Chapter 7
Resource Masters
Consumable Workbooks  Many of the worksheets contained in the Chapter Resource Masters booklets are available as consumable workbooks in both English and Spanish.

<table>
<thead>
<tr>
<th></th>
<th>MHID</th>
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<tbody>
<tr>
<td>Study Guide and Intervention Workbook</td>
<td>0-07-878871-4</td>
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<tr>
<td>Skills Practice Workbook</td>
<td>0-07-878873-0</td>
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<td>Practice Workbook</td>
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<td>Word Problem Practice Workbook</td>
<td>0-07-878877-3</td>
<td>978-0-07-878877-2</td>
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Spanish Versions

<table>
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<td>Word Problem Practice Workbook</td>
<td>0-07-878878-1</td>
<td>978-0-07-878878-9</td>
</tr>
</tbody>
</table>

Answers for Workbooks  The answers for Chapter 7 of these workbooks can be found in the back of this Chapter Resource Masters booklet.

StudentWorks Plus™  This CD-ROM includes the entire Student Edition test along with the English workbooks listed above.

TeacherWorks Plus™  All of the materials found in this booklet are included for viewing, printing, and editing in this CD-ROM.


These masters contain a Spanish version of Chapter 7 Test Form 2A and Form 2C.
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Teacher’s Guide to Using the
Chapter 7 Resource Masters

The Chapter 7 Resource Masters includes the core materials needed for Chapter 7. These materials include worksheets, extensions, and assessment options. The answers for these pages appear at the back of this booklet.

All of the materials found in this booklet are included for viewing and printing on the TeacherWorks Plus™ CD-ROM.

Chapter Resources

Student-Built Glossary (pages 1–2) These masters are a student study tool that presents up to twenty of the key vocabulary terms from the chapter. Students are to record definitions and/or examples for each term. You may suggest that students highlight or star the terms with which they are not familiar. Give this to students before beginning Lesson 7-1. Encourage them to add these pages to their mathematics study notebooks. Remind them to complete the appropriate words as they study each lesson.

Family Letter and Family Activity (pages 3–6) The letter informs your students' families of the mathematics they will be learning in this chapter. The family activity helps them to practice problems that are similar to those on the state test. A full solution for each problem is included. Spanish versions of these pages are also included. Give these to students to take home before beginning the chapter.

Anticipation Guide (pages 7–8) This master, presented in both English and Spanish, is a survey used before beginning the chapter to pinpoint what students may or may not know about the concepts in the chapter. Students will revisit this survey after they complete the chapter to see if their perceptions have changed.

Lesson Resources

Lesson Reading Guide Get Ready for the Lesson reiterates the questions from the beginning of the Student Edition lesson. Read the Lesson asks students to interpret the context of and relationships among terms in the lesson. Finally, Remember What You Learned asks students to summarize what they have learned using various representation techniques. Use as a study tool for note taking or as an informal reading assignment. It is also a helpful tool for ELL (English Language Learners).

Study Guide and Intervention This master provides vocabulary, key concepts, additional worked-out examples and Check Your Progress exercises to use as a reteaching activity. It can also be used in conjunction with the Student Edition as an instructional tool for students who have been absent.

Skills Practice This master focuses more on the computational nature of the lesson. Use as an additional practice option or as homework for second-day teaching of the lesson.

Practice This master closely follows the types of problems found in the Exercises section of the Student Edition and includes word problems. Use as an additional practice option or as homework for second-day teaching of the lesson.
Word Problem Practice  This master includes additional practice in solving word problems that apply the concepts of the lesson. Use as an additional practice or as homework for second-day teaching of the lesson.

Enrichment  These activities may extend the concepts of the lesson, offer an historical or multicultural look at the concepts, or widen students’ perspectives on the mathematics they are learning. They are written for use with all levels of students.

Graphing Calculator, Scientific Calculator, or Spreadsheet Activities  These activities present ways in which technology can be used with the concepts in some lessons of this chapter. Use as an alternative approach to some concepts or as an integral part of your lesson presentation.

Assessment Options

The assessment masters in the Chapter 7 Resource Masters offer a wide range of assessment tools for formative (monitoring) assessment and summative (final) assessment.

Student Recording Sheet  This master corresponds with the standardized test practice at the end of the chapter.

Pre-AP Rubric  This master provides information for teachers and students on how to assess performance on open-ended questions.

Quizzes  Four free-response quizzes offer assessment at appropriate intervals in the chapter.

Mid-Chapter Test  This 1-page test provides an option to assess the first half of the chapter. It parallels the timing of the Mid-Chapter Quiz in the Student Edition and includes both multiple-choice and free-response questions.

Vocabulary Test  This test is suitable for all students. It includes a list of vocabulary words and 10 questions to assess students’ knowledge of those words. This can also be used in conjunction with one of the leveled chapter tests.

Leveled Chapter Tests

- **Form 1** contains multiple-choice questions and is intended for use with below grade level students.
- **Forms 2A and 2B** contain multiple-choice questions aimed at on grade level students. These tests are similar in format to offer comparable testing situations.
- **Forms 2C and 2D** contain free-response questions aimed at on grade level students. These tests are similar in format to offer comparable testing situations.
- **Form 3** is a free-response test for use with above grade level students.

All of the above mentioned tests include a free-response Bonus question.

Extended-Response Test  Performance assessment tasks are suitable for all students. Sample answers and a scoring rubric are included for evaluation.

Standardized Test Practice  These three pages are cumulative in nature. It includes three parts: multiple-choice questions with bubble-in answer format, griddable questions with answer grids, and short-answer free-response questions.

Answers

- The answers for the Anticipation Guide and Lesson Resources are provided as reduced pages with answers appearing in red.
- Full-size answer keys are provided for the assessment masters.
This is an alphabetical list of new vocabulary terms you will learn in Chapter 7. As you study the chapter, complete each term’s definition or description. Remember to add the page number where you found the term. Add these pages to your math study notebook to review vocabulary at the end of the chapter.

<table>
<thead>
<tr>
<th>Vocabulary Term</th>
<th>Found on Page</th>
<th>Definition/Description/Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>discount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>percent equation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>percent of change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>percent of decrease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>percent of increase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocabulary Term</td>
<td>Found on Page</td>
<td>Definition/Description/Example</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>percent proportion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>principal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sales tax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>simple interest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dear Parent or Guardian:

We encounter percents in so many different aspects of our daily lives. We use percents when we buy something on sale, when we calculate taxes or commissions, and when we interpret statistical information. Because we all purchase different goods and services, knowing how to use percents will help us plan our budgets and make important financial decisions.

In Chapter 7, Applying Percents, your child will learn about percents. Your child will learn how to find the percent of a number, to use the percent proportion, to estimate percents, and to predict the actions of a larger group by using a sample. Your child will also learn how to solve problems involving sales tax, discount, and simple interest. In the study of this chapter, your child will complete a variety of daily classroom assignments and activities and possibly produce a chapter project.

By signing this letter and returning it with your child, you agree to encourage your child by getting involved. Enclosed is an activity you can do with your child that practices how the math we will be learning in Chapter 7 might be tested. You may also wish to log on to ca.gr6math.com for self-check quizzes and other study help. If you have any questions or comments, feel free to contact me at school.

Sincerely,

Signature of Parent or Guardian ______________________ Date ________
1. Benny wants to find 25% of $120. Use the graphic below to help him find the solution.

What is 25% of $120?

A $40
B $30
C $25
D $10

Solution
1. Hint: This problem can be approached several different ways, including shading the area that you are looking for, using fractions, or using percent proportions.

25% can also be written as $\frac{25}{100}$, which reduces to $\frac{1}{4}$, as shown below.

25% of 120 is the same as $\frac{1}{4}$ of 120, which is 120 ÷ 4, or 30.

The answer is B.

2. The school supplies shown below are currently on sale for 15% off the listed prices.

How much will 3 notebooks and 16 pencils cost at their sale prices?

A $2.55
B $2.95
C $4.25
D $5.95

Solution
2. Hint: 15% off the regular price is 85% of the regular price.

The total cost at regular price would be 3 notebooks × $1.00 + 8 pairs of pencils × $0.25, or $5.00. In order to find the sale price, multiply 85% × 5.

$$0.85 \times 5 = 4.25$$

The answer is C.
Carta a la familia

Estimado padre o apoderado:

El saber cómo aplicar porcentajes es una destreza valiosa. Encontramos porcentajes en tantos aspectos diferentes de nuestra vida diaria. Los utilizamos al comprar algún artículo en oferta, al calcular impuestos o comisiones y al interpretar información estadística. Debido a que todos adquirimos bienes y servicios diferentes, saber utilizar porcentajes nos ayudará a planificar nuestros presupuestos y tomar decisiones financieras importantes.

En el Capítulo 7, Aplica porcentajes, su hijo(a) estudiará porcentajes. Aprenderá a calcular el porcentaje de un número, a usar la proporción porcentual, a estimar porcentajes y a predecir las acciones de un grupo grande mediante una muestra. Su hijo(a) también aprenderá a resolver problemas relacionados con el impuesto sobre las ventas, descuentos e interés simple. En el estudio de este capítulo, su hijo(a) completará una variedad de tareas y actividades diarias y es posible que trabaje en un proyecto del capítulo.

Al firmar esta carta y devolverla con su hijo(a), usted se compromete a ayudarlo(a) a participar en su aprendizaje. Junto con esta carta, va incluida una actividad que puede realizar con él(ella) y la cual practica lo que podrían encontrar en las pruebas de los conceptos matemáticos que aprenderán en el Capítulo 7. Además, visiten ca.gr6math.com para ver autocontroles y otras ayudas para el estudio. Si tiene cualquier pregunta o comentario, por favor contácteme en la escuela.

Cordialmente,

Firma del padre o apoderado ______________________________ Fecha _______
Actividad en familia
Práctica de estándares

Doblen la página a lo largo de las líneas punteadas. Resuelvan cada problema en otra hoja de papel. Luego, desdoblen la página y revisen las respuestas.

1. Benny desea calcular el 25% de $120. Usen la siguiente gráfica para ayudarlo a encontrar la solución.

¿Cuánto es el 25% de $120?
A $40
B $30
C $25
D $10

2. Los siguientes útiles escolares tienen un descuento del 15% del precio marcado.

¿Cuánto costarán 3 cuadernos y 16 lápices a su precio de oferta?
A $2.55
B $4.25
C $5.95
D $2.95

Solución

1. Ayuda: Este problema puede enfocarse de varios modos, incluyendo el sombrear el área que se busca, el uso de fracciones o de proporciones porcentuales.

25% puede escribirse como $\frac{25}{100}$, que se reduce a $\frac{1}{4}$, como se muestra aquí.

25% de 120 es lo mismo que $\frac{1}{4}$ de 120, lo cual es $120 \div 4$, ó 30.

La respuesta es B.

2. Ayuda: 15% de descuento del precio regular es 85% del total del precio regular.

El costo total a precio regular sería 3 cuadernos $\times$ $1.00 + 8$ pares de lápices $\times$ $0.25$, ó $5.00$. Para calcular el precio de descuento, multipliquen $85\% \times 5$.

$0.85 \times 5 = $4.25

La respuesta es B.
## Anticipation Guide

### Applying Percent

#### Before you begin Chapter 7

- Read each statement.
- Decide whether you Agree (A) or Disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (Not Sure).

<table>
<thead>
<tr>
<th>STEP 1</th>
<th>Statement</th>
<th>STEP 2 A or D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, D, or NS</td>
<td>1. 65% of 123 can be found by multiplying 0.65 times 123.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. The proportion ( \frac{17}{22} = \frac{p}{100} ) could be used to find what percent of 22 is 17.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. A good estimate of 83% of 200 is 16.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Estimating is a good way to check the reasonableness of an answer to a problem.</td>
<td></td>
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<tr>
<td></td>
<td>5. It is always easier to write the percent as a decimal rather than a fraction when solving a percent equation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. A 200% increase would mean the original amount doubled.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. To find the total cost of an item including a 6( \frac{1}{2} )% sales tax, multiply the price by 0.065 and add that amount to the price.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. A 6( \frac{1}{2} )% sales tax is a percent of decrease.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. The formula for calculating interest, ( I = prt ), can be used to find the amount of interest earned on an account or the amount of interest owed on money that is borrowed.</td>
<td></td>
</tr>
</tbody>
</table>

#### After you complete Chapter 7

- Reread each statement and complete the last column by entering an A or a D.
- Did any of your opinions about the statements change from the first column?
- For those statements that you mark with a D, use a piece of paper to write an example of why you disagree.
Ejercicios preparatorios

Aplica porcentajes

**PASO 1**

Antes de comenzar el Capítulo 7

- Lee cada enunciado.
- Decide si estás de acuerdo (A) o en desacuerdo (D) con el enunciado.
- Escribe A o D en la primera columna O si no estás seguro(a) de la respuesta, escribe NS (No estoy seguro(a).

<table>
<thead>
<tr>
<th>PASO 1 A, D o NS</th>
<th>Enunciado</th>
<th>PASO 2 A o D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>El 65% de 123 se puede calcular al multiplicar 0.65 por 123.</td>
<td>A</td>
</tr>
<tr>
<td>2.</td>
<td>La proporción ( \frac{17}{22} = \frac{p}{100} ) podría usarse para calcular qué porcentaje de 22 es 17.</td>
<td>D</td>
</tr>
<tr>
<td>3.</td>
<td>Una buena estimación del 83% de 200 es 16.</td>
<td>A</td>
</tr>
<tr>
<td>4.</td>
<td>La estimación es una buena manera de revisar la racionalidad de la respuesta a un problema.</td>
<td>A</td>
</tr>
<tr>
<td>5.</td>
<td>Cuando se resuelve una ecuación porcentual, siempre es más fácil escribir el porcentaje como un decimal que como una fracción.</td>
<td>A</td>
</tr>
<tr>
<td>6.</td>
<td>Un aumento del 200% indicaría que se duplicó la cantidad inicial.</td>
<td>D</td>
</tr>
<tr>
<td>7.</td>
<td>Para calcular el costo total de un artículo incluyendo un impuesto sobre las ventas de ( \frac{6}{2}% ), multiplica el precio por 0,065 y luego suma este resultado al precio.</td>
<td>A</td>
</tr>
<tr>
<td>8.</td>
<td>Un impuesto sobre las ventas ( \frac{6}{2}% ) es un porcentaje de disminución.</td>
<td>D</td>
</tr>
<tr>
<td>9.</td>
<td>Se puede usar la fórmula para calcular el interés, ( I = prt ), para calcular el interés que gana una cuenta o la cantidad de interés que se debe por un préstamo de dinero.</td>
<td>A</td>
</tr>
</tbody>
</table>

**PASO 2**

Después de completar el Capítulo 7

- Vuelve a leer cada enunciado y completa la última columna con una A o una D.
- ¿Cambió cualquiera de tus opiniones sobre los enunciados de la primera columna?
- En una hoja de papel aparte, escribe un ejemplo de por qué estás en desacuerdo con los enunciados que marcaste con una D.
Get Ready for the Lesson

Read the introduction at the top of page 344 in your textbook.
Write your answers below.

1. Sketch the model and label using decimals instead of percents.

2. Sketch the model using fractions instead of percents.

3. Use these models to write two multiplication sentences that are equivalent to 60% of 2,000 = 1,200.

Read the Lesson

4. What are two methods for finding the percent of a number?

5. When writing a percent as a fraction to solve a percent problem, what is helpful to do to the percent before solving the problem?

6. What is unusual about the answer to a percent problem where the percent taken is larger than 100?

Remember What You Learned

7. Suppose one of your friends said to you, “I want to pay for lunch and I know I’m supposed to leave a 15% tip, but I don’t know how to figure out how much to leave.” Write in your words what you would say to your friend to explain how to figure out the tip.
Find 25% of 80.

\[ 25\% = \frac{25}{100} \text{ or } \frac{1}{4} \]

Write 25% as a fraction and reduce to lowest terms.

\[ \frac{1}{4} \text{ of } 80 = \frac{1}{4} \times 80 \text{ or } 20 \]

Multiply.

So, 25% of 80 is 20.

What number is 15% of 200?

\[ 15\% \text{ of } 200 = 15\% \times 200 \]

Write a multiplication expression.

\[ = 0.15 \times 200 \]

Write 15% as a decimal.

\[ = 30 \]

Multiply.

So, 15% of 200 is 30.

Find each number.

1. Find 20% of 50.

2. What is 55% of $400?

3. 5% of 1,500 is what number?

4. Find 190% of 20.

5. What is 24% of $500?

6. 8% of $300 is how much?

7. What is 12.5% of 60?

8. Find 0.2% of 40.

9. Find 3% of $800.

10. What is 0.5% of 180?

11. 0.25% of 42 is what number?

12. What is 0.02% of 280?
Skills Practice
Percent of a Number

Find each number.

1. Find 80% of 80.
2. What is 95% of 600?

3. 35% of 20 is what number?
4. Find 60% of $150.

