# CHAPTER 5: PERCENTS

| **Chapter Objectives** |
| --- |
| By the end of this chapter, students should be able to:<br>✓ Perform fraction, decimal, and percent conversion<br>✓ Solve three main types of percent problems<br>✓ Solve percent application word problems involving percent, such as sales tax, commission, discounts, and percent increase or decrease |

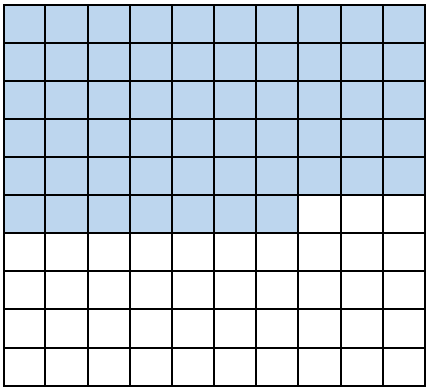
## Contents

## SECTION 5.1 DEFINITION OF PERCENT

How many cents are in one dollar? There are 100 cents in a dollar. How many years are in a century? There are 100 years in a century. This gives you a clue about what the word "percent" means. It is really two words, "per cent," and means per one hundred.

A **percent** is a ratio whose **denominator is 100**. We use the percent symbol %, to show percent.

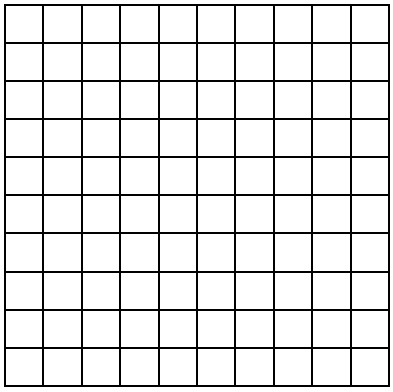
If 57% of college students are female, then by definition 57 out of every 100 community college students are female. We can write this as the ratio $\frac{57}{100}$. We can also represent it visually as the following grid where 57 out of 100 squares have been shaded.



**Media Lesson**
The Meaning of Percent | Decimals | Pre-Algebra | Khan Academy (Duration 3:00)

*View the video lesson, take notes and complete the problems below.*

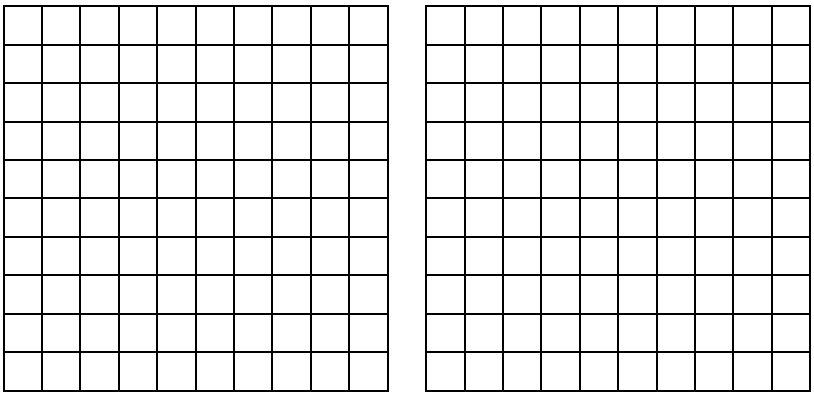
Shade 20% of the square below



**Media Lesson**
The Meaning of Percent Over 100 | Decimals| Pre-Algebra | Khan Academy (Duration 2:21)

*View the video lesson, take notes and complete the problems below.*

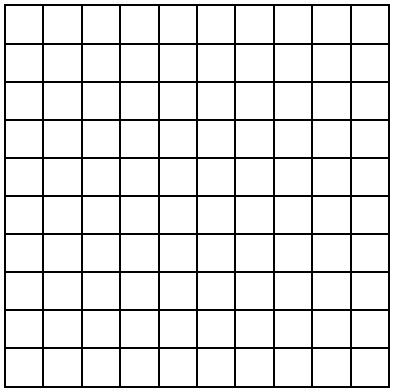
Show 109% by shading.



