

Lesson 6-1

Using the Percent Proportion

ISG Interactive Study Guide

See pages 127–128 for:

- Getting Started
- Real-World Link
- Notes

EQ Essential Question

How can you use proportional relationships to solve real-world percent problems?

CCSS Common Core State Standards

Content Standards
7.RP.2, 7.RP.2c, 7.RP.3,
7.EE.3

Mathematical Practices
1, 3, 4, 8

Vocab Vocabulary

percent proportion

What You'll Learn

- Use the percent proportion to solve problems.
- Apply the percent proportion to real-world problems.



Real-World Link

Snacks With four different kinds of fruit, this healthy fruit salad recipe is the perfect lunch box or after school snack! You can adjust the recipe to make more or less by keeping the proportions the same.

Fruit Salad
2 cups pineapple
1 cup blueberries
3 cups grapes
2 cups strawberries



Key Concept Percent Proportion

Words $\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{100}$

Symbols $\frac{a}{b} = \frac{p}{100}$, where a is the part, b is the whole and p is the percent.

In a **percent proportion**, one ratio compares *part* of a quantity to the *whole* quantity. The other ratio is the equivalent percent written as a fraction with a denominator of 100.

Example 1

Tutor

Twelve is what percent of 32?

Words Twelve is what percent of 32?



Variable Let p represent the percent.



Proportion $\left. \begin{array}{l} \text{part} \rightarrow \frac{12}{32} \\ \text{whole} \rightarrow \frac{p}{100} \end{array} \right\} \text{percent}$

Twelve is being compared to 32.
So, 12 is the part and 32
is the whole.

$$\frac{12}{32} = \frac{p}{100}$$

Write the percent proportion.

$$12 \cdot 100 = 32 \cdot p$$

Find the cross products.

$$1200 = 32p$$

Multiply.

$$\frac{1200}{32} = \frac{32p}{32}$$

Divide each side by 32.

$$37.5 = p$$

Simplify.

So, 12 is 37.5% of 32.

Got It? Do these problems to find out.

1a. Fifteen is what percent of 20? **75%**

1b. One hundred is what percent of 25? **400%**

1c. What percent of 5 is 12? **240%**

1d. What percent of 18 is 9? **50%**



Example 2

Check for Reasonableness

Ten percent of 450 is 45. So, the answer should be more than 45.

What number is 15.5% of 450?

The percent is 15.5, and the base is 450. Let a represent the part.

$$\frac{a}{450} = \frac{15.5}{100}$$

Write the percent proportion.

$$a \cdot 100 = 450 \cdot 15.5$$

Find the cross products.

$$100a = 6975$$

Multiply.

$$a = 69.75$$

Mentally divide each side by 100.

So, 69.75 is 15.5% of 450.

Got It? Do these problems to find out.

2a. What number is 11.4% of 330? **37.62** 2b. Find 10.5% of 30. **3.15**

2c. Find 15.3% of 425. **65.025** 2d. What number is 63.4% of 12? **7.608**



Example 3

Whole

In percent problems, the whole usually follows the word *of*.

Seventy-eight is 60% of what number?

The percent is 60%, and the part is 78. Let b represent the whole.

$$\frac{78}{b} = \frac{60}{100}$$

Write the percent proportion.

$$78 \cdot 100 = b \cdot 60$$

Find the cross products.

$$7800 = 60b$$

Multiply.

$$\frac{7800}{60} = \frac{60b}{60}$$

Divide each side by 60.

$$130 = b$$

Simplify.

So, 78 is 60% of 130.

Got It? Do these problems to find out.

3a. Thirty percent of what number is 63? **210** 3b. 3000 is 60% of what number? **5000**

3c. Forty-five is 3% of what number? **1500** 3d. Eighteen percent of what number is 126? **700**

Key words and phrases indicate which type of percent problem you need to solve.

Concept Summary Types of Percent Problems

| Type | Example | Proportion |
|------------------|--|--------------------------------|
| Find the Percent | 1 is what percent of 5? or what percent of 5 is 1? | $\frac{1}{5} = \frac{p}{100}$ |
| Find the Part | What number is 20% of 5? | $\frac{a}{5} = \frac{20}{100}$ |
| Find the Whole | 1 is 20% of what number? | $\frac{1}{b} = \frac{20}{100}$ |



Example 4



The table shows the batting statistics for one season for Derek Jeter of the New York Yankees. If he had 639 at-bats, what percent of his at-bats were singles? Round to the nearest tenth.

| Stat | Number |
|-----------|--------|
| single | 151 |
| double | 39 |
| triple | 4 |
| home run | 12 |
| walk | 56 |
| strikeout | 100 |

Compare the number of singles, 151, to the total number of at-bats, 639. Let p represent the percent.

$$\frac{151}{639} = \frac{p}{100} \quad \text{Write the percent proportion.}$$

$$151 \cdot 100 = 639 \cdot p \quad \text{Find the cross products.}$$

$$15,100 = 639p \quad \text{Simplify.}$$

$$\frac{15,100}{639} = \frac{639p}{639} \quad \text{Divide each side by 639.}$$

$$23.6 \approx p \quad \text{Simplify.}$$

So, about 23.6% of time Derek's at-bats were singles.

Check for Reasonableness

The number of at-bats is about 640. The fraction $\frac{160}{640}$ is equal to $\frac{1}{4}$, which is 25%. So, $\frac{151}{640}$ would be slightly less than 25%.

The answer is reasonable. ✓

Got It? Do these problems to find out.

- 4a. To the nearest tenth, what percent of Derek Jeter's at-bats were strikeouts? **15.6%**
- 4b. **Financial Literacy** The number of mutual funds that increased in value during the third quarter of the fiscal year was 15. If this is 60% of the total number of mutual funds offered, how many mutual funds were offered? **25 funds**

Guided Practice



Use the percent proportion to solve each problem. (Examples 1-3)

- 18 is what percent of 72? **25%**
- What percent of 8 is 20? **250%**
- What is 74% of 56? **41.44**
- 9 is 20% of what number? **45**
- What percent of 2 is 8? **400%**
- Find 6% of 300. **18**
- Find 9% of 255. **22.95**
- Find 97% of 900. **873**
- 16 is 80% of what number? **20**
- 18 is 5% of what number? **360**
- Of the 120 math tests, 47 were Bs. To the nearest tenth, what percent of the math tests were Bs? (Example 4) **39.2%**
- An Aztec Salad gets 28 of its Calories from protein. If this is 20% of the total number of Calories, how many Calories does the salad have? (Example 4) **140 Cal**