5. What is 75% of 240?
6. 380% of 30 is what number?

7. Find 40% of 80.
8. What is 30% of $320?

9. 12% of 150 is what number?
10. Find 58% of 200.

11. What is 18% of $450?
12. What is 70% of 1,760?

13. Find 92% of 120.
14. 45% of 156 is what number?

15. What is 12% of 12?
16. Find 60% of 264.

17. 37.5% of 16 is what number?
18. What is 82.5% of 400?

19. What is 0.25% of 900?
20. Find 1.5% of 220.
Find each number. Round to the nearest hundredth if necessary.

1. 55% of 140
2. 40% of 123
3. 37% of $150
4. 25% of 96
5. 11% of $333
6. 99% of 14
7. 140% of 30
8. 165% of 10
9. 150% of 150
10. 225% of 16
11. 106% of $40
12. 126% of 350
13. 4.1% of 30
14. 8.9% of 75
15. 24.2% of $120
16. 97.5% of 80

17. **SALES** Mr. Redding sells vehicles to 20% of the people that come to the sales lot. If 65 people came to the lot last month, how many vehicles did he sell?

Find each number. Round to the hundredth tenth if necessary.

18. \( \frac{5}{6} \) of 600
19. \( 30 \frac{1}{3} \) of 3
20. 1,000% of 87
21. 100% of 56
22. 0.25% of 150
23. 0.7% of 50

**ANALYZE TABLES** For Exercises 24–26, use the table that shows the percents of blood types of 145 donors during a recent blood drive.

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>45%</td>
</tr>
<tr>
<td>A</td>
<td>40%</td>
</tr>
<tr>
<td>B</td>
<td>11%</td>
</tr>
<tr>
<td>AB</td>
<td>4%</td>
</tr>
</tbody>
</table>

24. Write a proportion that can be used to find how many donors had type B blood. Then solve. Round to the nearest whole if necessary.

25. How many donors did not have type O blood? Round to the nearest whole if necessary.

26. Which blood type had less than 10 donors?
SPORTS For Exercises 1 and 2, use the graph below. It shows the results of a poll of 440 ninth grade students. Round answers to the nearest whole number.

**Favorite Sports of Students**

<table>
<thead>
<tr>
<th>Favorite Sport</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basketball</td>
<td>35.2%</td>
</tr>
<tr>
<td>Hockey</td>
<td>23.4%</td>
</tr>
<tr>
<td>Soccer</td>
<td>11.8%</td>
</tr>
<tr>
<td>Football</td>
<td>8.9%</td>
</tr>
<tr>
<td>Volleyball</td>
<td>7.4%</td>
</tr>
<tr>
<td>Baseball</td>
<td>7.4%</td>
</tr>
<tr>
<td>Other</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

1. Write the percent as a fraction to find how many students surveyed chose hockey as their favorite sport. Solve.

2. How many students surveyed chose basketball as their favorite sport?

3. Write the percent as a decimal to find how many households have at least one dog. Solve.

4. How many households have at least one dog or cat?

5. **VOTING** Going into a recent election, only about 62% of people old enough to vote were registered. In a community of about 55,200 eligible voters, how many people are registered?

6. **COLLEGE** A local college recently reported that enrollment increased to 108% percent of last year. If enrollment last year was at 17,113, about how many students enrolled this year? Round to the nearest whole number.

**PETS** For Exercises 3 and 4, use the table below. It shows the pet ownership in Los Angeles, California. Assume that the same percents apply to a town of 1,650 households. Round answers to the nearest whole number.

<table>
<thead>
<tr>
<th>Pets in Household</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>at least one dog or cat</td>
<td>26.7</td>
</tr>
<tr>
<td>at least one dog</td>
<td>19.9</td>
</tr>
<tr>
<td>at least one cat</td>
<td>13</td>
</tr>
<tr>
<td>at least one dog and one cat</td>
<td>6.19</td>
</tr>
</tbody>
</table>
Model Behavior

When a block is painted and then separated into small cubes, some of the faces of the cubes will have paint on them and some will not.

For each set of blocks determine the percent of cubes that are painted on the given number of faces.

1. 0 faces
2. 1 face
3. 2 faces
4. 3 faces
5. 4 faces
6. 5 faces
7. 6 faces
8. 0 faces
9. 1 face
10. 2 faces
11. 3 faces
12. 4 faces
13. 5 faces
14. 6 faces
15. 0 faces
16. 1 face
17. 2 faces
18. 3 faces
19. 4 faces
20. 5 faces
21. 6 faces
A scientific calculator can be used to find the percent of a number. On the TI-34 II, the user needs to press the [%] key. To use this key, press [2nd] [%].

**Example 1**

What is 60% of 315?

60% of 315 means $60\% \times 315$.

Enter: $60 \ [\text{2nd}] \ [%] \ 315 \ \boxed{=}$

So, 60% of 315 is 189.

**Example 2**

Shelly wants to buy a GameStation. A new GameStation is on sale for 35% of the original cost. If the original cost is $205, how much will she be saving?

To determine how much she will be saving, multiply 35% times 205.

Enter: $35 \ [\text{2nd}] \ [%] \ 205 \ \boxed{=}$

So, she will be saving $71.75.

**Exercises**

Solve each problem.

1. 23% of 150 is what number?

2. 32% of 175 is what number?

3. Find 66% of 220.

4. Find 31% of 25.

5. What is 15% of 31?

6. What is 21% of 65?

7. Find 21% of 120.

8. Find 16% of 118.

9. 7% of 18 is what number?

10. 8% of 20 is what number?

11. What is 25% of 110?

12. What is 30% of 50?

13. What is 16% of 75?

14. What is 22% of 75?

15. 90% of 150 is what number?

16. 70% of 50 is what number?

17. Find 11% of 27.

18. Find 62% of 130.

19. What is 20% of 70?

20. What is 80% of 25?
Get Ready for the Lesson

Read the introduction at the top of page 350 in your textbook. Write your answers below.

1. Write the ratio of engine weight to total weight as a fraction.

2. Use a calculator to write the fraction as a decimal to the nearest hundredth.

3. About what percent of the space shuttle’s weight is the engine?

Read the Lesson

4. What is a percent proportion?

5. Describe how the percent proportion is set up.

6. Select the information that can be found by solving each percent problem.
   ______  What number is 30% of 15?  a. Find the whole.
          18 is 65% of what number?  b. Find the percent.
          ______  What percent of 40 is 17?  c. Find the part.

Remember What You Learned

7. Write an example of each type of percent problem in the table below. (Be sure the examples are different from the ones given in the lesson and on this page.) Write the example in words and set up the correct proportion for each example.

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find the Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find the Part</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find the Whole</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A percent proportion compares part of a quantity to a whole quantity for one ratio and lists the percent as a number over 100 for the other ratio.

\[
\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{100}
\]

**Example 1**  What percent of 24 is 18?

Let \(n\%\) represent the percent.

\[
\frac{18}{24} = \frac{n}{100}
\]

Write the proportion.

\[
18 \times 100 = 24 \times n
\]

Find the cross products.

\[
1,800 = 24n
\]

Simplify.

\[
\frac{1,800}{24} = \frac{24n}{24}
\]

Divide each side by 24.

\[
75 = n
\]

So, 18 is 75% of 24.

**Example 2**  What number is 60% of 150?

Let \(a\) represent the part.

\[
\frac{a}{150} = \frac{60}{100}
\]

Write the proportion.

\[
a \times 100 = 150 \times 60
\]

Find the cross products.

\[
100a = 9,000
\]

Simplify.

\[
\frac{100a}{100} = \frac{9,000}{100}
\]

Divide each side by 24.

\[
a = 90
\]

So, 90 is 60% of 150.

**Exercises**

Find each number. Round to the nearest tenth if necessary.

1. What number is 25% of 20?  
2. What percent of 50 is 20?  

3. 30 is 75% of what number?  
4. 40% of what number is 36?  

5. What number is 20% of 625?  
6. 12 is what percent of 30?
Find each number. Round to the nearest tenth if necessary.

1. 50 is 20% of what number?  
2. What percent of 20 is 4?

3. What number is 70% of 250?  
4. 10 is 5% of what number?

5. What number is 45% of 180?  
6. 40% of what number is 82?

7. What percent of 90 is 36?  
8. 60 is 25% of what number?

9. What number is 32% of 1,000?  
10. What percent of 125 is 5?

11. 73 is 20% of what number?  
12. 57% of 109 is what number?

13. What percent of 185 is 35?  
14. 25 is what percent of 365?

15. 85% of 190 is what number?  
16. 12.5 is 25% of what number?

17. What percent of 128 is 24?  
18. 5.25% of 170 is what number?

19. What is 82% of 230?  
20. What percent of 49 is 7?
Find each number. Round to the nearest tenth if necessary.

1. What percent of 65 is 13?  
2. $4 is what percent of $50?  
3. What number is 35% of 22?

4. 14% of 81 is what number?  
5. 13 is 26% of what number?  
6. 55 is 40% of what number?

7. What percent of 45 is 72?  
8. 1% of what number is 7?  
9. 33 is 50% of what number?

10. What number is 3% of 100?  
11. What percent of 200 is 0.5?

12. What number is 0.4% of 20?  
13. What number is 6.1% of 60

14. What percent of 34 is 34?  
15. 10.4% of what number is 13?

16. ALLOWANCE Monica has $3 in her wallet. If this is 10% of her monthly allowance, what is her monthly allowance?

17. WEDDING Of the 125 guests invited to a wedding, 104 attended the wedding. What percent of the invited guests attended the wedding?

18. CAMERA The memory card on a digital camera can hold about 430 pictures. Melcher used 18% of the memory card while taking pictures at a family reunion. About how many pictures did Melcher take at the family reunion? Round to the nearest whole number.

OCEANS For Exercises 19 and 20, use the table shown.

19. The area of the Indian Ocean is what percent of the area of the Pacific Ocean? Round to the nearest whole percent.

20. If the area of the Arctic Ocean is 16% of the area of the Atlantic Ocean, what is the area of the Arctic Ocean? Round to the nearest whole million.
## 7-2 Word Problem Practice

### The Percent Proportion

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. DRIVING</strong></td>
<td>David installed a device on his car that guaranteed to increase his gas mileage by 15%. He currently gets 22 miles per gallon. How much will the gas mileage increase after installing the device?</td>
</tr>
<tr>
<td><strong>2. POPULATION</strong></td>
<td>The number of students at Marita’s school decreased to 98% of last year’s number. Currently, there are 1,170 students. How many students were there last year? Round to the nearest whole number.</td>
</tr>
<tr>
<td><strong>3. VOTING</strong></td>
<td>Yolanda’s club has 35 members. Its rules require that 60% of them must be present for any vote. At least how many members must be present to have a vote?</td>
</tr>
<tr>
<td><strong>4. GARBAGE</strong></td>
<td>This month, Chun’s office produced 690 pounds of garbage. Chun wants to reduce the weight of garbage produced to 85% of the weight produced this month. What is the target weight for the garbage produced next month?</td>
</tr>
<tr>
<td><strong>5. SALARIES</strong></td>
<td>Alma just received a 6% raise in salary. Before the raise, she was making $52,000 per year. How much more will Alma earn next year?</td>
</tr>
<tr>
<td><strong>6. SPORTS</strong></td>
<td>Sally’s soccer team played 25 games and won 17 of them. What percent did the team win?</td>
</tr>
</tbody>
</table>
Made in the Shade

To shade 25% of the figure below, ask yourself how many of the eight squares need to be shaded. Then use the percent proportion to find the answer.

\[
\frac{x}{8} = \frac{25}{100}
\]

\[
100x = 8 \times 25
\]

\[
\frac{100x}{100} = \frac{200}{100}
\]

\[
x = 2
\]

If you shade two squares, you have shaded 25% of the figure.

Shade the indicated percent of each diagram.

1. Shade 40%.
2. Shade 37.5%.
3. Shade 16\(\frac{2}{3}\)%.

Shade the indicated percent of each diagram. You will need to divide the squares in each diagram into smaller squares.

4. Shade 30%.
5. Shade 62.5%.
6. Shade 27.5%.
7. Shade 28.125%.
Spreadsheet Activity

The Percent Proportion

You can use a spreadsheet to help solve the three types of percent problems. Create a spreadsheet with three columns. Label the first column P for the percentage, the second column B for base, and the third column r for rate.

If you have values in any two columns, you can find the third value by entering the correct formula in the third column.

The formula for column P is \( \frac{B \times C}{100} \).

The formula for column B is \( \frac{A \times 100}{C} \).

The formula for column r is \( \frac{A \times 100}{B} \).

Use the spreadsheet to find what number is 25% of 64.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P</td>
<td>B</td>
<td>r</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>64</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16 is 25% of 64.

Exercises

Use your knowledge of percents and spreadsheets to answer each question.

1. Suppose you want to use a spreadsheet to solve “21 is 35% of what number?”
   Which columns would you use for each number?

2. Suppose you want to use a spreadsheet to solve “What percent of 125 is 20?”
   Which columns would you use for each number?

Use the spreadsheet to solve each problem. Round answers to the nearest tenth if necessary.

3. 9 is what percent of 20?
4. What number is 37% of 52?
5. 75% of 63 is what number?
6. What percent of 62 is 31?
7. 16 is 32% of what number?
8. 20 is 58% of what number?
Get Ready for the Lesson

Read the introduction at the top of page 355 in your textbook. Write your answers below.

1. What fraction of people surveyed chose Labor Day as their favorite grilling day? How many of the 80 people surveyed is this?

2. Explain how you could use a fraction to estimate the number of people who chose the Fourth of July as their favorite grilling day. Then estimate.

3. Use a fraction to estimate the number of people surveyed who chose Memorial Day as their favorite grilling day.

Read the Lesson

4. In Example 1, what does the \( \approx \) sign mean in the sentence
   \[ 53\% \text{ of } 159 \approx \frac{1}{2} \cdot 160 \]? Why is it necessary to use this sign?

5. Describe Method 2 of Example 2 on page 356 in your textbook.

6. In Example 5, what is an easy way to find 0.5\% of a number?

Remember What You Learned

7. Write fraction equivalents in simplest form for the following percents. Then work with a partner. Take turns asking each other fraction equivalents for any of the percents in the table, or think of others to quiz each other.

<table>
<thead>
<tr>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>100%</td>
</tr>
</tbody>
</table>
To estimate the percent of a number, you can use a fraction or a multiple of 10% or 1%.

**Example 1**  Estimate 77% of 800.

77% is about 75% or \(\frac{3}{4}\).

\[
77\% \text{ of } 800 = \frac{3}{4} \cdot 800 \quad \text{Use } \frac{3}{4} \text{ to estimate.}
\]

\[
\approx 600 \quad \text{Multiply.}
\]

So, 77% of 800 is about 600.

**Example 2**  Estimate 137% of 50.

137% is more than 100%, so 137% of 50 is greater than 50.

137% is about 140%.

\[
140\% \text{ of } 50 = (100\% \text{ of } 50) + (40\% \text{ of } 50) \\
= (1 \cdot 50) + \left(\frac{2}{5} \cdot 50\right) \\
= 50 + 20 \text{ or } 70
\]

So, 137% of 50 is about 70.

**Example 3**  Estimate 0.5% of 692.

0.5% is half of 1%. 692 is about 700.

\[
1\% \text{ of } 700 = 0.01 \cdot 700 \quad \text{To multiply by 1%, move the decimal point two places to the left.}
\]

\[
= 7
\]

One half of 7 is \(\frac{1}{2} \cdot 7\) or 3.5.

So, 0.5% of 697 is about 3.5.

**Exercises**

Estimate.

1. 24% of 36  
2. 81% of 25  
3. 11% of 67  

4. 150% of 179  
5. 67% of 450  
6. 79% of 590  

7. 0.4% of 200  
8. 42% of 61  
9. 19% of 41  

10. 129% of 54  
11. 32% of 66  
12. 0.2% of 150
Estimate by using fractions.

1. 51% of 128
2. 76% of 200

3. 32.9% of 90
4. 23% of 8

5. 19% of 45
6. 81% of 16

Estimate by using 10%.

7. 12% of 98
8. 89% of 300

9. 31% of 80
10. 28% of 49

11. 62% of 13
12. 77% of 28

Estimate.

13. 308% of 500
14. 0.5% of 87

15. 153% of 20
16. 0.6% of 41

17. 231% of 54
18. 0.9% of 116

19. 0.26% of 36
20. 425% of 119
Estimate.

1. 39% of 80  
2. 31% of 40  
3. 28% of 110  
4. 74% of 160  
5. 87% of 19  
6. 91% of 82  
7. 34% of 59  
8. 66% of 148  
9. 9% of 71  
10. 73% of 241  
11. 126% of 80  
12. 234% of 145  
13. $\frac{1}{3}$% of 307  
14. $\frac{1}{4}$% of 798  
15. 1.1% of 62  
16. 4.1% of 101  
17. 67% of 11.9  
18. 31% of 68.7  
19. 9.8% of 359  
20. 97.9% of 39  
21. 52% of 57.9  
22. 33% of 15.3  
23. 21.1% of 151  
24. 2.9% of 61.2

25. **ELEVATION** The highest point in Arizona is Humphreys Peak with an elevation of 12,633 feet. Estimate the elevation of the highest point in Florida, located in Walton County, if it is about 2.7% of the highest point in Arizona.