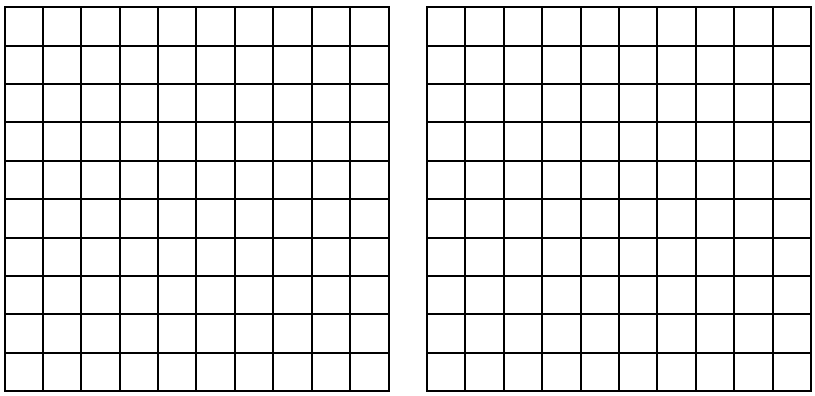
## YOU TRY:

For the following problems, write the percent as a ratio. Then shade the grid.

**a)** 35%



**b)** 117%



**Media Lesson**
Convert a Percent to a Ratio or Fraction (88% and 75%)
(Duration 2:58)

*View the video lesson, take notes and complete the problems below.*

1. According to a survey, 88% of college students have a smart phone. Write 88% as a ratio.

2. According to a survey, 75% of community college students also work part-time or full time. Write 75% as a ratio.

---

**YOU TRY:**

Write the following percent as a ratio.

**c)** In 2014, the unemployment rate for those with only a high school degree was 6%.

## A. CONVERT PERCENTS TO FRACTIONS AND DECIMALS

### *I. Convert a Percent to a Fraction*

Since percents are ratios, they can easily be expressed as fractions.

| **Convert a Percent to a Fraction** |
|---|
| **1.** Write the percent as a ratio with the denominator 100.<br>**2.** Simplify the fraction if possible. |

| | |
|---|---|
| | **Media Lesson**<br>Convert Percentages to Fractions (Duration 5:21) |

*View the video lesson, take notes and complete the problems below.*

Write each percent as a fraction.

| Percent | Fraction |
|---|---|
| 45% | |
| 6% | |
| 136% | |
| 64.2% | |
| $3\frac{3}{4}\%$ | |

**YOU TRY:**

Convert the percent to a fraction.

**d)** 36%

**e)** 24.5%

**f)** 125%

**g)** $33\frac{1}{3}\%$

## II. Convert a Percent to a Decimal

In earlier chapters, we learned how to convert fractions to decimals, we will use this method to convert a percent to a decimal.

Let's consider the 6%. We begin by converting our percent to a fraction.

$$6\% = \frac{6}{100}$$

We get the fraction $\frac{6}{100}$. To convert a fraction into a decimal we divide the numerator by the denominator.

$$6 \div 100 = 0.06$$

So 6% as a decimal is 0.06.

If we do this to a few percents a pattern emerges. Converting a percent to a decimal moves the decimal point to the left by two places.

$$6\% = 06. = 0.06$$

| **Convert a Percent to a Decimal** |
|---|
| **1.** Drop the % sign.<br>**2.** Divide by 100. (Shortcut: Move the decimal point to the left 2 places.) |

| | |
|---|---|
| | **Media Lesson**<br>Convert Percentages to Decimals – Two Methods (Duration 8:10) |

*View the video lesson, take notes and complete the problems below.*

Write each percent as a decimal.

| Percent | Decimals |
|---|---|
| 45% | |
| 6% | |
| 136% | |
| 64.2% | |
| $3\frac{3}{4}\%$ | |

**YOU TRY:**

Convert the percent into a decimal.

