

## What We Are Learning

## Percents

## Vocabulary

These are the math words we are learning:

**compatible number**

number that is close to the given number that makes estimation or mental calculations easier

**estimate** a logical guess to the solution of a problem

**percent** a ratio that compares a number to 100 whose symbol is %

*Dear Family,*

The student will be learning about the relationships between fractions, decimals, and percents. To convert a fraction to a decimal, the student will divide the numerator by the denominator. To convert a decimal to a **percent**, the student will learn to multiply the decimal by 100 and add the percent sign.

When given a number that is part of a whole, the student will learn to determine what percentage of the whole that number is, as shown below.

**Tom has a 5-gallon gas can that only has 2 gallons of gas in it. What percent of gas is in the gas can?**

$$\frac{\text{Gas in the can}}{\text{Capacity of the can}} = \frac{2}{5}$$

Set up a ratio.

$$\frac{2}{5} = 2 \div 5 = 0.40 = 40\%$$

Find the percent.

Tom's gas can is 40% full.

The student will learn to estimate with percents by using compatible numbers. **Compatible numbers** make it easier to estimate by providing numbers that go well together because they have common factors.

**Estimate 37% of 25.**

Instead of computing the exact answer of  $37\% \cdot 25$ , estimate.

$$37\% = \frac{37}{100} \approx \frac{40}{100}$$

Use compatible numbers, 40 and 100.

$$\approx \frac{2}{5}$$

Simplify.

$$\frac{2}{5} \cdot 25 = 10$$

Use mental math:  $2 \cdot 25 \div 5$

37% of 25 is about 10.

The student will be solving many different types of percent problems. One type involves finding the percent of a number. The student will learn two methods of trying to solve this type of problem as shown in the following example.

### What percent of 756 is 189?

Method 1: Set up an equation to find the percent.	Method 2: Set up a proportion to find the percent.
$p \cdot 756 = 189$ Set up an equation. $p = \frac{189}{756}$ Solve for $p$ . $p = 0.25 \rightarrow 25\%$	<i>Think: What number is to 100 as 189 is to 756?</i> Set up the proportion. $\frac{x}{100} = \frac{189}{756}$ $756x = 18,900$ Solve for $x$ . $x = 25\%$

The second type is finding a number when the percent is known. The student will need to convert the percent to a decimal in order to multiply the two known values together.

### What is 45% of 60?

$$\begin{array}{ll} n = 45\% \cdot 60 & \text{Set up an equation.} \\ n = 0.45 \cdot 60 & 45\% \text{ is equivalent to } 0.45. \\ n = 27 & \text{Solve for } n. \end{array}$$

45% of 60 is 27.

The last type of percent problem the student will encounter in this section is finding the number that is multiplied by a percent to obtain a given number.

### 30 is 60% of what number?

Think: 60 is to 100 as 30 is to what number?

$$\begin{array}{ll} \frac{60}{100} = \frac{30}{n} & \text{Set up the proportion.} \\ 60n = 3000 & \text{Find the cross products.} \\ n = 50 & \text{Solve for } n. \end{array}$$

30 is 60% of 50.

Knowing the meaning of key words like “of” and “is” will help the student successfully set up the proportions or equations to find the missing value.

Sincerely,



CHAPTER

**Family Fun**

**6**

**Percent Puzzle**

**Directions**

Each puzzle has 3 pieces.

- Cut out each puzzle piece and shuffle the pieces. Deal out three pieces to each player.
- To complete a puzzle, each piece must be equal to the other two pieces of the puzzle.
- If the three pieces do not make a match, you can discard one of your cards back to the deck and draw another card, or you can ask another player to give you the card you need to make your match. If you exchange a card with another player, you must give that player one of your cards.
- The first player to have the most completed puzzles wins the game.

25%	50%	75%	$33\frac{1}{3}\%$
0.25	0.5	0.75	$0.\overline{3}$
$\frac{5}{20}$	$\frac{17}{34}$	$\frac{36}{48}$	$\frac{7}{21}$
$\frac{3}{10}$	0.3	30%	
2	$\frac{50}{25}$	200%	

## What We Are Learning

## Applying Percents

## Vocabulary

These are the math words we are learning:

**commission** a fee paid to a person who makes a sale

**percent of change** the percent by which a number increases or decreases

**percent of decrease** a percent change describing a decrease in a quantity

**percent of increase** the percent change describing an increase in a quantity

**principal** the initial amount of money borrowed or saved

**rate of interest** the percent charged or earned on an amount of money

**sales tax** the tax on the sale of an item. It is a percent of the purchase price and is collected by the seller

**simple interest** a fixed percent of the principal

*Dear Family,*

The student will continue the study of percents by solving different application problems that involve percents. One everyday application is finding the **percent of change**, the rate of the amount of change to the original amount.

When finding the percent of change, the student will either find the percent of increase or the percent of decrease.