26. **BRAIN** The brain weight of a newborn baby is about 13% of the body weight of the newborn. If a newborn weighs 2,900 grams, about how much does the brain weigh?

27. **STOCKS** The value of a share of stock in an electronics company increased by $\frac{2}{3}$% during one week. If the value of a share of stock was $141 at the beginning of the week, estimate the increase in value of a share of stock at the end of the week.
### Word Problem Practice

#### Percent and Estimation

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. ORCHESTRA</strong></td>
<td>The orchestra at Millard Middle School has 120 members. Of these, 17% are eighth-grade students. Estimate the number of eighth-grade students in the orchestra.</td>
</tr>
<tr>
<td><strong>2. RESTAURANTS</strong></td>
<td>In one west coast city, 34% of the restaurants are on the river. The city has 178 restaurants. Estimate the number of restaurants that are on the river.</td>
</tr>
<tr>
<td><strong>3. FARMING</strong></td>
<td>Rhonda planted green beans on 67% of her farm. Rhonda’s farm has 598 acres of land. Estimate the number of acres of green beans on Rhonda’s farm.</td>
</tr>
<tr>
<td><strong>4. HOTELS</strong></td>
<td>At the Eastward Inn hotel, 47% of the rooms face the pool. The hotel has 92 rooms. Estimate the number of rooms that face the pool.</td>
</tr>
<tr>
<td><strong>5. TREES</strong></td>
<td>The students in Leon’s seventh grade science class determined that 42% of the trees at a local park are pine trees. If there are 632 trees in the park, about how many of them are pine trees?</td>
</tr>
<tr>
<td><strong>6. BOOKS</strong></td>
<td>Jenna has read 0.7% of a book. If the book has 431 pages, estimate the number of pages Jenna has read.</td>
</tr>
<tr>
<td><strong>7. FITNESS</strong></td>
<td>At the office where Mika works, 40% of the 18 employees exercise at least three times a week. Estimate the number of people who exercise at least three times a week.</td>
</tr>
<tr>
<td><strong>8. PETS</strong></td>
<td>Of all seventh grade students at Hart Middle School, 0.3% of the students own a pet iguana. If there are 610 seventh grade students at Hart, about how many own pet iguanas?</td>
</tr>
</tbody>
</table>
The History of %

Math historians believe that the percent symbol, %, may have been developed from the symbol, \(\frac{\text{c}}{\text{o}}\), that first appeared in an Italian writing dating back to 1425. At that time, percent was commonly written as “per 100”, “P cento”, and as a circle directly above a number, \(\text{c}.\) Roman Numerals were also used to represent a percent. For example, “xx.per.c.” meant 20 percent. The symbol continued to develop in mathematical writings as, Per \(\text{c}\), around 1650 to, \(\text{o}\), and eventually to our modern symbol, %.

Find the estimates below to reveal the meaning of a similar symbol, \(\%\).

- R 32% of 123
- S 90% of 138
- T 12% of 50
- O 110% of 20
- N 25% of 83
- P \(\frac{1}{4}\)% of 240
- E 78% of 20
- U 152% of 41
- A \(\frac{1}{2}\)% of 18
- H 0.3% of 62
- D 25.3% of 125

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6</td>
<td>15</td>
<td>41</td>
<td>5</td>
<td>0.2</td>
<td>22</td>
<td>60</td>
<td>126</td>
<td>0.09</td>
</tr>
</tbody>
</table>
Get Ready for the Lesson

Read the introduction at the top of page 361 in your textbook. Write your answers below.

1. Use the percent proportion to find the amount earned by cotton.

2. Express the percent of cotton as a decimal. Then multiply the decimal by 8.9 million. Compare the answers to Exercises 1 and 2.

Read the Lesson

3. The word percent is used in both the percent proportion and the percent equation. There is one major difference in the way percent is represented in each. What is the difference?

4. Write the following problems as percent proportions and as percent equations.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Percent Proportion</th>
<th>Percent Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 is 60% of what number?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find 50% of 6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40% of what number is 48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 is what percent of 72?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remember What You Learned

5. Work with a partner. One person should ask a question like the questions given as examples in the concept summary box. The other person should name the type of percent problem and name the equation that should be used to solve the problem. Do not solve the equation. Then trade roles. Continue until each of you can name the problem type and the related equation easily.
To solve any type of percent problem, you can use the percent equation, part = percent \cdot base, where the percent is written as a decimal.

**Example 1**  600 is what percent of 750?

600 is the part and 750 is the whole. Let \( n \) represent the percent.

\[
\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{} \\
\frac{600}{750} = \frac{n}{750} \quad \text{Write an equation.}
\]

\[
\frac{600}{750} = \frac{750n}{750} \quad \text{Divide each side by 750.}
\]

\[
0.8 = n \quad \text{Simplify.}
\]

\[
80\% = n \quad \text{Write 0.8 as a percent.}
\]

So, 600 is 80\% of 750.

**Example 2**  45 is 90\% of what number?

45 is the part and 90\% or 0.9 is the percent. Let \( n \) represent the whole.

\[
\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{} \\
\frac{45}{n} = \frac{0.9}{n} \quad \text{Write an equation.}
\]

\[
\frac{45}{0.9} = \frac{0.9n}{0.9} \quad \text{Divide each side by 0.9.}
\]

\[
50 = n \quad \text{The whole is 50.}
\]

So, 45 is 90\% of 50.

**Exercises**

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

1. What percent of 56 is 14?  
2. 36 is what percent of 40?

3. 80 is 40\% of what number?  
4. 65\% of what number is 78?

5. What percent of 2,000 is 8?  
6. What is 110\% of 80?

7. 85 is what percent of 170?  
8. Find 30\% of 70.
Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

1. 25% of 176 is what number?
2. What is 90% of 20?
3. 24 is what percent of 30?
4. 80% of what number is 94?
5. What is 60% of 45?
6. 9 is what percent of 30?
7. What percent of 125 is 25?
8. What is 120% of 20?
9. 2% of what number is 5?
10. 15% of 290 is what number?
11. 16 is what percent of 4,000?
12. What is 140% of 60?
13. 344.8 is what percent of 862?
14. 6% of what number is 21?
15. What number is 60% of 605?
16. 32% of 250 is what number?
17. Find 30% of 70.
18. What is 80% of 65?
Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

1. What number is 27% of 52?  
2. Find 41% of 48.

3. What percent of 88 is 33?  
4. 8 is what percent of 18?

5. What number is 33% of 360?  
6. What percent of 62 is 58?

7. 55 is what percent of 100?  
8. 22% of what number is 24.2?

9. 19 is 50% of what number?  
10. 25 is 32% of what number?

11. 40% of what number is 28?  
12. 30 is what percent of 60?

13. What percent of 5 is 2?  
14. 44% of 10 is what number?

15. Find 110% of 88.  
16. What number is 60% of 21.8?

17. What percent of 180 is 210?  
18. 220 is 95.3% of what number?

19. BASEBALL A baseball player was at bat 473 times during the regular season. If he made a hit 31.5% of the times he was at bat, how many hits did he make during the regular season? Round to the nearest whole number if necessary.

ANALYZE GRAPHS For Exercises 20 and 21, use the graph shown. The total enrollment at Central High School is 798 students.

20. About what percent of the students at Central High are freshmen? Round to the nearest tenth if necessary.

21. About what percent of the students at Central High are seniors? Round to the nearest tenth if necessary.
### Word Problem Practice

**Algebra: The Percent Equation**

1. **Dining** Jonas and Linda’s restaurant bill comes to $23.40. They are planning to tip the waiter 15% of their bill. How much money should they leave for a tip?

2. **Chess** The Briarwood Middle School chess club has 55 members. 22 of the members are in seventh grade. What percent of the members of the chess club are in seventh grade?

3. **Tennis** In the city of Springfield, 75% of the parks have tennis courts. If 15 parks have tennis courts, how many parks does Springfield have altogether?

4. **College** There are 225 students in eighth grade at Jefferson Middle School. A survey shows that 64% of them are planning to attend college. How many Jefferson eighth grade students are planning to attend college?

5. **Baseball** In the 2005 season, the Chicago White Sox won 99 out of 162 games. What percent of games did the White Sox win? Round to the nearest tenth if necessary.

6. **Housing** In the Stoneridge apartment complex, 35% of the apartments have one bedroom. If there are 49 one-bedroom apartments, what is the total number of apartments at Stoneridge?

7. **Space** On Mars, an object weighs 38% as much as on Earth. How much would a person who weighs 165 pounds on Earth weigh on Mars?

8. **Football** In the 2005 season, quarterback Jake Plummer of the Denver Broncos had 7 passes intercepted out of 456 attempts. What percent of Jake Plummer’s passes were intercepted? Round to the nearest tenth if necessary.
Inherited Traits

Everyone inherits traits like eye color, hair color, and skin pigmentation from their parents and grandparents, but there are other interesting traits that are also inherited. Right or left handedness is an inherited trait, as are dimples in one’s cheeks. The chart below shows some inherited traits and the percentage of the general population that shows the trait.

<table>
<thead>
<tr>
<th>Trait</th>
<th>Percent of General Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right-handedness</td>
<td>87%</td>
</tr>
<tr>
<td>Left-handedness</td>
<td>13%</td>
</tr>
<tr>
<td>Dimples</td>
<td>75%</td>
</tr>
<tr>
<td>Earlobes attached</td>
<td>25%</td>
</tr>
<tr>
<td>Able to roll tongue</td>
<td>65%</td>
</tr>
</tbody>
</table>

Source: www.extension.usu.edu/aitc and www.anythingleft-handed.co.uk

1. Based on the information presented above, predict how many of your classmates will have each of these traits.

<table>
<thead>
<tr>
<th>Trait</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right-handedness</td>
<td></td>
</tr>
<tr>
<td>Left-handedness</td>
<td></td>
</tr>
<tr>
<td>Dimples</td>
<td></td>
</tr>
<tr>
<td>Earlobes attached</td>
<td></td>
</tr>
<tr>
<td>Able to roll tongue</td>
<td></td>
</tr>
</tbody>
</table>

2. Survey your classmates to find how many have these traits.

<table>
<thead>
<tr>
<th>Trait</th>
<th>Number of Students</th>
<th>Percent of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right-handedness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left-handedness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earlobes attached</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to roll tongue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimples</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Compare your predictions to your actual results.

4. How do the class traits compare to the traits of the general population?
SALES TAX There is 4.8% sales tax on all clothing items purchased. Danielle wants to buy a shirt, which costs $18.95. Danielle figures that if she has $20 she will have enough to buy the shirt. After adding in sales tax, is $20 a reasonable amount for Danielle to bring?

Explore

The cost of the shirt is $18.95. Sales tax is 4.8%. Danielle has $20.

Plan

Round $18.95 to $19.00 and 4.8% to 5%. Then use mental math to find 5% of $19.00.

Solve

Round $18.95 to $19.00
Round 4.8% to 5%

10% of $19.00 = 0.1 \times 19 or $1.90 Use mental math. 10% = 0.1

Round $1.90 to $2.00
5\% \text{ is } \frac{1}{2} \text{ of } 10\%

So $2.00 is $1.00 $1.00 is the amount of sales tax.

$19.00 + $1.00 = $20.00 Add $1.00 to $19.00.

So $20 is a reasonable amount of money for Danielle to bring to pay for the shirt.

Check

Use a calculator to check.

0.048 \times 18.95 = 0.9096

Since 0.9096 is close to 1, the answer is reasonable.

1. **TIP** The total bill at a restaurant for a family of 5 is $64.72. They want to leave a 20% tip. They decide to leave $10.00. Is this estimate reasonable? Explain your reasoning.

2. **TELEVISION** A recent survey shows that 67% of students watch 3 or more hours of television a night. Suppose there are 892 students in your school. What would be a reasonable estimate of the number of students in your school who watch 3 or more hours of television a night? Explain your reasoning.
Determine reasonable answers for each.

1. **MONEY** Gillian and Roger have lunch at a restaurant and Gillian needs to determine how much tip to leave based on their bill. If their bill was $21.87 and Gillian wants to leave a 15% tip, what is a reasonable estimate for how much she should leave?

2. **SPORTS** Of the 82,000 fans that attended a bowl game between Ohio State and Notre Dame, 60% were Ohio State fans. About how many fans at the game were for Notre Dame?

3. **ICE CREAM** A survey of 1,950 people found that 39% preferred chocolate ice cream to vanilla. About how many people preferred chocolate ice cream according to the survey?

4. **EARTH** The surface area of Earth is approximately 70% water. If the surface area is about 510,000,000 square kilometers, about how many square kilometers are water?

5. **COLLEGE** Of 7,450 first-year college students interviewed, 72% had changed their major area of study since the beginning of the academic year. About how many students had kept the same major?

6. **MONEY** While shopping, Hilary spent $149. If the amount she spent was 20% of her savings, how much savings did she have before she shopped?
Mixed Problem Solving

For Exercises 1 and 2, determine a reasonable answer.

1. **HOMES** In a retirement village, 86% of the residents own their home. If the village has 540 homes, how many homes are owned by the residents, about 250, 350, or 450?

2. **ANALYZE GRAPHS** The graph shows how the Forenzo family spent their money on their summer vacation. Is 25% a reasonable estimate of how much money they spent on dining? Justify your answer.

Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

### PROBLEM-SOLVING STRATEGIES
- Use the four-step plan.
- Guess and check.
- Choose the method of computation.
- Make an organized list.
- Determine reasonable answers.

3. **NUMBER SENSE** 12 is added to 25% of a number. The result is 30. What is the number?

4. **ANALYZE GRAPHS** The graph shows the percent of community attendance during a little league season. Is 90% a reasonable estimate for the percent of community attendance for September? Explain.

---

**Select The Operation**

For Exercises 5 and 6, select the appropriate operation(s) to solve the problem. Justify your solution(s) and solve the problem.

5. **TRAVEL** Cecil averages 31 miles per gallon when driving his car on the highway to visit friends 461 miles away. If he filled the 16-gallon gasoline tank before leaving and did not buy any gasoline along the way, about how many gallons of gasoline are left in the tank when he arrives?

6. **FABRIC** Mrs. Tillman is making identical dresses for her three granddaughters. She needs \(\frac{21}{8}\) yards of fabric for each dress. If she purchased \(8\frac{1}{2}\) yards of fabric, how much fabric will be leftover?
### Word Problem Practice

**Problem-Solving Investigation:**
**Determine Reasonable Answers**

Solve using any method.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. GYM</strong></td>
<td>The 6th graders are running the mile in physical education. Jared finishes the mile 2 minutes before Stacey who finished 1 minute 26 seconds behind Kareem. If Joanna completes the mile 1 minute and 42 seconds after Kareem, and her time is 8 minutes 34 seconds, what is Jared’s time?</td>
</tr>
<tr>
<td><strong>2. POLITICS</strong></td>
<td>A candidate receives 62% of the vote in an election and there are 1,603 votes recorded. How many votes did the candidate receive?</td>
</tr>
<tr>
<td><strong>3. POPULATION</strong></td>
<td>The population of the United States is about 296,000,000. Spanish is the primary language for 10.7% of the population, about how many people speak Spanish as their primary language?</td>
</tr>
<tr>
<td><strong>4. BAKING</strong></td>
<td>Bea has prepared a basic cookie dough to which she will add ingredients to make several types of cookies. She has chocolate chips, raisins, and peanut butter chips. She also has peanuts, pecans, and walnuts. If she wants to put one ingredient from the first group with one type of nut into the dough, how many different types of cookies can she make?</td>
</tr>
<tr>
<td><strong>5. COINS</strong></td>
<td>Zachary has four different coins that total 41 cents. What coins does he have?</td>
</tr>
<tr>
<td><strong>6. DECORATING</strong></td>
<td>Mr. Chen is planning to wallpaper his family room and dining room. The dining room is 11 feet by 13 feet, while the family room is 20 feet by 10 feet. All of the walls are 8 feet high. How many square feet of wallpaper does he need to wallpaper the two rooms?</td>
</tr>
<tr>
<td><strong>7. MOVIES</strong></td>
<td>Charis is going to the movies with a friend. The price of admission is $5.50, a small popcorn is $2.39, and a small drink is $2.65. If Charis has a ten dollar bill, does she have enough money for admission, popcorn, and a drink? If not, how much more money would she need?</td>
</tr>
<tr>
<td><strong>8. TRAVELING</strong></td>
<td>Shawn is packing his suitcase for vacation. If he has 2 pairs of shorts, and 5 shirts, how many different outfits can he make?</td>
</tr>
</tbody>
</table>
Get Ready for the Lesson

Complete the Mini Lab at the top of page 369 in your textbook. Write your answers below.