**h)** 36%

**i)** 24.5%

**j)** 133%

**k)** 12.5%

## B. CONVERT DECIMALS AND FRACTIONS TO PERCENTS

We learned how to convert a percent to a decimal. To convert a decimal to a percent we do the opposite.

### *I. Convert a Decimal to a Percent*

| **Convert a Decimal to a Percent** |
|---|
| **1.** Multiply by 100. (Shortcut: Move the decimal point to the right 2 places.)<br>**2.** Add % sign. |

**Example 1:** Convert 0.41 to a percent.

0.41
0.41 Move the decimal point to the right 2 places
41 0.41 becomes 41
41% Add the % sign

$$0.41 = 0.41 = 41\%$$

**Example 2**: Convert 0.04 to a percent.

0.04
0.04 Move the decimal point to the right 2 places
4 0.04 becomes 4
4% Add the % sign

$$0.04 = 0.04 = 4\%$$

**Media Lesson**
Convert Decimal to Percents (Duration 2:52)

*View the video lesson, take notes and complete the problems below.*

Percent: _____

To convert a decimal to a percent: Multiply by _____ or

move the decimal _____ to the _____

Example 1: Convert 0.582 to percent

_____

**YOU TRY:**

Convert the decimal into a percent.

| | |
|---|---|
| **l)** 0.05 | **m)** 0.83 |
| **n)** 0.01 | **o)** 1.17 |

## *II. Convert a Fraction to a Percent*

| **Convert a Fraction to a Percent** |
|---|
| **1.** Convert the fraction to a decimal.<br>**2.** Convert the decimal to a percent. |

**Example:** Convert $\frac{4}{5}$ to a percent.

$$\begin{array}{rl} \frac{4}{5} & \\ 4 \div 5 = 0.8 & \text{Divide numerator by denominator to convert to decimal} \\ 0.80 & \text{Move decimal point to the right 2 places to convert to percent} \\ 80\% & \text{Add \% sign} \end{array}$$

**Media Lesson**
Convert a Fractions to Decimals and Decimals to Percents (7:57)

*View the video lesson, take notes and complete the problems below.*

| Fraction | Decimal | Percent |
|---|---|---|
| $\frac{3}{8}$ | | |
| $\frac{7}{4}$ | | |
| $2\frac{3}{5}$ | | |

**Media Lesson**
Convert a Fractions to Decimals and Decimals to Percents – repeating decimals (5:56)

*View the video lesson, take notes and complete the problems below.*

| Fraction | Decimal | Percent |
|---|---|---|
| $\frac{2}{3}$ | | |
| $5\frac{4}{9}$ | | |

**YOU TRY:**

Convert the decimal into a percent.

**p)** $\frac{3}{4}$

**q)** $\frac{11}{8}$

**r)** $2\frac{1}{5}$

**s)** $\frac{2}{6}$

**Media Lesson**
Example 1: Relating Fractions, Decimals, and Percents (3:14)

*View the video lesson, take notes and complete the problems below.*

Complete the table.

| Fraction | Decimal | Percent |
|---|---|---|
| $\frac{1}{8}$ | | |
| | 0.02 | |
| | | 85% |

---

**YOU TRY:**

Complete the table below. Show all your work.

| Fraction | Decimal | Percent |
|---|---|---|
| **a)** $\frac{4}{5}$ | | |
| **b)** | 1.05 | |
| **c)** | | 255% |

## EXERCISES

In the following exercises, convert each percent to a fraction. Simplify all fractions.

| | |
|---|---|
| **1)** 4% | **2)** 8% |
| **3)** 52% | **4)** 140% |
| **5)** 42.5% | **6)** 104% |
| **7)** 18.4% | **8)** $5\frac{1}{3}\%$ $\%$ |

In the following exercises, convert each percent to a decimal.

| | |
|---|---|
| **9)** 1% | **10)** 9% |
| **11)** 50% | **12)** 250% |
| **13)** 39.3% | **14)** 7.8% |

In the following exercises, convert each decimal to a percent.

