

$132 = 120 + 0.15m$ Simplify.

$132 - 120 = 120 - 120 + 0.15m$ Subtract 120 from each side.

$12 = 0.15m$ Simplify.

$\frac{12}{0.15} = \frac{0.15m}{0.15}$ Divide each side by 0.15.

$80 = m$ Simplify.

Mrs. Jones drove 80 miles.

Answer: The correct answer is C. (A) (B) (C) (D)

LESSON 5.5

Study Guide *continued*

For use with pages 269–275

Exercise for Example 2

4. If it had cost Mrs. Jones $210 to rent the van for 4 days, how many miles would she have driven?

EXAMPLE 3 Solving with a Variable in the Numerator

Solve $\frac{x}{3} + 16 = 31$.

$\frac{x}{3} + 16 = 31$	Write original equation.
$\frac{x}{3} + 16 - 16 = 31 - 16$	Subtract 16 from each side. (Subtraction property of equality)
$\frac{x}{3} = 15$	Simply.
$\frac{x}{3} \cdot 3 = 15 \cdot 3$	Multiply each side by 3. (Multiplication property of equality)
$x = 45$	Simply.

✓ **Check**

$\frac{45}{3} + 16 \stackrel{?}{=} 31$	Substitute 45 for x in original equation.
$15 + 16 = 31$ ✓	

EXAMPLE 4 Solving with a Negative Coefficient

Solve $21 = 3 - 9z$.

$21 = 3 - 9z$	Write original equation.
$21 - 3 = 3 - 9z - 3$	Subtract 3 from each side. (Subtraction property of equality)
$18 = -9z$	Simplify.
$\frac{18}{-9} = \frac{-9z}{-9}$	Divide each side by -9. (Division property of equality)
$-2 = z$	Simplify.

Exercises for Examples 3 and 4

Solve the equation. Check your solution.

5. $\frac{x}{4} - 21 = 30$ **6.** $\frac{z}{7} + 12 = 19$ **7.** $9 + \frac{t}{5} = 11$

8. $15 - z = 21$ **9.** $24 - 3w = 33$ **10.** $81 = -8x - 15$

Name _____ Date _____

LESSON 5.6

Study Guide

For use with pages 277–281

CA Standards Gr. 6 NS. 1.3

GOAL **Write and solve proportions.**

VOCABULARY

A **proportion** is an equation stating that two ratios are equivalent.

The proportion $\frac{a}{b} = \frac{c}{d}$ has cross products ad and bc.

Cross Products Property

The cross products of a proportion are equal.

EXAMPLE 1 Writing and Solving a Proportion

There are 50 calories in four ounces of orange juice. How many calories are in 14 ounces of orange juice?

Solution

$\frac{50}{4} = \frac{x}{14}$ Write a proportion $\frac{\text{calories}}{\text{ounces}} = \frac{\text{calories}}{\text{ounces}}$.

$14 \cdot \frac{50}{4} = \frac{x}{14} \cdot 14$ Multiply each side by 14.

$\frac{700}{4} = x$ Multiply.

$175 = x$ Divide.

Answer: There are 175 calories in fourteen ounces of orange juice.

EXAMPLE 2 Using the Cross Products Property

Solve $\frac{17}{2} = \frac{n}{6}$.

Solution

$\frac{17}{2} = \frac{n}{6}$ Write original proportion.

$17(6) = 2n$ Cross products property

$102 = 2n$ Multiply.

$\frac{102}{2} = \frac{2n}{2}$ Divide each side by 2.

$51 = n$ Simplify.

Lesson 5.6

Name _____ Date _____

LESSON 5.6

Study Guide *continued*

For use with pages 277–281

Exercises for Examples 1 and 2

Use the information in Example 1 to find the number of calories in the given amount of orange juice.

1. 10 ounces **2.** 16 ounces **3.** 24 ounces

Use the cross products property to solve the proportion. Check your solution.

4. $\frac{a}{4} = \frac{10}{8}$ **5.** $\frac{4}{6} = \frac{x}{15}$ **6.** $\frac{2}{y} = \frac{1}{8}$

7. $\frac{3.2}{0.5} = \frac{22.4}{z}$ **8.** $\frac{4}{b} = \frac{32.8}{57.4}$ **9.** $\frac{g}{0.1} = \frac{6.4}{1.6}$

EXAMPLE 3 Multiple Choice Practice

What is the solution of $\frac{x+3}{25} = \frac{4}{5}$?

A 5 **B** 17 **C** 20 **D** 24

Solution

$\frac{x+3}{25} = \frac{4}{5}$ Write original proportion.

$(x + 3) \cdot 5 = 25 \cdot 4$ Cross products property

$5x + 15 = 100$ Multiply and use distributive property.

$5x = 85$ Subtract 15 from each side.

$x = 17$ Divide each side by 5.

Answer: The correct answer is B. (A) (B) (C) (D)

Exercises for Example 3

Solve the proportion. Check your solution.

10. $\frac{18}{x+2} = \frac{9}{7}$ **11.** $\frac{y+1}{8} = \frac{30}{40}$ **12.** $\frac{9}{2} = \frac{27}{x-4}$