Model each percent of change.

1. 25% increase

2. 75% increase

3. 30% increase

4. Describe a model that represents a 100% increase, a 200% increase, and a 300% increase.

5. Describe how this process would change to show percent of decrease.

Read the Lesson

6. In a percent of change, what are the two numbers that are being compared?

7. How can you tell if a percent of change is a percent of increase or a percent of decrease?

8. Tell how to find the amount of increase and the amount of decrease.

Remember What You Learned

9. Find an example of something in your life that has increased or decreased, such as your height in the past year. Calculate the percent of change and share your results with your class.
A percent of change is a ratio that compares the change in quantity to the original amount. If the original quantity is increased, it is a percent of increase. If the original quantity is decreased, it is a percent of decrease.

**Example 1**  Last year, 2,376 people attended the rodeo. This year, attendance was 2,950. What was the percent of change in attendance to the nearest whole percent?

Since this year’s attendance is greater than last year’s attendance, this is a percent of increase.

The amount of increase is 2,950 – 2,376 or 574.

\[
\text{percent of increase} = \frac{\text{amount of increase}}{\text{original amount}} = \frac{574}{2,376}
\]

\[
\approx 0.24 \text{ or } 24\%
\]

Rodeo attendance increased by about 24%.

**Example 2**  John’s grade on the first math exam was 94. His grade on the second math exam was 86. What was the percent of change in John’s grade to the nearest whole percent?

Since the second grade is less than the first grade, this is a percent of decrease. The amount of decrease is 94 – 86 or 8.

\[
\text{percent of decrease} = \frac{\text{amount of decrease}}{\text{original amount}} = \frac{8}{94}
\]

\[
\approx 0.09 \text{ or } 9\%
\]

John’s math grade decreased by about 9%.

**Exercises**

Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

1. original: 4
   new: 5

2. original: 1.0
   new: 1.3

3. original: 15
   new: 12

4. original: $30
   new: $18

5. original: 60
   new: 63

6. original: 160
   new: 136

7. original: 7.7
   new: 10.5

8. original: 9.6
   new: 5.9
### Percent of Change

Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an *increase* or *decrease*.

<table>
<thead>
<tr>
<th></th>
<th>Original</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>original: 35</td>
<td>new: 70</td>
</tr>
<tr>
<td>2.</td>
<td>original: 8</td>
<td>new: 12</td>
</tr>
<tr>
<td>3.</td>
<td>original: 45</td>
<td>new: 30</td>
</tr>
<tr>
<td>4.</td>
<td>original: $350</td>
<td>new: $400</td>
</tr>
<tr>
<td>5.</td>
<td>original: $75</td>
<td>new: $60</td>
</tr>
<tr>
<td>6.</td>
<td>original: 250</td>
<td>new: 100</td>
</tr>
<tr>
<td>7.</td>
<td>original: $30</td>
<td>new: $110</td>
</tr>
<tr>
<td>8.</td>
<td>original: 35</td>
<td>new: 28</td>
</tr>
<tr>
<td>9.</td>
<td>original: $12.50</td>
<td>new: $15</td>
</tr>
<tr>
<td>10.</td>
<td>original: 80</td>
<td>new: 52</td>
</tr>
<tr>
<td>11.</td>
<td>original: 45</td>
<td>new: 63</td>
</tr>
<tr>
<td>12.</td>
<td>original: 120</td>
<td>new: 132</td>
</tr>
<tr>
<td>13.</td>
<td>original: $210</td>
<td>new: $105</td>
</tr>
<tr>
<td>14.</td>
<td>original: 84</td>
<td>new: 111</td>
</tr>
<tr>
<td>15.</td>
<td>original: $84</td>
<td>new: $100</td>
</tr>
<tr>
<td>16.</td>
<td>original: 6.8</td>
<td>new: 8.2</td>
</tr>
<tr>
<td>17.</td>
<td>original: 1.5</td>
<td>new: 2.5</td>
</tr>
<tr>
<td>18.</td>
<td>original: 91</td>
<td>new: 77</td>
</tr>
<tr>
<td>19.</td>
<td>original: $465.50</td>
<td>new: $350</td>
</tr>
<tr>
<td>20.</td>
<td>original: $87.05</td>
<td>new: $100</td>
</tr>
<tr>
<td>21.</td>
<td>original: 144</td>
<td>new: 108</td>
</tr>
<tr>
<td>22.</td>
<td>original: 20.8</td>
<td>new: 12.2</td>
</tr>
<tr>
<td>23.</td>
<td>original: $75</td>
<td>new: $15</td>
</tr>
<tr>
<td>24.</td>
<td>original: 8.6</td>
<td>new: 7</td>
</tr>
</tbody>
</table>
Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

1. 8 feet to 10 feet
2. 136 days to 85 days
3. $0.32 to $0.37
4. 62 trees to 31 trees
5. 51 meters to 68 meters
6. 16.5 grams to 24.8 grams
7. 0.55 minutes to 0.1 minutes
8. $180 to $210
9. 2.9 months to 4.9 months
10. \( \frac{1}{4} \) to \( \frac{3}{8} \)
11. \( \frac{1}{6} \) to \( \frac{1}{3} \)
12. \( \frac{4}{3} \) to \( \frac{1}{3} \)

13. SURGERY Recent developments in surgical procedures change the average healing time for some operations from 8 weeks to 3 weeks.

14. ROADS The city added an extra lane in each direction to the 5-lane road.

GEOMETRY For Exercises 15 and 16, refer to the rectangle shown. Suppose the width is decreased by 3 inches.

15. Find the percent change in the perimeter.

16. Find the percent change in the area.

ANALYZE TABLES For Exercises 17 and 18, refer to the table that shows the average monthly rainfall during the first six months of the year for Singapore.

17. Between which two consecutive months is the percent of decrease the greatest? What is the percent change? Round to the nearest whole percent.

<table>
<thead>
<tr>
<th>Month</th>
<th>Average Rainfall (inches/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>9.4</td>
</tr>
<tr>
<td>February</td>
<td>6.5</td>
</tr>
<tr>
<td>March</td>
<td>6.8</td>
</tr>
<tr>
<td>April</td>
<td>6.6</td>
</tr>
<tr>
<td>May</td>
<td>6.7</td>
</tr>
<tr>
<td>June</td>
<td>6.4</td>
</tr>
</tbody>
</table>

Source: worldclimate.com

18. Between which two consecutive months is the percent of increase the least? What is the percent change? Round to the nearest whole percent.
### Word Problem Practice

#### Percent of Change

**1. SHOES** A popular brand of running shoes costs a local store $68 for each pair. If the store sells the shoes for $119, what is the percent of increase in the price?

**2. CLUBS** Last year the backgammon club had 30 members. This year the club has 24 members. Find the percent of decrease in the number of members.

**3. READING** In the seventh grade, Rachel read 15 books. In the eighth grade, she read 18 books. Find the percent of increase in the number of books Rachel read.

**4. VOTES** Last year 762 students voted in the student council election at San Bruno Middle School. This year 721 students voted. To the nearest tenth, what was the percent of change in the number of students that voted?

**5. HEIGHT** When Hugo was 9 years old he was 56 inches tall. Hugo is now 12 years old and he is 62 inches tall. Find the percent of increase in Hugo’s height to the nearest tenth.

**6. PLANTS** Alicia planted 45 tulip bulbs last year. This year she plans to plant 65 bulbs. Find the percent of increase in the number of tulip bulbs to the nearest tenth.

**7. PICTURES** The 2006 yearbook at Middleton Middle School had 236 candid pictures of students. The 2005 yearbook had 214 candid pictures of students. To the nearest tenth, what was the percent of change in the number of candid student pictures from 2005 to 2006?

**8. POPULATION** In 1990, there were 4,298,000 Mexican immigrants living in the United States. In 2000 this number had increased to 7,858,000. Find the percent of increase to the nearest tenth.
A Taxing Exercise

People who earn income are required by law to pay taxes. The amount of tax a person owes is computed by first subtracting the amount of all exemptions and deductions from the amount of income, then using a tax table like this.

Schedule X—Use if your filing status is Single

<table>
<thead>
<tr>
<th>If the amount on Form 1040, line 37, is: Over—</th>
<th>But not over—</th>
<th>Enter on Form 1040, line 38 of the amount over—</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
<td>$20,350</td>
<td>$3,052.50 + 28%</td>
</tr>
<tr>
<td>20,350</td>
<td>49,300</td>
<td>11,158.50 + 31%</td>
</tr>
<tr>
<td>49,300</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compute each person’s income. Subtract $5,550 for each person’s exemption and deduction. Then use the tax rate schedule to compute the amount of federal tax owed.

1. A cashier works 40 hours each week, earns $7.50 per hour, and works 50 weeks each year.

2. A newspaper carrier works each day, delivers 154 papers daily, and earns $0.12 delivering each paper.

3. A baby-sitter earns $3.50 per hour per child. During a year, the baby-sitter works with two children every Saturday for 8 hours and with three children every other Sunday for 6 hours.

4. While home from college for the summer, a painter earns $17.00 per hour, working 45 hours each week for 15 weeks.

5. Working before and after school in the school bookstore, an employee works 2.5 hours each day for 170 days and earns $4.60 per hour.

6. After graduating from college, a computer programmer accepts a position earning $2,450 monthly.
TI-73 Activity

Simple Interest

Use the Equation Solver on your calculator to solve problems involving simple interest. Use the simple interest formula: \(I = \frac{prt}{100}\).

**Example**

Find the amount of money you would need to deposit in a savings account that earns 5% interest, if you want to earn $250 interest in 1 year.

**Step 1** Choose Equation Solver.

**Step 2** Enter the formula after the symbol \(eqn\).

**Step 3** Enter the values given in the problem: Interest = 250, rate = 5%, time = 1.

**Step 4** Solve for \(P\), the principal.

The principal amount is $5,000.

**Exercises**

Use this same formula and enter different values to solve the following problems. Round money to the nearest cent; round time to the nearest tenth of a year.

1. Find the amount of interest you would earn if you deposited $500 for 4 years in a savings account that earns 3.4% interest.

2. Find the amount of money you would need to deposit in a savings account that earns 5.1% interest if you want to earn $1000 in interest in 2 years.

3. Find the amount of time you would need to leave a deposit of $500 in a savings account that earns 5.3% interest if you want to earn $500 in interest.

4. Find the amount of money you would need to deposit in a savings account earning 4.9% interest if you want to earn $800 in interest in 3 years.
Lesson Reading Guide

Sales Tax and Discount

Get Ready for the Lesson

Read the introduction at the top of page 375 in your textbook. Write your answers below.

1. Calculate the sales tax by finding 6% of $1,299.

2. What will be the total cost including the sales tax?

3. Use a calculator to multiply 1.06 and 1,299. How does the result compare to your answer in Exercise 2?

Read the Lesson

4. In Example 1, the \( = \) is used when the sales tax is found. Why is the value of 0.0425 times 90 rounded?

5. In Method 2 of Example 1, why is the sales tax added to 100%?

6. In Examples 2 and 3, the percent equation is used to find discount price and to find the original price. When using the percent equation, how do you represent the percent?

Remember What You Learned

7. Use the Internet to find the state sales tax in your state, including tax on food, prescription drugs, and nonprescription drugs, if applicable. Then suppose you have a cold and you go to a local pharmacy. You purchase a box of crackers for $2.99 and a bottle of over-the-counter pain reliever for $8.49. Your doctor ordered a prescription for you for your cold and you pay $10 for this prescription. Using the sales tax for your state, what is your total cost at the pharmacy, including taxes?
Sales tax is a percent of the purchase price and is an amount paid in addition to the purchase price. Discount is the amount by which the regular price of an item is reduced.

**Example 1**  
**SOCCER** Find the total price of a $17.75 soccer ball if the sales tax is 6%.

**Method 1**
First, find the sales tax. 
6% of $17.75 = 0.06 \cdot 17.75 
\approx 1.07 
The sales tax is $1.07.

Next, add the sales tax to the regular price. 
1.07 + 17.75 = 18.82

The total cost of the soccer ball is $18.82.

**Method 2**
100% + 6% = 106% Add the percent of tax to 100%.

The total cost is 106% of the regular price.

106% of $17.75 = 1.06 \cdot 17.75 
\approx 18.82

**Example 2**  
**TENNIS** Find the price of a $69.50 tennis racket that is on sale for 20% off.

First, find the amount of the discount \( d \).

\[
d = \frac{\text{part}}{\text{percent}} \cdot \text{whole} \\
d = 0.2 \cdot 69.50 \\
d = 13.90
\]

Use the percent equation. The discount is $13.90.

So, the sale price of the tennis racket is $69.50 \(- $13.90 or $55.60.

**Exercises**

Find the total cost or sale price to the nearest cent.

1. $22.95 shirt; 7% sales tax
2. $39.00 jeans; 25% discount
3. $35 belt; 40% discount
4. $115.48 watch; 6% sales tax
5. $16.99 book; 5% off
6. $349 television; 6.5% sales tax
# Skills Practice

## Sales Tax and Discount

Find the total cost or sale price to the nearest cent.

1. $49.95 CD player; 5% discount
2. $69 shoes; 6% sales tax

3. $2.99 socks; 5.5% sales tax
4. $119 coat; 40% discount

5. $299 DVD player; 7% sales tax
6. $49 tie; 15% discount

7. $59 power tool; 5% sales tax
8. $17.99 CD; 10% discount

9. $79 cell phone; 20% discount
10. $65 concert ticket; 7.5% sales tax

11. $459 television; 30% discount
12. $19,995 car; 6.5% sales tax

Find the original price to the nearest cent.

13. boots: discount, 30%
   sale price, $62.50

14. video game: discount, 15%
   sale price, $12.64

15. drum set: discount, 10%
   sale price, $1,099

16. gloves: discount, 30%
   sale price, $16.40

17. sweater: discount, 30%
   sale price, $34

18. sunglasses: discount, 20%
   sale price, $62.95

19. dinner for two: discount, 5%
   sale price, $70

20. bicycle: discount, 25%
   sale price, $147.85
Practice

Sales Tax and Discount

Find the total cost or sale price to the nearest cent.

1. $18 haircut; 10% discount
2. $299 lawn mower; 5% tax
3. $9.99 meal; 25% discount
4. $149 guitar; 20% discount
5. $15.75 music CD; 4% tax
6. $24 gym bag; 8% tax
7. $32.88 jacket; 50% discount
8. $3.45 coffee; 33% discount
9. $9.99 chair; $8.50 tax

Find the original price to the nearest cent.

10. bracelet: discount, 40%
sale price, $13.80
11. bicycle: discount, 35%
sale price, $79

12. TICKETS State residents get discounts at various theme parks throughout the state. One theme park charges a state resident $51.70. If this price represents a 15% discount from the regular adult admission, find the cost of a regular adult admission to the nearest cent.

13. TRUCKS What is the sales tax on a $17,500 truck if the tax rate is 6%?

COMPUTERS For Exercises 14–16, use the following information.
Lionel is buying a computer that normally sells for $890. The state sales tax is 6%.

14. What is the total cost of the computer including tax?

15. If the computer is on sale with a 10% discount, what is the sale price of the computer before adding the sales tax?

16. What is the sales tax on the discounted price?
## Word Problem Practice

### Sales Tax and Discount

<table>
<thead>
<tr>
<th>1. SKATEBOARDS</th>
<th>Ines wants to buy a skateboard but she does not know if she has enough money. The price of the skateboard is $85 and the sales tax is 6%. What will be the total cost of the skateboard?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. PRETZELS</td>
<td>The Spanish club sold hot pretzels as a fund-raiser. The pretzels normally sold for $1.50, but near the end of the sale they wanted to sell as many as possible, so they reduced the price by 30%. What was the new price for a hot pretzel?</td>
</tr>
<tr>
<td>3. COMPUTERS</td>
<td>Andrea ordered a computer on the Internet. The computer cost $1,499 plus 7(\frac{1}{2})% sales tax. What was the total amount Andrea paid for her computer?</td>
</tr>
<tr>
<td>4. BOOKS</td>
<td>Nate went shopping at a bookstore. The price of the book he selected was $14.95, but it had a sale sticker on it. When he paid for the book, he was charged $12.71 before sales tax was added. What was the percent of discount to the nearest percent?</td>
</tr>
<tr>
<td>5. CELL PHONES</td>
<td>Justin is buying a cell phone that has a regular price of $149. The cell phone is on sale for 15% off the regular price. What will be the sale price?</td>
</tr>
<tr>
<td>6. MAGAZINES</td>
<td>Ivan bought two magazines for $4.95 each. If the sales tax was 6.75%, what was the total amount that he paid for the magazines?</td>
</tr>
<tr>
<td>7. MOVIES</td>
<td>A video store is having a sale in which DVDs are on sale for 20% off. During this sale, what is the cost of three DVDs that regularly cost $16.99?</td>
</tr>
<tr>
<td>8. MODELS</td>
<td>The original price of a collectible model airplane is $115. The discounted price is $99. What is the percent of discount to the nearest percent?</td>
</tr>
</tbody>
</table>
Taxes

Texas is one of the few states that does not impose a state income tax on residents. However, the state does collect sales and use taxes. The Texas state sales tax rate is 6.25%. Local taxing authorities can require additional tax of up to 2%, raising the total possible tax rate to 8.25%.