| | |
|---|---|
| **15)** 0.03 | **16)** 0.18 |
| **17)** 1.35 | **18)** 4 |
| **19)** 0.009 | **20)** 0.0625 |
| **21)** 2.2 | **22)** 5.3 |

In the following exercises, convert each fraction to a percent.

| | |
|---|---|
| **23)** $1\frac{2}{3}$ | **24)** $\frac{3}{8}$ |
| **25)** $\frac{7}{4}$ | **26)** $6\frac{4}{5}$ |

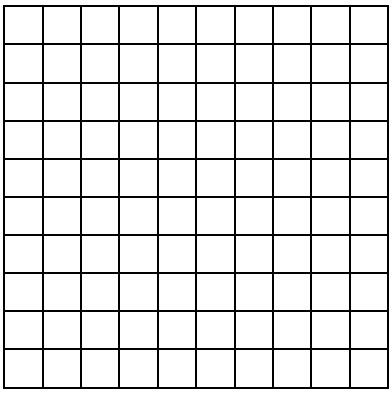
**27)** Complete the table below.

| Fraction | Decimal | Percent |
|---|---|---|
| | 0.85 | |
| | | 32% |
| $\frac{17}{25}$ | | |
| | 1.237 | |
| | | 64.25% |
| $\frac{2}{3}$ | | |
| | | $17\frac{3}{5}\%$ |
| | | 0.42% |

**28)** According to the local weather report, the probability of thunderstorms in New York City on July 15 is 60%.

**a.** Write this percent as a ratio in fraction form. Simplify the fraction.

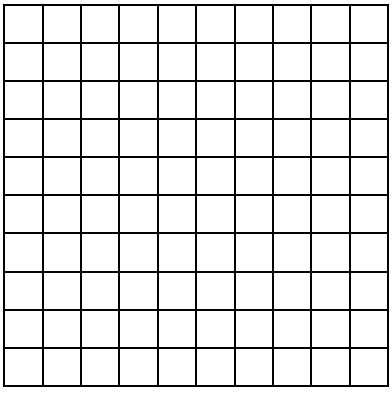
**b.** Shade the following grid to represent this percent.



**29)** According to the National Center for Health Statistics, in 2012, $\frac{7}{20}$ of American adults were obese.

**a.** Convert this fraction to a percent.

**b.** Shade the following grid to represent this percent.



## Check your work with the answer key!

## SECTION 5.2 SOLVE PERCENT PROBLEMS

### A. PERCENT AS A PART OF A WHOLE

We will explore how to find a percent of a quantity. A percent is always referring to a percent of something. We call this the whole. For example,

- You gained 3% of your body weight last year. The whole refers to your body weight last year.
- You are charged 7% tax on a purchase. The whole refers to the cost of your purchase.
- The interest rate on your mortgage is 4.35%. The whole is how much you owe on your mortgage.

When we are given a part of a whole we can get a percent by writing our ratio as

$$\frac{part}{whole}$$

We can then convert our fraction to a percent.

Example: Think about taking a test. You get 43 out of 50 questions correct. What percent is this?

The whole is the 50 questions on the test.

The part is the 43 questions answered correctly.

We can set this up in a ratio to get:

$$\frac{part}{whole} = \frac{43}{50}$$
$$= 43 \div 50$$
$$= 0.86$$
$$= 86\%$$

Divide numerator by denominator to get decimal
Move decimal to right 2 places to convert to percent

You scored an 86%.

---

**YOU TRY:**

Round any percent tow two decimal places.

**a)** Carol went shopping for a cell phone. The price was listed as $400. She had a coupon for $50 off. What percent of the original price is the coupon savings amount?

**b)** Chanelle is driving to Washington on a 20-hour road trip. So far, she has driven for 8 hours. What percent of the hours has Chanelle already driven?

