

? Topic Essential Question

How can percents show proportional relationships between quantities and be used to solve problems?

Vocabulary Review

Complete each definition and then provide an example of each word.

Vocabulary markdown markup percent change
 principal simple interest

Definition	Example
1. The <input type="text"/> is the decrease from the original price of an item to its sale price.	
2. The accuracy of a measured or estimated value compared to its actual value is described as the <input type="text"/> .	
3. An initial amount of money that is deposited in an account is called the <input type="text"/> .	
4. The <input type="text"/> describes how much a quantity has changed relative to its original amount.	

Use Vocabulary in Writing

Thema deposits \$500 in a savings account with a simple interest rate of 1.3%. How could you use this information to find the interest she would earn in 4 years and determine the percent change in her savings account?

Concepts and Skills Review

LESSON 3-1 Analyze Percents of Numbers

Quick Review

You can use equivalent ratios to find the percent of a number. Remember that a percent is a ratio that relates a number to 100.

Example

Find 57% of 690.

$$\frac{57}{100} = \frac{x}{690}$$

$$\frac{57}{100} \cdot 690 = \frac{x}{690} \cdot 690$$

$$393.3 = x$$

Practice

1. Find 0.8% of 1,046.
2. Find 160% of 98.
3. A company charges a shipping fee that is 4.5% of the purchase price for all items it ships. What is the fee to ship an item that costs \$56?

LESSON 3-2 Connect Percent and Proportion

Quick Review

You can use proportions to solve different types of percent problems. There are three values in a percent problem—the percent, the part, and the whole. If you know two of these values, you can set up a proportion to find the third value.

Example

What percent of 19 is 4.75?

The whole is 19 and the part is 4.75. Write a proportion, and solve for the percent, p .

$$\frac{\text{part}}{\text{whole}} = \frac{p}{100}$$

$$\frac{4.75}{19} = \frac{p}{100}$$

$$\frac{4.75}{19} \cdot 100 = \frac{p}{100} \cdot 100$$

$$25 = p$$

So, 4.75 is 25% of 19.

Practice

1. 24.94 is 29% of what number?
2. On Thursday, a restaurant serves iced tea to 35 of its 140 customers. What percent of the customers order iced tea?
3. Liam puts \$40 in savings in March and 175% of this amount in savings in April. How much does Liam put in savings in April?

LESSON 3-3

Represent and Use the Percent Equation

Quick Review

You can use the percent equation to solve percent problems.

$$\text{part} = \text{percent} \cdot \text{whole}$$

Substitute two of the three values to solve for the unknown value.

Example

Omondi earns a 6% commission on each house he sells. If he sells a house for \$180,000, how much does he earn in commission, c ?

$$c = 0.06 \cdot 180,000$$

$$c = 10,800$$

Omondi earns \$10,800 in commission.

Practice

- Jayda paid \$78 sales tax on a new camera. If the sales tax rate is 6.5%, what was the cost of the camera?
- There are 45 students who play a woodwind instrument in the school band. Of these, 18 play the saxophone. What percent of these students play the saxophone?

LESSON 3-4

Solve Percent Change and Percent Error Problems

Quick Review

A percent change can be an increase or a decrease. You can use an equation to find a percent change.

$$\text{change} = \text{percent change} \cdot \text{original amount}$$

A percent error is always a nonnegative value. You can use an equation to find a percent error.

$$\text{difference} = \text{percent error} \cdot \text{actual}$$

Example

Juan's puppy weighed 16 pounds at the age of 2 months. The puppy weighed 60 pounds at the age of 8 months. What is the percent change in the puppy's weight?

$$\text{change in pounds} = 60 - 16 = 44$$

$$44 = P \cdot 16$$

$$\frac{44}{16} = P$$

$$2.75 = P$$

The puppy's weight increased by 275%.

Practice

- In 2014, the attendance at Jefferson School's Fall Festival was 650. In 2015, the attendance was 575. What was the percent change in attendance from 2014 to 2015?
Round to the nearest whole percent.
- Jamila estimated that she would read 250 pages last week. She read 290 pages. What is the percent error of Jamila's estimate? Round to the nearest whole percent.

LESSON 3-5

Solve Markup and Markdown Problems

Quick Review

You can use the percent equation to solve markup and markdown problems.

$$\text{markup} = \text{percent markup} \cdot \text{cost}$$

$$\text{markdown} = \text{percent markdown} \cdot \text{selling price}$$

Example

Tia buys a purse for \$90. She sells it at her store for \$135. What is the percent markup on the purse?

$$\text{markup} = \$135 - \$90 = \$45$$

$$45 = P \cdot 90$$

$$\frac{45}{90} = P$$

$$0.5 = P$$

The decimal 0.5 is equivalent to 50%.

The percent markup on the purse is 50%.

Practice

1. Cruz buys a used car for \$7,200 and plans to sell it on his used car lot. What is the price of the car after a markup of 15%?
2. Nya wants to buy a sweater that had an original price of \$55. The sweater is now discounted 20% and the sales tax rate is 5.5%. How much will Nya pay for the sweater?

LESSON 3-6

Solve Simple Interest Problems

Quick Review

You consider four quantities when solving problems involving simple interest.

initial amount, or **principal**, p

interest rate, r

time, t

amount of simple interest, I

Example

Yuni loaned \$400 to her brother. He will repay the loan by paying 2.5% simple interest for 3 years. How much will he pay in interest?

$$I = 400 \cdot 0.025 \cdot 3 = \$30$$

He will pay \$30 in interest.

Practice

1. Ishaq put \$700 into a Certificate of Deposit (CD) account that earns 1.8% interest each year. What will the interest of the CD account be after 6 years?
2. Lonzo opened a bank account that earns 1.2% simple interest each year. After 7 years, Lonzo will earn \$126 in interest. How much did Lonzo deposit when he opened the account?