Use the Sales and Use Tax Chart below to solve the following problems.

<table>
<thead>
<tr>
<th>Texas City</th>
<th>Total Sales and Use Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abilene</td>
<td>8.25%</td>
</tr>
<tr>
<td>Corral City</td>
<td>8%</td>
</tr>
<tr>
<td>Sadler</td>
<td>7.25%</td>
</tr>
<tr>
<td>Ackerly</td>
<td>7.75%</td>
</tr>
<tr>
<td>San Antonio</td>
<td>8.125%</td>
</tr>
<tr>
<td>Raccoon Bend</td>
<td>6.75%</td>
</tr>
<tr>
<td>Dallas</td>
<td>8.25%</td>
</tr>
</tbody>
</table>

Source: [window.state.tx.us](http://window.state.tx.us)

1. Kendra purchases a sweater that costs $24.99 at the Corral City Mall. What is the total cost of the sweater?

2. Brandon agrees to buy a new car for $21,525. As an employee of the company that produces the car, he is entitled to an additional 15% discount. He must pay the Dallas City sales tax. What is the total amount Brandon will pay for his new car?

3. While at the Abilene Outlet Store, Barbara purchases an outfit that is regularly priced $113.49 on sale for $99.00. What is the percent of discount?

4. Sara pays a total of $32.43 for an item after a 25% discount and the Ackerly City tax were applied. What is the original amount of Sara’s purchase?

5. Davis makes a list of the cost of each item he would like to buy with his $100.00 gift card. Determine if Davis has enough money to purchase everything on his list after the Sadler City tax is applied. If not, how much more money will he need? If so, what is the gift card balance?

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost of Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD</td>
<td>$14.99</td>
</tr>
<tr>
<td>DVD</td>
<td>$19.99</td>
</tr>
<tr>
<td>Headphones</td>
<td>$59.99</td>
</tr>
</tbody>
</table>
Lesson Reading Guide

Simple Interest

Get Ready for the Lesson

Read the introduction at the top of page 379 in your textbook. Write your answers below.

1. Calculate 2.25% of $1,000 to find the amount of money that Jin can earn in one year for a CD at State Credit Union.

2. Find the amount of money that she can earn in one year at the other three banks.

Read the Lesson

3. In Example 4, why is \( t \) replaced with \( \frac{1}{12} \)?

4. Complete the following table that gives the conversion of months to years.

<table>
<thead>
<tr>
<th>Number of months</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio of number of months to 12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simplified ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remember What You Learned

5. Write the formula for simple interest and explain what each of the letters in the formula stands for.

6. Look up the word interest in a dictionary. Write the meaning that matches the way the word is used in this lesson.

7. When do you earn interest? When do you have to pay interest?
**Study Guide and Intervention**

**Simple Interest**

**Simple interest** is the amount of money paid or earned for the use of money. To find simple interest $I$, use the formula $I = prt$. Principal $p$ is the amount of money deposited or invested. Rate $r$ is the annual interest rate written as a decimal. Time $t$ is the amount of time the money is invested in years.

**Example 1**

Find the simple interest earned in a savings account where $136 is deposited for 2 years if the interest rate is 7.5% per year.

$I = prt$

$I = 136 \cdot 0.075 \cdot 2$

$I = 20.40$

The simple interest earned is $20.40.

**Example 2**

Find the simple interest for $600 invested at 8.5% for 6 months.

6 months $= \frac{6}{12}$ or 0.5 year

$I = prt$

$I = 600 \cdot 0.085 \cdot 0.5$

$I = 25.50$

The simple interest is $25.50.

**Exercises**

Find the interest earned to the nearest cent for each principal, interest rate, and time.

1. $300, 5\%, 2 \text{ years}$

2. $650, 8\%, 3 \text{ years}$

3. $575, 4.5\%, 4 \text{ years}$

4. $735, 7\%, 2\frac{1}{2} \text{ years}$

5. $1,665, 6.75\%, 3 \text{ years}$

6. $2,105, 11\%, 1\frac{3}{4} \text{ years}$

7. $903, 8.75\%, 18 \text{ months}$

8. $4,275, 19\%, 3 \text{ months}$
Skills Practice

Simple Interest

Find the interest earned to the nearest cent for each principal, interest rate, and time.

1. $500, 4%, 2 years
2. $350, 6.2%, 3 years

3. $740, 3.25%, 2 years
4. $725, 4.3%, 2 \frac{1}{2} years

5. $955, 6.75%, 3 \frac{1}{4} years
6. $1,540, 8.25%, 2 years

7. $3,500, 4.2%, 1 \frac{3}{4} years
8. $568, 16%, 8 months

Find the interest paid to the nearest cent for each loan balance, interest rate, and time.

9. $800, 9%, 4 years
10. $280, 5.5%, 4 years

11. $1,150, 7.6%, 5 years
12. $266, 5.2%, 3 years

13. $450, 22%, 1 year
14. $2,180, 7.7%, 2 \frac{1}{2} years

15. $2,650, 3.65%, 4 \frac{1}{2} years
16. $1,245, 5.4%, 6 months
Practice

Simple Interest

Find the simple interest earned to the nearest cent for each principal, interest rate, and time.

1. $750, 7%, 3 years
2. $1,200, 3.5%, 2 years
3. $450, 5%, 4 months
4. $1,000, 2%, 9 months
5. $530, 6%, 1 year
6. $600, 8%, 1 month

Find the simple interest paid to the nearest cent for each loan, interest rate, and time.

7. $668, 5%, 2 years
8. $720, 4.25%, 3 months
9. $2,500, 6.9%, 6 months
10. $500, 12%, 18 months
11. $300, 9%, 3 years
12. $2,000, 20%, 1 year

13. ELECTRONICS Rita charged $126 for a DVD player at an interest rate of 15.9%. How much will Rita have to pay after 2 months if she makes no payments?

14. VACATION The average cost for a vacation is $1,050. If a family borrows money for the vacation at an interest rate of 11.9% for 6 months, what is the total cost of the vacation including the interest on the loan?

For Exercises 15–17, use the following information.

Robin has $2,500 to invest in a CD (certificate of deposit).

15. If Robin invests the $2,500 in the CD that yields 4% interest, what will the CD be worth after 2 years?

16. Robin would like to have $3,000 altogether. If the interest rate is 5%, in how many years will she have $3,000?

17. Suppose Robin invests the $2,500 for 3 years and earns $255. What was the rate of interest?
## Word Problem Practice

### Simple Interest

1. **SAVINGS ACCOUNT** How much interest will Hannah earn in 4 years if she deposits $630 in a savings account at 6.5% simple interest?

2. **INVESTMENTS** Terry invested $2,200 in the stock market for 2 years. If the investment earned 12% simple interest, how much money did Terry earn in interest in 2 years?

3. **SAVINGS ACCOUNT** Malik deposited $1,050 in a savings account, and it earned $241.50 in simple interest after four years. Find the interest rate on Malik’s savings account.

4. **INHERITANCE** Kelli Rae’s inheritance from her great-grandmother was $220,000 after taxes. If Kelli Rae invests this money in a savings account that earns $18,260 in simple interest every year, what is the interest rate on her account?

5. **RETIREMENT** Mr. Pham has $410,000 in a retirement account that earns 3.85% simple interest each year. Find the amount earned each year by this investment.

6. **COLLEGE FUND** When Melissa was born, her parents put $8,000 into a college fund account that earned 9% simple interest. Find the total amount in the account after 18 years.

7. **LOTTERY** Raj won $900,000 in a regional lottery. After paying $350,000 in taxes, he invested the remaining money in a savings account at 4.25% simple interest. How much money is in the account if Raj makes no deposits or withdrawals for two years?

8. **SAVINGS** Mona opened a savings account with a $500 deposit and a simple interest rate of 5.6%. If there were no deposits or withdrawals, how much money is in the account after $\frac{81}{2}$ years?
Taking an Interest

When interest is paid on both the amount of the deposit and any interest already earned, interest is said to be compounded. You can use the formula below to find out how much money is in an account for which interest is compounded.

\[ A = P(1 + r)^n \]

In the formula, \( P \) represents the principal, or amount deposited, \( r \) represents the rate applied each time interest is paid, \( n \) represents the number of times interest is given, and \( A \) represents the amount in the account.

**Example**

A customer deposited $1,500 in an account that earns 8% per year. If interest is compounded and earned semiannually, how much is in the account after 1 year?

Use the formula \( A = P(1 + r)^n \).

Since interest is earned semiannually, \( r = \frac{8}{2} = 4\% \) and \( n = 2 \).

\[ A = 1,500(1 + 0.04)^2 \]

\[ = 1,500(1.04)^2 \]

\[ = 1,500(1.0816) \]

\[ = 1,622.40 \]

After 1 year, there is $1,622.40 in the account.

**Exercises**

Use the compound interest formula and a calculator to find the value of each of these investments. Round each answer to the nearest cent.

1. $2,500 invested for 1 year at 6% interest compounded semiannually

2. $3,600 invested for 2 years at 7% interest compounded semiannually

3. $1,000 invested for 5 years at 8% interest compounded annually

4. $2,000 invested for 6 years at 12% interest compounded quarterly

5. $4,800 invested for 10 years at 9% interest compounded annually

6. $10,000 invested for 15 years at 7.5% interest compounded semiannually
Student Recording Sheet

Use this recording sheet with pages 390–391 of the Student Edition.

Read each question. Then fill in the correct answer.

1. ○ ○ ○ ○
2. ○ ○ ○ ○
3. ○ ○ ○ ○
4. ○ ○ ○ ○
5. ○ ○ ○ ○
6. ○ ○ ○ ○
7. ○ ○ ○ ○

8. ○ ○ ○ ○
9. ○ ○ ○ ○
10. ○ ○ ○ ○
11. ○ ○ ○ ○
12. ○ ○ ○ ○
13. ○ ○ ○ ○

Pre-AP

Record your answers for Question 14 on the back of this paper.
Rubric for Scoring Pre-AP

(Use to score the Pre-AP question on page 391 of the Student Edition.)

General Scoring Guidelines

- If a student gives only a correct numerical answer to a problem but does not show how he or she arrived at the answer, the student will be awarded only 1 credit. All extended response questions require the student to show work.

- A fully correct answer for a multiple-part question requires correct responses for all parts of the question. For example, if a question has three parts, the correct response to one or two parts of the question that required work to be shown is not considered a fully correct response.

- Students who use trial and error to solve a problem must show their method. Merely showing that the answer checks or is correct is not considered a complete response for full credit.

Exercise 13 Rubric

<table>
<thead>
<tr>
<th>Score</th>
<th>Specific Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The percent of increase is correctly determined to be 21%. The explanation of how to determine the amount of monthly rent if the family sweeps the stairwell contains both of the following methods. (1) Find 6% of $907.50 and then subtract that amount from $907.50. (2) Find 100% – 6% or 94% of $907.60. The amount of rent if the family sweeps the stairwell is correctly determined to be $853.05.</td>
</tr>
<tr>
<td>3</td>
<td>The percent of increase and the amount of rent if the family sweeps the stairwell are correctly determined. However, the explanation is correct but not complete. OR The method for finding the percent of increase is correct and the explanation of how to determine the amount of rent if the family sweeps the stairwell is correct and complete. However, one computational error is made.</td>
</tr>
<tr>
<td>2</td>
<td>The computations are correct, but the explanation is incorrect or not given. OR The explanation is given, but the percent of increase or the amount of rent if the family sweeps the stairwell are calculated incorrectly.</td>
</tr>
<tr>
<td>1</td>
<td>The percent of increase is correctly determined, but the explanation and the amount of rent if the family sweeps the stairwell are incorrect or not given. OR The amount of rent if the family sweeps the stairwell is correct, but the percent of increase and explanation are incorrect or not given.</td>
</tr>
<tr>
<td>0</td>
<td>Response is completely incorrect.</td>
</tr>
</tbody>
</table>
1. What is 8% of 850?
2. 36.5% of 84 is what number? Round to the nearest tenth.
3. Find 0.25% of 52.
4. **TRANSPORTATION** If 75% of the 248 students in the seventh grade ride the bus to school, how many students ride the bus to school?
5. 21% of what number is 84? Round to the nearest tenth if necessary.
6. What percent of 76 is 289? Round to the nearest whole percent if necessary.
7. 66% of what number is 65? Round to the nearest tenth if necessary.

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1. Estimate 67% of 26.8 by using fractions.
2. Estimate 60% of 88 by using 10%.
3. **MULTIPLE CHOICE** Choose the best estimate for 0.9% of 32.
   A. 0.003   B. 0.03   C. 0.3   D. 30

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.
4. 45% of what number is 72?
5. What is 9% of 63?
6. 4 is what percent of 38?
7. Find 21.6% of 400.
Chapter 7 Quiz 3
(Lessons 7-5 and 7-6)

1. MULTIPLE CHOICE A survey of 508 seventh graders showed that 62% buy their lunch at school. Which is a reasonable estimate for the number of students who buy their lunch at school?
   A. 3 students
   B. 30 students
   C. 300 students
   D. 3,000 students

   1. ________________

   Find the percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

   2. original: $63; new: $57.25
   3. original: $45; new: $27
   4. original: $24; new: $36
   5. original: $45.20; new: $58.60

   2. ________________
   3. ________________
   4. ________________
   5. ________________

Chapter 7 Quiz 4
(Lessons 7-7 and 7-8)

Find the total cost or sale price to the nearest cent.

1. $19.99 belt; 25% discount

2. $4.99 game; 6% sales tax

Find the percent of discount to the nearest percent.

3. notebook: regular price, $7.99; sale price, $5.59

4. jacket: regular price, $119.99; sale price, $101.99

5. MULTIPLE-CHOICE TEST ITEM Reed invested $6,500 in a savings account that pays 7.5% simple interest. How much interest will his investment earn after 4\(\frac{1}{2}\) years.
   A. $487.50    B. $2,193.75    C. $6,987.50    D. $8,693.75

   5. ________________
Write the letter for the correct answer in the blank at the right of each question.

Find each number. Round to the nearest tenth if necessary.

1. Find 25% of 96.
   A. 2,400       C. 240
   B. 384          D. 24
   1. ____

2. 90% of what number is 63?
   F. 56.7       H. 567
   G. 70         J. 5,670
   2. ____

3. 32 is what percent of 15?
   A. 213.3%      C. 2.1%
   B. 46.9%       D. 0.5%
   3. ____

4. MUSIC Refer to the table. It shows the results of a survey in which 287 middle school students were asked to name their favorite types of music. Which is a reasonable estimate for the number of middle school students who chose country as their favorite type of music?
   F. 9       G. 19       H. 75       J. 190
   4. ____

Type of Music | Percent
---|---
rock ’n’ roll | 35%
classical/jazz | 10%
country | 26%
pop | 29%

5. Estimate 226% of 240.
   5. ______________

6. Estimate 51% of 79.
   6. ______________

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

7. What number is 85% of 29?
   7. ______________

8. 13% of what number is 2?
   8. ______________

9. 46 is what percent of 55?
   9. ______________

10. SPENDING The circle graph shows the results of a poll of 806 residents of Maytown. Is 320, 400, or 680 a reasonable estimate for the number of residents of Maytown who prefer traveling by airplane when on vacation?
   10. ______________
Write the letter of the term that best matches each statement. You may use a term more than once.

1. the percent of change when the original quantity is greater than the new quantity
   - a. percent of increase

2. a ratio that compares a change in quantity to the original amount
   - b. percent of change

3. an equation (part = percent \cdot base) in which the percent is written as a decimal
   - c. percent equation

4. the amount of money originally deposited, invested, or borrowed
   - d. sales tax

5. an amount of money charged by a government on items that people buy
   - e. simple interest

6. the amount by which the regular price of an item is reduced
   - f. percent of decrease

7. given by the formula $I = prt$
   - g. principal

8. the amount of money paid or earned on an investment or deposit for the use of the money
   - h. discount

9. the percent of change when the original quantity is less than the new quantity

10. Define percent proportion in your own words.
Write the letter for the correct answer in the blank at the right of each question.

1. What is 38% of 250?
   A. 0.152   B. 95   C. 658   D. 950
   1. __________  

2. What percent of 80 is 8?
   F. 0.1%   G. 1%   H. 10%   J. 72%
   2. __________  

3. SWIMMING Twenty-four percent of the 25 swim team members are new on the team. How many members are new?
   A. 6   B. 8   C. 10   D. 12
   3. __________  

Estimate.