## B. PERCENT PROPORTION

Think about the following problems:

$$What\ is\ 30\%\ of\ 50?$$

$$20\ is\ 40\%\ of\ what\ number?$$

We cannot use the $\frac{part}{whole}$ ratio alone to solve these problems. We use the percent proportion. The **percent proportion** is the following:

$$\frac{\boldsymbol{part}}{\boldsymbol{whole}} = \frac{\boldsymbol{percent}}{\boldsymbol{100}}$$

| | |
|---|---|
| | **Media Lesson**<br>Percents and Proportions – Set Up Proportion (Duration 3:46) |

*View the video lesson, take notes and complete the problems below.*

Percent Proportion:

Set up a proportion, do not solve:

16 is what percent of 20?

52% of 68 is what?

**YOU TRY:**

Set up the following proportions but do not solve.

**c)** 7.5% of what number is $1.95?

**d)** What percent of 120 is 96?

**Media Lesson**
Percents and Proportions – Solve Percent Problems (Proportion) (Duration 3:43)

*View the video lesson, take notes and complete the problems below.*

Solve the percent proportion like _____.

What percent of 25 is 16?

14 is 60% of what?

---

**YOU TRY:**

**a)** What number is 45% of 80?

**b)** 150% of 78 is what number?

**c)** 17 is 25% of what number?

**d)** What percent of 76 is 57?

## C. PERCENT EQUATION

Think about the following problem:

$$What\ is\ 30\%\ of\ 50?$$

An alternative way we can solve this problem is to use a percent equation.

When we use a **percent equation** we translate the question into an equation.

Our percent is rewritten as a decimal, "is" is replaced with an equal sign, the unknown is replaced with a question mark, and "of" is replaced with a multiplication sign.

| ***What*** | ***is*** | **30%** | ***of*** | **50?** |
|---|---|---|---|---|
| **Unknown** | **equal sign** | **decimal** | **multiplication sign** | **50** |
| **?** | **=** | **0.30** | **×** | **50** |

The problem is rewritten as the following equation:

$$? = 0.30 \times 50$$

We can then solve for amount by multiplying 0.30 by 50. We would get:

$$? = 15$$

30% of 50 is 15.

When we solve for a percent using the percent equation we need to be careful with our answer. The percent equation will give you the answer in decimal form. To get a percent we will have to move the decimal point two places to the right.

| Translations | |
|---|---|
| is | = |
| of | × |
| percent | Rewrite in decimal form |
| what number<br>what percent<br>unknown | ? |

**Media Lesson**
Solving Percent Problems Using the Percent Equation (Stop 4:00)

*View the video lesson, take notes and complete the problems below.*

Key Words in Percent Translations

"**OF**" translates to _____.

"**IS**" translates to _____.

"**WHAT**" translates to a variable "n".

**p%** translates to the percent in decimal form.

Once you have the equation, solve for the unknown. Make sure your answer is in the correct form.

**1.** What is 12% of 875?

**2.** 25 is what percent of 500?

**3.** 2 is 4% of what number?

| | |
|---|---|
| | **Media Lesson**<br>Percent Word Problem Example 4 \| Decimals \| Pre-Algebra \| Khan Academy (Duration 4:33) |

*View the video lesson, take notes and complete the problems below.*

100 is what percent of 80?

| | |
|---|---|
| | **Media Lesson**<br>Percent Word Problem Example 5 \| Decimals \| Pre-Algebra \| Khan Academy (Duration 5:25) |

*View the video lesson, take notes and complete the problems below.*

78 is 15% of what number?

---

**YOU TRY:**

Use the percent equation to solve the following problems.

**t)** 10 is 20% of what number?

**u)** 300 is what percent of 15?

You should be familiar with both the percent proportion and percent equation. Unless indicated you can use the method you prefer to solve percent problems.

## EXERCISES

**1)** Travis bought 60 cans of soda for a party. He bought 24 cans of diet cola and 36 cans of regular cola. What percent of the soda that Travis bought is diet cola?

**2)** Faith was selling her old math book online. The book originally cost her $150. Based on her research, she can sell the book for $67.50. What percent of the original cost of the book can Faith earn back by selling her book?