**Find the percent of increase or decrease from 60 to 45, to the nearest percent.**

First find the amount of change.

$$60 - 45 = 15 \quad \text{This is a percent decrease.}$$

*Think:* What percent is 15 of 60?

$$\frac{\text{amount of decrease}}{\text{original amount}} \rightarrow \frac{15}{60} \quad \text{Set up the ratio.}$$

$$\frac{15}{60} = \frac{1}{4} = 0.25 \quad \text{Find the decimal form.}$$

$$= 25\% \quad \text{Write as a percent.}$$

From 60 to 45 is a 25% decrease.

Other applications of percent are calculating **commissions**, **sales tax**, profit and withholding tax. These amounts can be calculated using the same method.

In some occupations, people are paid a percentage of a sale. This percentage amount is called a **commission rate**.

**A real estate agent is paid a 4% commission on a house that sold for \$125,000. How much was his commission?**

*Think:* commission rate  $\cdot$  sales = commission

$$4\% \cdot 125,000 = c \quad \text{Write an equation.}$$

$$0.04 \cdot 125,000 = c \quad \text{Change the percent to a decimal.}$$

$$5000 = c \quad \text{Solve for } c.$$

The agent earned a commission of \$5000 on the sale.

Another real life application with percents involves **simple interest**. The student will use the formula  $I = P \cdot r \cdot t$  to find the simple interest on a specified amount of money.

**Chas borrowed \$3500 for 5 years at an annual simple interest rate of 5%. How much interest will he pay if he pays off the entire loan at the end of the fifth year?**

$$I = P \cdot r \cdot t$$

Use the formula.

$$I = 3500 \cdot 0.05 \cdot 5$$

Substitute. Use 0.05 for 5%.

$$I = 875$$

Solve for  $I$ .

Chas will pay \$875 in interest.

The student will also learn about compound interest in this section. With compound interest, the interest earned is added to the principal for future interest calculations.

This section covers many applications of percents. Discuss with the student how percents are used in your family. If the student has a savings account, help calculate the interest that is being accrued each year. Being able to relate math to everyday situations will help the student see the connection between the concept and the application of mathematics.

**Sincerely,**

**CHAPTER**

**6**

**At-Home Practice**

**Applying Percents**

**Find the percent of increase or decrease.**

1. A coat was discounted from \$70 to \$45. Find the percent of decrease.  
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2. When Andre was 2 years old, he weighed 28 lb. At the age of 3, Andre weighed 34 lb. Find the percent of increase.  
\_\_\_\_\_

**Solve.**

3. Matthew works in a bicycle shop where he earns an 8% commission and no weekly salary. What will Matthew’s weekly sales need to be to earn \$450?  
\_\_\_\_\_
4. The sales tax in Sandra’s town is 6.5%. If she buys 2 shirts for \$23.99 each, and a pair of shoes for \$41.99, how much sales tax does she owe?  
\_\_\_\_\_
5. Mark borrows \$6000 from the bank at a simple interest rate of 7.5% for 5 years. How much will Mark pay back to the bank?  
\_\_\_\_\_
6. Marissa has a savings account with a balance of \$2750. If the account earns an annual simple interest rate of 4.85%, how much will be in the account in 3 years?  
\_\_\_\_\_
7. Kevin earns \$1066 every two weeks. Of that, \$213.20 is withheld for taxes. What percent of Kevin’s earnings is withheld each pay period?  
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8. Muriel sells blankets and quilts that she makes at home. She marks up her prices so that she earns a 12% profit on all sales. If Muriel’s profit this month was \$215, what were her total sales?  
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**Answers:** 1. 35.71% 2. 21.43% 3. \$56625 4. \$5.85 5. \$8250 6. \$3150.13 7. 20% 8. \$1791.67

**CHAPTER**

**6**

**Family Fun**

**Money Matters**

**Materials**

- Number cube
- Calculator

**Directions**

- Cut out the cards and place in a stack face down.
- Divide into teams. Each team is given a beginning balance of \$500.
- Roll a number cube. If your team rolls an even number, you will earn a commission. If it is an odd number, you will be taxed.
- Draw a card to determine your commission rate or tax rate. Determine your commission or tax by multiplying the rate times your current balance at the end of each round.
- Add your commission to the running balance. Subtract the tax from the running balance.
- The game lasts ten rounds. After the final round, the team with the highest ending balance is the winner.

<b>5%</b>	<b>10%</b>	<b>15%</b>	<b>20%</b>	<b>25%</b>
<b>30%</b>	<b>5%</b>	<b>10%</b>	<b>15%</b>	<b>20%</b>

<b>Round</b>	<b>Rate</b>	<b>Balance \$500</b>	<b>Round</b>	<b>Rate</b>	<b>Balance \$500</b>
<b>1</b>			<b>6</b>		
<b>2</b>			<b>7</b>		
<b>3</b>			<b>8</b>		
<b>4</b>			<b>9</b>		
<b>5</b>			<b>10</b>		