4. 49% of 15\(\frac{1}{8}\)
   F. 1   G. 2   H. 4.5   J. 8
   4. __________  

5. 0.75% of 387
   A. 300   B. 40   C. 3   D. 0.4
   5. __________  

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

6. Find 74% of 58.
   F. 0.74 = n \cdot 58; 1.3   G. \(p = 0.74 \cdot 58; 42.9\)   H. 58 = n \cdot 0.74; 78.4   J. \(p = 74.58; 4,292\)
   6. __________  

7. 89% of what number is 14?
   A. 0.89 = n \cdot 14; 0.1   B. 14 = 89 \cdot w; 0.2   C. \(p = 0.89 \cdot 14; 12.5\)   D. 14 = 0.89 \cdot w; 15.7
   7. __________  

8. While shopping, Lucinda spent $48. If the amount she spent was 15% of her savings, how much savings did she have before she shopped?
   F. $40.80   G. $55.20   H. $150   J. $320
   8. __________  

9. Jaime has lunch at a restaurant and needs to determine how much tip to leave based on his bill. If his bill was $14.41 and Jaime wants to leave a 20% tip, what is a reasonable estimate for how much he should leave?
   A. $2.90   B. $2.50   C. $2.00   D. $1.44
   9. __________  

10. DISCOUNT The regular price of an aquarium is $70 and the sale price is $60. Find the percent of discount to the nearest whole percent.
    F. 20%   G. 14%   H. 11%   J. 10%
    10. __________
Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

11. original: 100; new: 150
   A. 50% decrease  B. 50% increase  C. 33% increase  D. $\frac{1}{2}$% increase  11. _____

12. original: $300; new: $200
   F. 100% decrease  G. 50% decrease  H. 33% decrease  J. 33% increase  12. _____

13. original: 30; new: 90
   A. 3% increase  B. 67% increase  C. 200% increase  D. 300% increase  13. _____

Find the total cost or sale price to the nearest cent.

14. $200 jacket; 25% discount
   F. $50  G. $150  H. $175  J. $250  14. _____

15. $10 lamp; 5% sales tax
   A. $0.50  B. $9.50  C. $10.50  D. $15.00  15. _____

16. $50 rental fee; 10% discount
   F. $5  G. $40  H. $45  J. $55  16. _____

Find the interest paid to the nearest cent for each loan balance, interest rate, and time.

17. $1,000, 5%, 2 years
   A. $10,000  B. $1,000  C. $100  D. $50  17. _____

18. $300, $6\frac{1}{2}$%, 1 year
   F. $19.50  G. $195  H. $319.50  I. $1,950  18. _____

19. $850, 4%, 6 months
   A. $2,040  B. $1,700  C. $204  D. $17  19. _____

20. INVESTMENT Chaleah deposited $900 in a new account that earns 6% simple interest. After 2 years, how much interest will she have earned?
   F. $54  G. $108  H. $540  I. $1,080  20. _____

Bonus Find the total price to the nearest cent for a $250 saddle that is on sale for 30% off with a sales tax of 6.5%.  B: _________________
Write the letter for the correct answer in the blank at the right of each question.

1. What is 64% if 25?
   A. 160       B. 16       C. 15       D. 2.6
   1. ____

2. What percent of 700 is 385?
   F. 0.55%     G. 1.82%    H. 45%     J. 55%
   2. ____

3. SOCCER Fifteen percent of the 20 players on the soccer team are new this year. How many players on the team are new this year?
   A. 3       B. 6       C. 10       D. 15
   3. ____

Estimate.

4. 37% of 293
   F. 75       G. 120     H. 125     J. 150
   4. ____

5. 0.8% of 192
   A. 2       B. 8       C. 12       D. 19
   5. ____

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

6. Find 16% of 44.
   F. \( p = 16 \cdot 44; 704 \)
   G. \( 44 = 0.16 \cdot w; 275 \)
   H. \( p = 0.16 \cdot 44; 7.0 \)
   J. \( 0.16 = n \cdot 44; 0.4 \)
   6. ____

7. 36% of what number is 27?
   A. \( 27 = 0.36 \cdot w; 75 \)
   B. \( p = 0.36 \cdot 27; 9.7 \)
   C. \( 0.36 = n \cdot 27; 1.3 \)
   D. \( 27 = 36 \cdot w; 0.8 \)
   7. ____

8. While shopping, Santiago spent $57. If the amount he spent was 30% of his savings, how much savings did he have before he shopped?
   F. $190       G. $171     H. $87      J. $39.90
   8. ____

9. Maria has lunch at a restaurant and needs to determine how much tip to leave based on her bill. If her bill was $11.81 and Maria wants to leave a 22% tip, what is a reasonable estimate for how much she should leave?
   A. $1.30       B. $2.00     C. $2.40     D. $2.80
   9. ____
Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

10. original: 200; new: 300
   F. 33% increase   G. 50% decrease   H. 50% increase   J. 100% increase

11. original: $99; new: $74
   A. 34% decrease   B. 34% increase
   C. 25% decrease   D. 25% increase
   11. ____

12. original: $49; new: $149
   F. 2% increase
   G. 67% increase   H. 100% increase
   J. 204% increase
   12. ____

Find the total cost or sale price to the nearest cent.

13. $1,725 couch; 15% discount
   A. $1,983.75   B. $1,638.75   C. $1,466.25   D. $258.75
   13. ____

14. $14.30 watch; $6\frac{3}{4}$% sales tax
   F. $0.97   G. $13.33
   H. $15.27   J. $23.95
   14. ____

15. $48 bouquet; 5.5% sales tax
   A. $2.64   B. $45.36
   C. $50.64   D. $74.40
   15. ____

Find the interest paid to the nearest cent for each loan balance, interest rate, and time.

16. $2,500, 4.5%, 2 years
   F. $225   G. $2,250
   H. $2,725
   16. ____

17. $834, 3%, 15 months
   A. $31.28
   B. $375.30
   C. $865.28
   D. $3,127.50
   17. ____

18. $1,750, 5\frac{3}{4}%, 9 months
   F. $70.09
   G. $75.47
   H. $905.63
   J. $1,825.47
   18. ____

19. DISCOUNT The regular price of a keyboard is $845 and the sale price is $695. Find the percent of discount to the nearest whole percent.
   A. 150%   B. 22%   C. 18%   D. 2%
   19. ____

20. INVESTMENT Roberto deposited $860 in a new account that earns 6\frac{1}{2}% simple interest. After 6 months, how much interest will he have earned?
   F. $279.50
   G. $55.90
   H. $27.95
   J. $2.80
   20. ____

Bonus Find the total price to the nearest cent for a $22 hat that is on sale for 15% off with a sales tax of 8%. B: _______________
Write the letter for the correct answer in the blank at the right of each question.

1. What is 75% of 56?
   A. 1.3      B. 42      C. 69      D. 75
   1. ____

2. What percent of 85 is 15.3?
   F. 0.18%     G. 5.56%    H. 18%     J. 555%
   2. ____

3. SOFTBALL Thirty-six percent of the 25 softball players have already reached their fundraising goals. How many softball players have reached their fundraising goals?
   A. 9        B. 11       C. 18       D. 21
   3. ____

Estimate.

4. 43% of 250
   F. 200     G. 150      H. 125      J. 75
   4. ____

5. 0.5% of 600
   A. 6        B. 3        C. 0.3      D. 0.6
   5. ____

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

6. Find 18% of 54.
   F. $n = 18 \cdot 54; 972$    H. $p = 0.18 \cdot 54; 9.7$
   G. $54 = 0.18 \cdot w; 300$  J. $0.18 = n \cdot 54; 0.3$
   6. ____

7. 48% of what number is 35?
   A. $35 = 0.48 \cdot w; 72.9$     C. $0.48 = n \cdot 35; 1.4$
   B. $p = 0.48 \cdot 35; 16.8$     D. $35 = 48 \cdot w; 0.7$
   7. ____

8. While shopping, Juanita spent $68. If the amount she spent was 22% of her savings, how much savings did she have before she shopped?
   F. $1,496$     G. $309.09$     H. $90$     J. $53.04$
   8. ____

9. Felipe has lunch at a restaurant and needs to determine how much tip to leave based on his bill. If his bill was $13.56 and Felipe wants to leave an 18% tip, what is a reasonable estimate for how much he should leave?
   A. $2.70$     B. $2.50$     C. $2.10$     D. $1.80$
   9. ____
Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

10. original: 50; new: 200
   F. 300% increase  G. 150% increase  H. 75% increase  J. 3% increase  10. ___

11. original: $79; new: $63
   A. 25% increase  B. 20% increase  C. 25% decrease  D. 20% decrease  11. ___

12. original: $50; new: $80
   F. 60% increase  G. 38% increase  H. 30% increase  J. 3% increase  12. ___

Find the total cost or sale price to the nearest cent.

13. $199 DVD player; 20% discount
   A. $238.80  B. $195.02  C. $159.20  D. $39.80  13. ___

14. $29.50 vase; $\frac{1}{4}$ sales tax
   F. $1.55  G. $27.95  H. $31.05  J. $31.09  14. ___

15. $62 telephone bill; 7% discount
   A. $66.34  B. $57.66  C. $43.40  D. $4.34  15. ___

Find the interest paid to the nearest cent for each loan balance, interest rate, and time.

16. $3,800, 5.5%, 3 years
   F. $627  G. $209  H. $62.70  J. $20.90  16. ___

17. $725, 4%, 18 months
   A. $43.50  B. $52.50  C. $435  D. $522  17. ___

18. $1,275, 3\frac{1}{2}%, 4 months
   F. $178.50  G. $148.75  H. $133.88  J. $14.88  18. ___

19. **DISCOUNT** The regular price of a tennis racquet is $79.99 and the sale price is $64.99. Find the percent of discount to the nearest whole percent.
   A. 23%  B. 19%  C. 18%  D. 15%  19. ___

20. **INVESTMENT** Momusa deposited $750 in a new account that earns $\frac{3}{4}$% interest. After 4 years, how much interest will he have earned?
   F. $43.13  G. $160.20  H. $172.50  J. $1,725  20. ___

**Bonus** Find the total price to the nearest cent of a $50 jacket
   is on sale for 10% off and the sales tax is $\frac{1}{2}$%.
   B: ________________
Find each number.

1. 85% of 160 is what number?
2. 18 is 36% of what number?
3. 6 is what percent of 48?
4. Estimate 25% of 803 by using fractions.
5. Estimate 60% of 29 by using 10%.
6. Estimate 509% of 11.

For Questions 7 and 8, write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

7. 19 is what percent of 53?
8. 37% of what number is 955?

9. **CONCERTS** So far, 72% of 300 tickets have been sold for the concert. How many tickets have been sold?

**ENTERTAINMENT** The table shows various prices at a movie theater. Use the table for Questions 10–12. Round to the nearest cent.

<table>
<thead>
<tr>
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10. Brianna is going to the movies and plans on getting a large popcorn and a small drink. If she must purchase an adult ticket, will $15 be enough? Explain.

11. Will $10 be enough for Julian to go to the movies and get a small drink if he purchases an adult ticket?

12. Judy, who is 12, is going to the movies and is going to take her little brother who is 5. They plan on sharing a large popcorn and drink. Will $20 be enough?
Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

13. original: 100
   new: 160

14. original: $93
   new: $70

15. original: 19.4
   new: 6.5

16. FUNDRAISING  Last week, students sold 44 magazine subscriptions. This week they sold 99. What was the percent of change?

Find the total cost or sale price to the nearest cent.

17. $39 shirt; 7.5% sales tax

18. $9.25 book; 20% discount

19. $2,000 stereo; 30% discount

20. DISCOUNT  The regular price of ice skates is $86.49 and the sale price is $64.87. Find the percent of discount to the nearest whole percent.

Find the interest earned to the nearest cent for each principal, interest rate, and time.

21. $1,500, 5.5%, 3 years

22. $350, 6%, 1 year

23. $975, $\frac{3}{4}\%$, 18 months

24. $2,000, 1.85\%, 4$ months

25. LOANS  Jeremy borrowed $1,600 to buy a computer at 8.5% interest. If he pays the loan back over 2 years, how much will he pay back including interest?

Bonus  If the principal amount of $3,575 earned $715 in 30 months, find the interest rate.
Find each number.
1. 15% of 80 is what number?
2. 35 is 35% of what number?
3. 9 is what percent of 72?
4. Estimate 80% of 49 by using fractions.
5. Estimate 20% of 142 by using 10%.

For Questions 7 and 8, write an equation for each problem. Then solve. Round to the nearest tenth if necessary.
7. 15 is what percent of 36?
8. 45% of what number is 63?

9. VOLUNTEER So far, 28% of 25 students in the class have signed up to volunteer. How many students is this?

ENTERTAINMENT The table shows various prices at a movie theater. Use the table for Questions 10–12. Round to the nearest cent.

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10. Jordan is going to the movies and plans on getting a large popcorn and a small drink. If she must purchase an adult ticket, will $15 be enough? Explain.

11. Will $12 be enough for Greg to go to the movies and get a small drink if he purchases an adult ticket?

12. Suzanne, who is 13, is going to the movies and is going to take her little sister who is 9. They plan on sharing a large popcorn and drink. Will $22 be enough?

Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.
13. original: $100
    new: $50

14. original: 30
    new: 45

15. original: 50
    new: 25
14. original: $110
    new: $85

15. original: 15
    new: 26.4

16. STOCKS Five years ago one share of a stock was
    worth $16.00. Today one share of the stock is
    worth $96.00. What was the percent of change?

Find the total cost or sale price to the nearest cent.

17. $27 amusement park ticket; 10% discount

18. $1,700 lawn tractor; $7\frac{1}{4}\%$ sales tax

19. $73.25 skateboard; 5% sales tax

20. DISCOUNT The regular price of a golf club is $57.50 and
    the sale price is $46.00. Find the percent of discount to the
    nearest whole percent.

Find the interest earned to the nearest cent for each
principal, interest rate, and time.

21. $2,500, 4.5%, 2 years

22. $58.50, 6%, 1 year

23. $700, 3.85%, 3 months

24. $1,225, 9%, 21 months

25. LOANS Maxwell borrows $1,000 to repair his car at 9% interest. If he pays the loan back over 1\frac{1}{2} years, how much does he pay back including interest?

Bonus If the principal amount of $2,650 earned $331.25 in 30 months, find the interest rate.

B: ______________
Find each number.

1. 18% of 7 is what number?  
   
2. 39 is 0.6% of what number?  
   
3. 4 is what percent of 64?  
   
4. Estimate 76% of 160 by using fractions.  
   
5. Estimate 28% of 131 by using 10%.  
   

For Questions 7 and 8, write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

7. 12 is what percent of 48?  
   
8. 70% of what number is 42?  

9. LIGHTS The maintenance person had to change 44% of the 75 light bulbs. How many light bulbs were changed?

ENTERTAINMENT The table shows various prices at a movie theater. Use the table for Questions 10–12. Round to the nearest cent.

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</table>

10. Jeff and Michael are going to the movies and plan on getting a small popcorn and a small drink each. If they must both purchase an adult ticket, will $25 be enough? Explain.

11. Will $11 be enough for Sheila to go to the movies and get a small drink if she purchases an adult ticket?

12. Emily, who is 14, is going to the movies and is going to take her cousin who is 9. They plan on sharing a small popcorn and large drink. Will $22 be enough?
Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

13. original: $180  
new: $41

14. original: $25  
new: $34.50

15. original: 7  
new: 3

16. STOCKS Five years ago, one share of a stock was worth $31.00. Today, one share of the stock is worth $81.00. What was the percent of change?

Find the total cost or sale price to the nearest cent.

17. $13.99 map; \(\frac{7}{2}\)% sales tax

18. $27.50 shorts; 15% discount

19. $49 theater tickets; 6% sales tax

20. DISCOUNT If the regular price of a pair of sunglasses is $39.99 and the sale price is $27.49, find the percent of discount to the nearest whole percent.

Find the interest earned to the nearest cent for each principal, interest rate, and time.

21. $2,325, 4%, 3 years

22. $930, 3\(\frac{1}{2}\)%, 2 years

23. $75.99, 5\(\frac{3}{4}\)%, 45 months

24. $1,020, 2.85%, 8 months

25. LOANS June needs to borrow $5,000 for a new roof. If she borrows the money at an 11\(\frac{3}{4}\)% interest rate and pays back the loan over 2\(\frac{1}{2}\) years, how much will she pay back including interest?

Bonus INVESTING Byron has $4,000 to invest. If he wants to have a total of $5,350, how many years should it be invested at 4\(\frac{1}{2}\)%?
Demonstrate your knowledge by giving a clear, concise solution to each problem. Be sure to include all relevant drawings and justify your answers. You may show your solutions in more than one way or investigate beyond the requirements of the problem. If necessary, record your answer on another piece of paper.

Most teens start their school shopping long before classes start as shown on the graph.

1. Write an equation to find the number of 2000 teens who said they shop in July. Solve. Show your work.

2. a. Find the rate of discount for a pair of pants that cost $65 and are on sale for $41.99. Explain each step.

   b. How would you find the sale price of an item if it originally costs $16.95, is on sale for 22% off, and the sales tax is 6.5%? Explain each step.