**In the following exercises use the percent proportion. Round to the nearest hundredths if necessary**

| | |
|---|---|
| **3)** What number is 45% of 120? | **4)** What number is 65% of 100? |
| **5)** What number is 36% of 124? | **6)** 250% of 65 is what number? |

| | |
|---|---|
| **7)** 800% of 2,250 is what number? | **8)** 600% of 1,740 is what number? |
| **9)** 36 is 25% of what number? | **10)**81 is 75% of what number? |
| **11)**8.2% of what number is $2.87? | **12)** 6.4% of what number is $2.88? |
| **13)** 12.3% of what number is $92.25? | **14)** What percent of 260 is 78? |
| **15)** What percent of 1,500 is 540? | **16)**What percent of 1,800 is 846? |
| **17)** 50 is what percent of 40? | **18)** 840 is what percent of 480? |

**In the following exercises use the percent equation. Round to the nearest hundredths if necessary.**

| | |
|---|---|
| **19)** What percent of 250 is 90? | **20)** What is 20% of 200? |
| **21)** 50% of what number is 70? | **22)** 4 is what percent of 20? |
| **23)** What is 36% of 200? | **24)** 320 is 120% of what number? |

# SECTION 5.3 PERCENT APPLICATIONS

## A. APPLICATIONS OF PERCENTS

Many applications of percents occur in our daily lives, such as tips, sales tax, and discounts. To solve these applications, we can use both the percent proportion and percent equation. It becomes helpful to reword the problem as **an is/of** statement.

Example: Juliana changed careers. Her old salary was $53,000 a year. Her new salary is 26% more per year. What is her new salary?

This problem can be reworded as "What is 26% of $53,000?"

Example: A $7,594 purchase will have a sales tax of $569.55 added to it. What is the tax rate?

This problem can be reworded as "What percent of $7,594 is $569.55?"

| | |
|---|---|
| | **Media Lesson**<br>Percents and Proportions – Percent Applications (Duration 5:00) |

*View the video lesson, take notes and complete the problems below.*

"**OF**" represents _____.

"**IS**" represents _____.

Among male smokers, the lifetime risk of developing lung cancer is 17.2%. According to the Washington State Department of Health, in 2011 the state had 760,000 smokers. How many are at risk of developing lung cancer in their lifetime?

In 2010, women made up 58% of Big Bend Community College's students. If there were 1,688 women enrolled in 2010, how many students were there total?

**Media Lesson**
Percent Application – Tipping (Duration 3:14)

*View the video lesson, take notes and complete the problems below.*

You and your friends spend $56 at a restaurant. If you want to tip 15%, what is the tip amount? What it the total bill amount?

---

**YOU TRY:**

Use the method you prefer to solve each of these problems.

**a)** Jim and his girlfriend enjoyed a dinner at a restaurant, and the bill was $68.50. They want to leave an 18% tip. If the tip will be 18% of the total bill, how much should the tip be?

**b)** Pam has worked for the same employer for 5 years. Her current salary is $73,500 which is 122.5% of her starting salary. What was Pam's starting salary?

## B. SALES TAX

Do you pay a tax when you shop in your city or state? In many parts of the United States, sales tax is added to the purchase price of an item. The sales tax is determined by computing a percent of the purchase price. The **sales tax rate** is the percent of the tax and the **sales tax** is the dollar amount of the tax.

The price a customer pays, the total cost, is the purchase price plus the sales tax.

| | |
|---|---|
|  | **Media Lesson**<br>Ex: Percent Application – Sales Tax Given Percent<br>(Duration 4:21 focus on solutions after 0:43) |

*View the video lesson, take notes and complete the problems below.*

What is the sales tax on a suit priced at $1,483 if the sales tax is 5%?

---

### YOU TRY:

Round answers to two decimal places. Use the method you prefer to solve each problem.

**a)** Alexandra bought a television set $724 in Boston, where the sales tax rate was 6.25% of the purchase price. What was the sales tax?

**b)** Evelyn bought a new smartphone for $499 plus tax. She was surprised when she got the receipt and saw that the sales tax was $42.42. What was the sales tax rate for this purchase?