3. a. Find the interest on $1,200 at 8% for 6 months. Explain each step.

   b. Find the interest on $900 at 6% for 4 years if the interest is added to the principal at the end of each year. Show your work.
1. Find \(-30 - (-5)\). (Lesson 2-5)
   A \(-35\)  B \(-25\)  C \(25\)  D \(35\)
   1. © © © ©

2. Solve \(6p - 9 = 3\). (Lesson 3-5)
   F \(-1\)  G \(2\)  H \(6\)  J \(9.5\)
   2. © © © ©

3. Which expression represents the prime factorization of 225?
   (Lesson 4-1)
   A \(3^2 \times 5\)  B \(3 \times 75\)  C \(3^2 \times 5^2\)  D \(9 \times 5^2\)
   3. © © © ©

4. Find the GCF of 2, 4, and 8. (Lesson 4-2)
   F 2  G 8  H 32  J 64
   4. © © © ©

5. Find \(3\frac{3}{7} \div \frac{1}{2}\). Write in simplest form. (Lesson 5-6)
   A \(6\frac{6}{7}\)  B \(3\frac{6}{7}\)  C \(3\frac{3}{14}\)  D \(1\frac{5}{7}\)
   5. © © © ©

6. SALES At a clearance sale, 15 scooters were sold and 36 bicycles were sold. Write the ratio scooters sold:bicycles sold as a fraction in simplest form. (Lesson 6-1)
   F \(\frac{5}{12}\)  G \(\frac{10}{24}\)  H \(\frac{5}{3}\)  J \(\frac{12}{5}\)
   6. © © © ©

7. Which of the following has the lowest unit price? (Lesson 6-2)
   A 1.5 L: \$1.29  C 3 L: \$4.79
   B 4 L: \$3.96  D 9 L: \$8.19
   7. © © © ©

8. MEASUREMENT How many quarts of fruit juice is 25 pints?
   (Lesson 6-3)
   F \(6\frac{1}{4}\)  G \(12\frac{1}{2}\)  H 50  J 100
   8. © © © ©

9. TRAVEL Manuel drove 145 miles in 2.5 hours. At that rate, how long will it take him to drive the final 29 miles of his trip? (Lesson 6-5)
   A 0.5 h  B 1 h  C 1.5 h  D 1.7 h
   9. © © © ©

10. Choose the distance between Buffalo and Syracuse if they are 2.2 inches apart on a map and the scale is 1 inch:70 miles. (Lesson 6-7)
    F 0.03 mi  G 31.8 mi  H 142 mi  J 154 mi
    10. © © © ©

11. Write 850% as a mixed number. (Lesson 6-7)
    A \(8\frac{1}{5}\)  B \(8\frac{1}{2}\)  C \(85\frac{1}{2}\)  D \(850\frac{1}{100}\)
    11. © © © ©
12. **TELEMARKETING** A telemarketing company makes an average of 200 calls each night. Each operator working for the company makes about 15% of the total number of calls. How many calls will an operator make in one night? (Lesson 7-1)

- **F** 300
- **G** 30

13. 84 is 16% of what number? (Lesson 7-2)

- **A** 1,344
- **B** 525

14. Estimate 15% of 39. (Lesson 7-3)

- **F** 6
- **G** 60

15. 18 is what percent of 50? (Lesson 7-5)

- **A** 0.36%
- **B** 3.6%

16. Find the percent of change from 10 to 14. Round to the nearest whole percent. (Lesson 7-6)

- **F** 1%
- **G** 29%

17. Find the total price to the nearest cent of a notebook that costs $10 with a sales tax of 5%. (Lesson 7-7)

- **A** $0.50
- **B** $9.50

18. Find the interest earned for a principal of $560 at a $12\frac{3}{4}\%$ interest rate and a time period of 3 years. (Lesson 7-8)

- **F** $17.85
- **G** $21.42

19. Find the unit rate for 560 miles on 20 gallons. (Lesson 6-2)

- **A** 28
- **B** 540

20. 35.5% of 70 is what number? (Lesson 7-1)

- **F** 2,485
- **G** 105.5
21. Solve $7t - 13 = 22$ (Lesson 3-5)

22. Write $\frac{24}{84}$ in simplest form. (Lesson 4-4)

23. **DINING** A family of four went out to eat at a restaurant. Their total bill was $46 plus 15\%$ of the bill as a tip. How much did the family spend on the tip, in dollars? (Lesson 7-2)

24. Estimate 88\% of 405. (Lesson 7-3)

25. What percent of 88 is 22? (Lesson 7-5)

26. Santos spent $42 on a video game. If the amount he spent was 23\% of his savings, how much savings did he have before he bought the video game? (Lesson 7-5)

27. Find the percent of change from 15 to 75. Round to the nearest whole percent. State whether the percent of change is an **increase** or **decrease**. (Lesson 7-6)

28. **SALE** Find the percent of discount if a helmet that originally cost $79 goes on sale for $59. Round to the nearest percent. (Lesson 7-7)

29. **CREDIT** What is simple the interest earned to the nearest cent for a principal of $1,900 if the interest rate is 13.25\% and the money earns interest for 30 months? (Lesson 7-8)

30. **INVESTMENTS** Isabel has $2,000 to invest (Lesson 7-8)
   
   a. If she invests in a CD for 2 years and earns 5\% interest how much will she have after 2 years?

   b. Isabel also has the option to invest in a CD that earns 4.25\% interest over 6 years. Comparing this CD to the CD in part a, which CD earns her more money? Explain.

   c. Isabel wants to have $2,600 altogether. How can you, determine the number of years she must invest her money if the money earns 6\% interest? Solve the problem.
WEIGHTS Terrell’s birth weight was 7 pounds 4 ounces, and his sister Aisha’s birth weight was 8 pounds 2 ounces. Write a ratio in simplest form that compares Terrell’s and Aisha’s weights.

On a map, the scale is 1 inch:150 miles. What is the actual distance if the map distance is \(3\frac{1}{2}\) inches?

Find each unit rate.
3. 240 miles in 5 hours
4. $13.50 for 6 pounds

Solve each proportion.
5. \(\frac{9}{2} = \frac{18}{w}\)
6. \(\frac{y}{9} = \frac{3}{2}\)

Write 6.25% as a fraction in simplest form.

Write each decimal as a percent.
8. 9.7
9. 0.007

What is 125% of 250?

Estimate 26% of 199.

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.
12. 58 is what percent of 30?
13. What number is 19% of 216?

Find each number. Round to the nearest tenth if necessary.
14. Find 86% of 40.
15. 5 is what percent of 72?
16. 9 is 20% of what number?

SHOPPING Find the percent of change if a drill that originally costs $45 is sold for $25. Round to the nearest whole percent and state whether the percent of change is an increase or decrease.

DISCOUNT Find the total price to the nearest cent if a $299 DVD player is on sale for 18% off with a sales tax of 7.8%.

Find the simple interest earned on a principal amount of $2,200 at an interest rate of 6.75% over a period of 2 years.
For Questions 20 and 21, find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

20. original: 14
   new: 24

21. original: $15.50
   new: $10.95

22. Lisa Cantini bought a suit for $159. She used her credit card, which charges 21% annual interest from the moment of purchase. If she does not make any payment or additional charges, how much would she owe at the end of the first month?

Complete.

23. 14 ft = ____ yd

24. $2\frac{3}{4}$ lb = ____ oz

25. 25 qt = ____ gal

26. Write 32.5% as a fraction in simplest form.

27. Write $\frac{1}{6}$ as a percent. Round to the nearest hundredth if necessary.

28. A person bikes 30 miles in $2\frac{1}{2}$ hours. What is the unit rate?

29. 9.6% of 500 is what number?

30. What percent of 12 is 18?

31. Estimate 24% of 406.

32. Find 68% of 40.

33. Alisa and her mom have dinner at a restaurant and need to determine how much tip to leave based on their bill. If their bill was $36.81 and they want to leave a 20% tip, what is a reasonable estimate for how much they should leave?
Anticipation Guide
Applying Percent

**Step 1** Before you begin Chapter 7

- Read each statement.
- Decide whether you Agree (A) or Disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (Not Sure).

<table>
<thead>
<tr>
<th>STEP 1</th>
<th>Statement</th>
<th>STEP 2 A or D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, D, or NS</td>
<td>1. 65% of 123 can be found by multiplying 0.65 times 123.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>2. The proportion ( \frac{14}{22} = \frac{p}{100} ) could be used to find what percent of 22 is 17.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>3. A good estimate of 83% of 200 is 16.</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>4. Estimating is a good way to check the reasonableness of an answer to a problem.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>5. It is always easier to write the percent as a decimal rather than a fraction when solving a percent equation.</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>6. A 200% increase would mean the original amount doubled.</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>7. To find the total cost of an item including a ( \frac{3}{4} ) sales tax, multiply the price by 0.065 and add that amount to the price.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>8. A ( \frac{3}{4} ) sales tax is a percent of decrease.</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>9. The formula for calculating interest, ( I = prt ), can be used to find the amount of interest earned on an account or the amount of interest owed on money that is borrowed.</td>
<td>A</td>
</tr>
</tbody>
</table>

**Step 2** After you complete Chapter 7

- Reread each statement and complete the last column by entering an A or a D.
- Did any of your opinions about the statements change from the first column?
- For those statements that you mark with a D, use a piece of paper to write an example of why you disagree.

Lesson Reading Guide
Percent of a Number

Get Ready for the Lesson
Read the introduction at the top of page 344 in your textbook.
Write your answers below.

1. Sketch the model and label using decimals instead of percents.

2. Sketch the model using fractions instead of percents.

3. Use these models to write two multiplication sentences that are equivalent to 60% of 2,000 = 1,200.

   \[ 0.6 \times 2,000 = 1,200 \]

   \[ \frac{3}{5} \times 2,000 = 1,200 \]

Read the Lesson
4. What are two methods for finding the percent of a number?
   **Use a proportion or use multiplication.**

5. When writing a percent as a fraction to solve a percent problem, what is helpful to do to the percent before solving the problem?
   **It is helpful to reduce the fraction to lowest terms.**

6. What is unusual about the answer to a percent problem where the percent taken is larger than 100?
   **The answer is larger than the original number.**

Remember What You Learned
7. Suppose one of your friends said to you, “I want to pay for lunch and I know I’m supposed to leave a 15% tip, but I don’t know how to figure out how much to leave.” Write in your words what you would say to your friend to explain how to figure out the tip. **Sample answer: Change 15% to a decimal: 0.15. Now, multiply 0.15 by the cost of lunch. The result is how much should be left for the tip.**
Lesson 7–1

Find each number.

1. Find 80% of 80. 64
2. What is 95% of 600? 570
3. 35% of 20 is what number? 7
4. Find 60% of $150. $90
5. What is 75% of 240? 180
6. 380% of 30 is what number? 114
7. Find 40% of 80. 32
8. What is 30% of $320? $96
9. 12% of 150 is what number? 18
10. Find 58% of 200. 116
11. What is 18% of $450? $81
12. What is 70% of 1,760? 1,232
13. Find 92% of 120. 110.4
14. 45% of 156 is what number? 70.2
15. What is 12% of 12? 1.44
16. Find 60% of 284. 158.4
17. 37.5% of 16 is what number? 6
18. What is 82.5% of 400? 330
19. What is 0.25% of 900? 2.25
20. Find 1.5% of 220. 3.3

Worked examples:

Example 1 Find 25% of 80.

\[
\text{25% of 80} = \frac{25}{100} \times 80 = \frac{1}{4} \times 80 = 20.
\]

Example 2 What number is 15% of 200?

\[
\text{15% of 200} = \frac{15}{100} \times 200 = 0.15 \times 200 = 30.
\]

Exercises:

Find each number.

1. Find 20% of 50. 10
2. What is 55% of $400? $220
3. 5% of 1,500 is what number? 75
4. Find 190% of 20. 38
5. What is 24% of $500? $120
6. 8% of $300 is how much? $24
7. What is 12.5% of 60? 7.5
8. Find 0.2% of 40. 0.08
9. Find 3% of $800. $24
10. What is 0.5% of 180? 0.9
11. 0.25% of 42 is what number? 0.105
12. What is 0.02% of 280? 0.056

NAME ___________________________ DATE ______________ PERIOD _____

Chapter 7

Glencoe California Mathematics, Grade 6
Lesson 7–1

Chapter 7

13

Glencoe California Mathematics, Grade 6

Lesson 7–1

SPORTS For Exercises 1 and 2, use the graph below. It shows the results of a poll of 440 ninth grade students. Round answers to the nearest whole number.

Favorite Sports of Students

<table>
<thead>
<tr>
<th>Sport</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basketball</td>
<td>35.2%</td>
</tr>
<tr>
<td>Hockey</td>
<td>23.4%</td>
</tr>
<tr>
<td>Soccer</td>
<td>11.8%</td>
</tr>
<tr>
<td>Football</td>
<td>8.9%</td>
</tr>
<tr>
<td>Volleyball</td>
<td>7.4%</td>
</tr>
<tr>
<td>Baseball</td>
<td>7.4%</td>
</tr>
<tr>
<td>Other</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

For Exercises 3 and 4, use the table below. It shows the pet ownership in Los Angeles, California. Assume that the same percents apply to a town of 1,650 households. Round answers to the nearest whole number.

<table>
<thead>
<tr>
<th>Pets in Household</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>at least one dog</td>
<td>26.7%</td>
</tr>
<tr>
<td>at least one cat</td>
<td>19.9%</td>
</tr>
<tr>
<td>at least one dog and one cat</td>
<td>6.19%</td>
</tr>
</tbody>
</table>

1. Write the percent as a fraction to find how many students surveyed chose hockey as their favorite sport. Solve.
   103 students

2. How many students surveyed chose basketball as their favorite sport?
   155 students

3. Write the percent as a decimal to find how many households have at least one dog. Solve.
   328 households

4. How many households have at least one dog or cat?
   441 households

5. VOTING Going into a recent election, only about 62% of people old enough to vote were registered. In a community of about 55,200 eligible voters, how many people are registered?
   34,224 people

6. COLLEGE A local college recently reported that enrollment increased to 108% percent of last year. If enrollment last year was at 17,113, about how many students enrolled this year?
   Round to the nearest whole number.
   18,482 students

Find each number. Round to the nearest hundredth if necessary.

1. 55% of 140 77
2. 40% of 123 49.2
3. 37% of $150 55.50
4. 25% of 96 24
5. 11% of $333 36.63
6. 99% of 14 13.86
7. 140% of 30 42
8. 165% of 30 61.5
9. 150% of 150 225
10. 225% of 30 66.5
11. 106% of $40 42.40
12. 126% of 350 441
13. 4.1% of 30 1.23
14. 8.9% of 75 6.68
15. 24.2% of $120 29.04
16. 97.5% of 80 78
17. SALES Mr. Redding sells vehicles to 20% of the people that come to the sales lot. If 165 people came to the lot last month, how many vehicles did he sell? 33 vehicles

Find each number. Round to the hundredth if necessary.

18. \( \frac{5}{6} \) of 600 500
19. 30.3% of 3 0.91
20. 1,000% of 87 870
21. 100% of 56 56
22. 0.25% of 150 0.38
23. 0.7% of 50 0.35

ANALYZE TABLES For Exercises 24–26, use the table that shows the percents of blood types of 145 donors during a recent blood drive.

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>45%</td>
</tr>
<tr>
<td>A</td>
<td>40%</td>
</tr>
<tr>
<td>B</td>
<td>11%</td>
</tr>
<tr>
<td>AB</td>
<td>4%</td>
</tr>
</tbody>
</table>

24. Write a proportion that can be used to find how many donors had type B blood. Then solve. Round to the nearest whole if necessary. \( \frac{n}{145} = \frac{11}{100} \); 16 donors

25. How many donors did not have type O blood? Round to the nearest whole if necessary. 80 donors

26. Which blood type had less than 10 donors? Type AB
Example 1

What is 60% of 315?

60% of 315 means \(\frac{60}{100}\times315\).

Enter:

\[
\begin{align*}
60 & \text{[\%]} \quad 315 \\
\end{align*}
\]

So, 60% of 315 is 189.

Example 2

Shelly wants to buy a GameStation. A new GameStation is on sale for 35% of the original cost. If the original cost is $205, how much will she be saving?

To determine how much she will be saving, multiply 35% times 205.

Enter:

\[
\begin{align*}
35 & \text{[\%]} \quad 205 \\
\end{align*}
\]

So, she will be saving $71.75.

Solve each problem.