## C. COMMISSION

Sales associates often receive a commission, or percent of total sales, for their sales. The commission they earn is calculated as a certain percent of the price of each item they sell. That percent is called the **rate of commission**.

| | |
|---|---|
|  | **Media Lesson**<br>Ex: Percent Application – Commission Amount Given Percent of Sales<br>(Duration 4:15) |

*View the video lesson, take notes and complete the problems below.*

A salesperson receives a 6.9% commission on her sales. If her total sales for the month are $4,100, what is her commission?

---

**YOU TRY:**

**a)** Helene is a realtor. She receives 3% commission when she sells a house. How much commission will she receive for selling a house that costs $260,000?

---

## D. DISCOUNTS

Think about going shopping. When you buy an item on sale, the original price of the item has been reduced by some dollar amount. The item has usually been marked down a certain percent.

Like commission and sales tax problems we can use the percent proportion to solve discount problems.

| | |
|---|---|
| | **Media Lesson**<br>Ex: Find the Original Price Given the Discounted Price (Duration 3:33) |

*View the video lesson, take notes and complete the problems below.*

You buy a pair of shoes for $40 that was marked down 30%. What was the original price? Round to the nearest cent if needed.

---

**YOU TRY:**

**v)** Elise bought a dress that was discounted 35% off the original price of $140. What was the amount of the discount?

## E. PERCENT INCREASE AND DECREASE

Prices of car registrations, tuition, homes, and a cup of coffee can change from year to year. We are often interested in calculating the percent an amount has changed. The **percent increase** answers the question "what percent of the old amount is the change?" The **percent decrease** answers the question "what percent of the old amount is the change?"

To calculate the percent increase or decrease of an amount, we begin by finding the change from the old to new amount. We find it by **taking the difference between** the old and new amount. We can then either use the percent proportion or equation to solve for the percent.

**Example 1:** In 2011, the California governor proposed raising community college fees from \$26 per unit to \$36 per unit. Find the percent increase. Round your percent to the tenths place.

We need to find the percent increase.

The original amount per unit is \$26.

The new amount per unit is \$36.

Let's calculate the change.

$$\begin{aligned} Change &= 36 - 26 \\ &= 10 \end{aligned}$$

We will now use this information to find the percent increase.

We can rephrase the questions as: What percent of \$26 is \$10?

$$\begin{aligned} ? \times 26 &= 10 \\ ? &= 10 \div 26 \\ &= 0.38462 \ldots \text{. } Move\ the\ decimal\ point\ two\ places\ to\ the\ left. \\ &= 38.462 \ldots \% \ Round\ to\ two\ decimal\ places. \\ &= 38.46\% \end{aligned}$$

The percent increase is 38.46%.

Alternatively, we can also find the percent increase or decrease by using the percent proportion.

$$\frac{change}{old\ amount} = \frac{percent}{100}$$

**Example 2:** The average price of a gallon of gas in one city in June 2014 was $3.71. The average price in that city in July was $3.64. Find the percent decrease.

We need to find the percent decrease.

The original price was $3.71.

The new price is $3.64.

Let's calculate the change.

$$Change = 3.71 - 3.64$$
$$Change = 0.07$$

We will now use this information to set up a percent proportion.

We can rephrase the question as: What percent of $3.71 is 0.07?

$$\frac{change}{old\ amount} = \frac{percent}{100}$$
$$\frac{0.07}{3.71} = \frac{percent}{100}$$
$$0.07 \times 100 = 3.71 \times percent$$
$$7 = 3.71 \times percent$$
$$1.886 = percent$$

The percent decrease is 1.89%.

In the following media lesson, the video calculates the change as the absolute value of the old and new amount. Continue to solve for the change listing the larger number first.

| | |
|---|---|
| | **Media Lesson**<br>Percents and Proportions – Percent Increase/Decrease<br>(Duration 5:00) |

*View the video lesson, take notes and complete the problems below.*

The price of a sofa was $299. During the weekend sale the price was dropped to $179. What was the percent decrease?

The population of a small town was 12,345 in 1990. By 2000, the population was 31,416. What was the percent increase?

(Note: The difference will be 31,416-12,345.)

## YOU TRY:

In the following problems solve using the method you prefer.

**a)** In 1995, the standard bus far in Chicago was $1.50. In 2008, the standard bus fare was $2.25. Find the percent increase. Round to the nearest tenth of a percent.

**b)** Last year Sheila's salary was $42,000. Because of furlough days, this year her salary was $37,800. Find the percent decrease. Round to the nearest tenth of a percent.

## EXERCISES

**Round any answers to the hundredths place**

**1)** When Chihiro and her coworkers had lunch at a restaurant the bill was $90.50. They want to leave 18% of the total bill as a tip. How much should the tip be?

**2)** Marlene has 12% of each paycheck automatically deposited to her savings account. Her last paycheck was $2,165. How much money was deposited to Marlene's savings account?

**3)** A bacon cheeseburger at a fast food restaurant contains 2,070 milligrams of sodium, which is 86% of the recommended daily amount. What is the total recommended daily amount of sodium?

**4)** Eliza gets paid $3,000 per month. She pays $750 a month for rent. What percent of her monthly pay goes to rent?

## Sales Tax

**5)** The cost of a pair of boots was $84. The sales tax rate is 5% of the purchase. What is the sales tax?

**6)** Blanca bought a washer and dryer set for $2,100. The sales tax on the purchase was $152.25. What was the sales tax rate?

**7)** The cost of a microwave oven was $129. The sales tax rate is 7.5%. What is the sales tax?

**8)** Delia bought a bedroom set for $3,600. The sales tax on the purchase was $246.60. What was the sales tax rate?

## Commissions

**9)** Raul sold his dinette set for $225 through an online site, which charged him 9% of the selling price as commission. How much was the commission?

**10)** As a waitress, Leslie earned $20 in tips on sales of $2,625 last Saturday night. What was her rate of commission?

**11)** Yamilet works in a jewelry store and receives 12% commission when she makes a sale. How much commission will she receive for selling an $8,125 ring?

**12)** Diego earned $1,393.74 commission on weekly sales of $15,486 as a salesperson at the computer store. What is his rate of commission?

## Discounts

**13)** Darwin bought a skateboard helmet on sale at 40% off. The original price was $49.95. What was the amount of the discount?

**14)** Franco and Cristina bought a sofa at the sale price of $1,344. The original price of the sofa was $1,920. What was the percent of the discount?

**15)** Cynthia wants to buy a camera that lists for $398. The camera is on sale with a 33% discount. What was the amount of the discount?

**16)** Karen bought a baby stroller on sale for $301.75. The original price of the stroller was $335. What was the percent of the discount?

.

**Percent Increase and Percent Decrease**

In the following exercises round answers to the nearest tenth of a percent.

**17)** Tamika got a raise in her hourly pay, from $15.50 to $17.75. Find the percent increase.

**18)** Annual student fees at the University of California rose from about $4,000 in 2000 to about $9,000 in 2014. Find the percent increase.

**19)** Hernando's salary was $49,500 last year. This year his salary was cut to $44,055. Find the percent decrease.

**20)** Sales of video games and consoles fell from $1,150 million to $1,030 million in one year. Find the percent decrease.

## Online Quiz

Log on to Canvas to take the section quiz

**Directions**: It is very useful to save your math exercise work and use it as a chapter test review when you study for your chapter test and final.

**1)** Write each question on the screen down to for your record

**2)** Solve the problem step by step below each question

**3)** Double check your work to see whether your answer make sense

**4)** Enter your answer in the answer box in Canvas. Make sure you click on the **"Preview"** button to make sure you enter the right format before you submit your answer. If you are not sure how to enter your answer with the correct format, ask your instructor.

**5)** If you did not answer the question correctly, solve the question again from the beginning below your 1st attempt. Sometimes, it is better to start a problem again from the beginning and compare your steps with your 1st attempt to figure out your mistake.

**6)** Insert your work at the end of each section in your workbook so that you can use it to study for your chapter test later.