1. 23% of 150 is what number? 34.5
2. 32% of 175 is what number? 56
3. Find 66% of 220. 145.2
4. Find 31% of 25. 7.75
5. What is 15% of 31? 4.65
6. What is 21% of 65? 13.65
7. Find 21% of 120. 25.2
8. Find 16% of 118. 18.88
9. 7% of 18 is what number? 1.26
10. 8% of 20 is what number? 1.6
11. What is 25% of 110? 27.5
12. What is 30% of 50? 15
13. What is 16% of 75? 12
14. What is 22% of 75? 16.5
15. 90% of 150 is what number? 135
16. 70% of 50 is what number? 35
17. Find 11% of 27. 2.97
18. Find 62% of 130. 80.6
19. What is 20% of 70? 14
20. What is 80% of 25? 20

Model Behavior

When a block is painted and then separated into small cubes, some of the faces of the cubes will have paint on them and some will not.

For each set of blocks determine the percent of cubes that are painted on the given number of faces.

1. 0 faces 0
2. 1 face 0
3. 2 faces 64
4. 3 faces 32
5. 4 faces 4
6. 5 faces 0
7. 6 faces 0
8. 0 faces 0
9. 1 face 0
10. 2 faces 0
11. 3 faces 0
12. 4 faces 90
13. 5 faces 10
14. 6 faces 0
15. 0 faces 0
16. 1 face 0
17. 2 faces 0
18. 3 faces 0
19. 4 faces 100
20. 5 faces 0
21. 6 faces 0

Scientific Calculator Activity

Percent of a Number

A scientific calculator can be used to find the percent of a number. On the TI-34 II, the user needs to press the [%] key. To use this key, press \(\frac{2nd}{\%}\).

Example 1

What is 60% of 315?

60% of 315 means \(\frac{60}{100}\times315\).

Enter:

\[
\begin{align*}
60 & \text{[2nd][\%]} \quad 315 \\
\text{So, 60% of 315 is 189.} \\
\end{align*}
\]

Example 2

Shelly wants to buy a GameStation. A new GameStation is on sale for 35% of the original cost. If the original cost is $205, how much will she be saving?

To determine how much she will be saving, multiply 35% times 205.

Enter:

\[
\begin{align*}
35 & \text{[2nd][\%]} \quad 205 \\
\text{So, she will be saving$71.75.} \\
\end{align*}
\]
Lesson 7-2

Get Ready for the Lesson
Read the introduction at the top of page 350 in your textbook. Write your answers below:

1. Write the ratio of engine weight to total weight as a fraction. 19,700
   178,000
2. Use a calculator to write the fraction as a decimal to the nearest
   hundredth. 0.11
3. About what percent of the space shuttle's weight is the engine? 11%

Read the Lesson
4. What is a percent proportion? A proportion that compares part of
   a quantity to a whole quantity using a percent
5. Describe how the percent proportion is set up. The part of the
   quantity is compared to the whole quantity as one ratio and the second
   ratio is the equivalent percent written over 100.
6. Select the information that can be found by solving each percent problem.
   a. Find the whole.
   b. Find the part.
   c. What number is 30% of 15?

Remember What You Learned
7. Write an example of each type of percent problem in the table below. Be
   sure the examples are different from the ones given in the lesson and on
   this page. Write the example in words and set up the correct proportion
   for each example. Sample answer:

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find the Percent</td>
<td>What percent of 12 is 6?</td>
<td>( \frac{6}{12} = \frac{p}{100} )</td>
</tr>
<tr>
<td>Find the Part</td>
<td>What number is 45% of 60?</td>
<td>( \frac{a}{60} = \frac{45}{100} )</td>
</tr>
<tr>
<td>Find the Whole</td>
<td>80 is 60% of what number?</td>
<td>( \frac{80}{b} = \frac{60}{100} )</td>
</tr>
</tbody>
</table>

Example 1
What percent of 24 is 18?

Let \( \% \) represent the percent.

\[ \frac{18}{24} = \frac{\%}{100} \]

Write the proportion.

\[ 18 \times 100 = 24 \times \% \]

Find the cross products.

\[ 1,800 = 24\% \]

Simplify.

\[ 75 = \% \]

So, 18 is 75% of 24.

Example 2
What number is 60% of 150?

Let \( \% \) represent the part.

\[ \frac{a}{150} = \frac{60}{100} \]

Write the proportion.

\[ a \times 100 = 150 \times 60 \]

Find the cross products.

\[ 100a = 9,000 \]

Simplify.

\[ a = 90 \]

Divide each side by 24.

So, 90 is 60% of 150.

Exercises
Find each number. Round to the nearest tenth if necessary.

1. What number is 25% of 20? 5
2. What percent of 50 is 20? 40%
3. 30 is 75% of what number? 40
4. 40% of what number is 36? 90
5. What number is 20% of 625? 125
6. 12 is what percent of 30? 40%

Answers (Lesson 7-2)
Find each number. Round to the nearest tenth if necessary.

1. What percent of 65 is 13? 20%
2. What percent of 20 is 4? 20%
3. What number is 70% of 250? 175
4. 10 is 5% of what number? 200
5. What number is 45% of 180? 81
6. 40% of what number is 82? 205
7. What percent of 90 is 36? 40%
8. 60 is 25% of what number? 240
9. What number is 32% of 1,000? 320
10. What percent of 125 is 5? 4%
11. 73 is 20% of what number? 365
12. 57% of 109 is what number? 62.1
13. What percent of 185 is 35? 18.9%
14. 25 is what percent of 365? 6.8%
15. 85% of 190 is what number? 161.5
16. 12.5 is 25% of what number? 50
17. What percent of 128 is 24? 18.8%
18. 5.25% of 170 is what number? 8.9
19. What is 82% of 230? 188.6
20. What percent of 49 is 7? 14.3%

11. What number is 3% of 100? 3
12. What number is 45% of 180? 81
13. What number is 40% of what number? 205
14. What percent of 90 is 36? 40%
15. What number is 32% of 1,000? 320
16. What percent of 200 is 0.5? 0.25% 
17. What number is 0.4% of 20? 0.08
18. What number is 6.1% of 60? 3.66
19. What percent of 34 is 34? 100%
20. What percent of 125 is 13? 10.4%

16. ALLOWANCE Monica has $3 in her wallet. If this is 10% of her monthly allowance, what is her monthly allowance? $30
17. WEDDING Of the 125 guests invited to a wedding, 104 attended the wedding. What percent of the invited guests attended the wedding? 83.2%
18. CAMERA The memory card on a digital camera can hold about 430 pictures. Melcher used 18% of the memory card while taking pictures at a family reunion. About how many pictures did Melcher take at the family reunion? Round to the nearest whole number. 77 pictures

OCEANS For Exercises 19 and 20, use the table shown.

<table>
<thead>
<tr>
<th>Ocean</th>
<th>Area (square miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific</td>
<td>64 million</td>
</tr>
<tr>
<td>Atlantic</td>
<td>32 million</td>
</tr>
<tr>
<td>Indian</td>
<td>25 million</td>
</tr>
</tbody>
</table>

Source: worldatlas.com

19. The area of the Indian Ocean is what percent of the area of the Pacific Ocean? Round to the nearest whole percent. 99%
20. If the area of the Arctic Ocean is 18% of the area of the Atlantic Ocean, what is the area of the Arctic Ocean? Round to the nearest whole million. 5 million square miles
Lesson 7–2
Chapter 7
21
Glencoe California Mathematics, Grade 6

To shade 25% of the figure below, ask yourself how many of the eight squares need to be shaded. Then use the percent proportion to find the answer.

\[
\frac{x}{8} = \frac{25}{100} \quad \frac{100x}{8} = 25\quad \frac{100x}{100} = 25 \\
x = 2
\]

If you shade two squares, you have shaded 25% of the figure.

Shade the indicated percent of each diagram.

1. Shade 40%.
2. Shade 37.5%.
3. Shade \(\frac{16}{2}\)%.

Shade the indicated percent of each diagram. You will need to divide the squares in each diagram into smaller squares.

4. Shade 30%.
5. Shade 62.5%.
6. Shade 27.5%.
7. Shade 28.125%.

DRIVING: David installed a device on his car that guaranteed to increase his gas mileage by 15%. He currently gets 22 miles per gallon. How much will the gas mileage increase after installing the device? 3.3 mi per gal

POPULATION: The number of students at Marita’s school decreased to 98% of last year’s number. Currently, there are 1,170 students. How many students were there last year? Round to the nearest whole number. 1,194 students

VOTING: Yolanda’s club has 35 members. Its rules require that 60% of them must be present for any vote. At least how many members must be present to have a vote? 21 members

GARbage: This month, Chun’s office produced 690 pounds of garbage. Chun wants to reduce the weight of garbage produced to 85% of the weight produced this month. What is the target weight for the garbage produced next month? 586.5 lb

SALARIES: Alma just received a 6% raise in salary. Before the raise, she was making $52,000 per year. How much more will Alma earn next year? $3,120

SPORTS: Sally’s soccer team played 25 games and won 17 of them. What percent did the team win? 68%

Made in the Shade

To shade 25% of the figure below, ask yourself how many of the eight squares need to be shaded. Then use the percent proportion to find the answer.

\[
\frac{x}{8} = \frac{25}{100} \quad \frac{100x}{8} = 25\quad \frac{100x}{100} = 25 \\
x = 2
\]

If you shade two squares, you have shaded 25% of the figure.

Shade the indicated percent of each diagram.

1. Shade 40%.
2. Shade 37.5%.
3. Shade \(\frac{16}{2}\)%.

Shade the indicated percent of each diagram. You will need to divide the squares in each diagram into smaller squares.

4. Shade 30%.
5. Shade 62.5%.
6. Shade 27.5%.
7. Shade 28.125%.

NAME ________________________________________ DATE ______________ PERIOD _____
Lesson 7–3
Chapter 7

Get Ready for the Lesson
Read the introduction at the top of page 355 in your textbook. Write your answers below.

1. What fraction of people surveyed chose Labor Day as their favorite grilling day? How many of the 80 people surveyed is this?
   \[ \frac{1}{2} \text{ or } 40 \text{ people} \]

2. Explain how you could use a fraction to estimate the number of people who chose the Fourth of July as their favorite grilling day. Then estimate.
   Sample answer: Find \( \frac{1}{2} \) of 80; about 40 people

3. Use a fraction to estimate the number of people surveyed who chose Memorial Day as their favorite grilling day.
   Sample answer: \( \frac{1}{5} \) of 80, or about 16 people

Read the Lesson

4. In Example 1, what does the \( \approx \) sign mean in the sentence 53% of 159 \( \approx 80 \)? Why is it necessary to use this sign? Sample answer: The \( \approx \) sign means approximately equal to; this sign is necessary because 48% is not equal to \( \frac{1}{2} \), and rounding has been done to 50%, so the answer is an estimate.

5. Describe Method 2 of Example 2 on page 356 in your textbook. Method 2 says to first find 10% of $300 which is $30 and then multiply $30 x 8 = $240 to find the estimate of 80% of $295.

6. In Example 5, what is an easy way to find 0.5% of a number? Multiply by 1% and then divide the result by 2.

Remember What You Learned

7. Write fraction equivalents in simplest form for the following percents. Then work with a partner. Take turns asking each other fraction equivalents for any of the percents in the table, or think of others to quiz each other.

<table>
<thead>
<tr>
<th>Percent</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>( \frac{1}{5} )</td>
</tr>
<tr>
<td>40%</td>
<td>( \frac{2}{5} )</td>
</tr>
<tr>
<td>60%</td>
<td>( \frac{3}{5} )</td>
</tr>
<tr>
<td>80%</td>
<td>( \frac{4}{5} )</td>
</tr>
<tr>
<td>25%</td>
<td>( \frac{1}{4} )</td>
</tr>
<tr>
<td>50%</td>
<td>( \frac{1}{2} )</td>
</tr>
<tr>
<td>75%</td>
<td>( \frac{3}{4} )</td>
</tr>
<tr>
<td>100%</td>
<td>1</td>
</tr>
</tbody>
</table>
Estimate by using fractions. 1–6. Sample answers are given.

1. \( \frac{1}{2} \cdot 128 = 64 \)
2. \( \frac{3}{4} \cdot 200 = 150 \)
3. 32.9% of 90
   \( \frac{1}{3} \cdot 90 = 30 \)
4. 23% of 8
   \( \frac{1}{4} \cdot 8 = 2 \)
5. 19% of 45
   \( \frac{1}{5} \cdot 45 = 9 \)
6. 81% of 16
   \( 4 \cdot 16 = 12 \)

Estimate by using 10%. 7–12. Sample answers are given.

7. 12% of 98
   \( 0.1 \cdot 100 = 10 \)
8. 89% of 300
   \( 0.1 \cdot 300 = 30 \) and \( 9 \cdot 30 = 270 \)
9. 31% of 80
   \( 0.1 \cdot 80 = 8 \) and \( 3 \cdot 8 = 24 \)
10. 28% of 49
    \( 0.1 \cdot 50 = 5 \) and \( 3 \cdot 5 = 15 \)
11. 62% of 13
    \( 0.1 \cdot 10 = 1 \) and \( 6 \cdot 1 = 6 \)
12. 77% of 28
    \( 0.1 \cdot 30 = 3 \) and \( 8 \cdot 3 = 24 \)

Estimate. 13–20. Sample answers are given.

13. 308% of 500
    \( 3 \cdot 500 = 1,500 \)
14. 0.5% of 87
    \( 0.01 \cdot 90 = 0.9 \) and \( \frac{1}{2} \cdot 0.9 = 0.45 \)
15. 153% of 20
    \( (1 \cdot 20) + \left( \frac{1}{2} \cdot 20 \right) = 30 \)
16. 0.6% of 41
    \( 0.01 \cdot 40 = 0.4 \) and \( \frac{1}{2} \cdot 0.4 = 0.2 \)
17. 231% of 54
    \( (2 \cdot 54) + \left( \frac{1}{3} \cdot 54 \right) = 126 \)
18. 0.9% of 116
    \( 0.01 \cdot 116 = 1.16 \)
19. 0.26% of 36
    \( 0.01 \cdot 36 = 0.36 \) and \( \frac{1}{4} \cdot 0.36 = 0.09 \)
20. 425% of 119
    \( (4 \cdot 120) + \left( \frac{1}{4} \cdot 120 \right) = 510 \)

Chapter 7 24
Glencoe California Mathematics, Grade 6
Chapter 7
7-3

Practice

Percent and Estimation

Estimate. 1–24. Sample answers are given.
1. 39% of 80

\[ \frac{39}{100} \times 80 = 32 \]

2. 31% of 40

\[ \frac{31}{100} \times 40 = 12.4 \]

3. 28% of 110

\[ \frac{28}{100} \times 110 = 30.8 \]

4. 74% of 160

\[ \frac{74}{100} \times 160 = 122.4 \]

5. 87% of 19

\[ \frac{87}{100} \times 19 = 16.53 \]

6. 91% of 82

\[ \frac{91}{100} \times 82 = 74.92 \]

7. 34% of 59

\[ \frac{34}{100} \times 59 = 19.96 \]

8. 66% of 148

\[ \frac{66}{100} \times 148 = 97.68 \]

9. 9% of 71

\[ \frac{9}{100} \times 71 = 6.39 \]

10. 73% of 241

\[ \frac{73}{100} \times 241 = 177.33 \]

11. 23% of 145

\[ \frac{23}{100} \times 145 = 33.35 \]

12. 22% of 60

\[ \frac{22}{100} \times 60 = 13.2 \]

13. 3% of 307

\[ \frac{3}{100} \times 307 = 9.21 \]

14. 14% of 798

\[ \frac{14}{100} \times 798 = 111.72 \]

15. 1.1% of 62

\[ \frac{1.1}{100} \times 62 = 0.682 \]

16. 4.1% of 101

\[ \frac{4.1}{100} \times 101 = 4.201 \]

17. 67% of 11.9

\[ \frac{67}{100} \times 11.9 = 7.883 \]

18. 31% of 68.7

\[ \frac{31}{100} \times 68.7 = 21.297 \]

19. 9.8% of 359

\[ \frac{9.8}{100} \times 359 = 35.242 \]

20. 97.9% of 39

\[ \frac{97.9}{100} \times 39 = 37.981 \]

21. 52% of 57.9

\[ \frac{52}{100} \times 57.9 = 29.948 \]

22. 33% of 15.3

\[ \frac{33}{100} \times 15.3 = 5.049 \]

23. 21.1% of 151

\[ \frac{21.1}{100} \times 151 = 31.871 \]

24. 29% of 61.2

\[ \frac{29}{100} \times 61.2 = 17.748 \]

25. ELEVATION The highest point in Arizona is Humphreys Peak with an elevation of 12,633 feet. Estimate the elevation of the highest point in Florida, located in Walton County, if it is about 2.7% of the highest point in Arizona. Sample answer: 1% of 12,633 = 126.33 feet; 2.7% of 12,633 = 338.01 feet. The elevation of the highest point in Florida is about 375 feet.

26. BRAIN The brain weight of a newborn baby is about 13% of the body weight of the newborn. If a newborn weighs 2,900 grams, about how much does the brain weigh? Sample answer: 13% of 2,900 = 377 grams. The brain weighs about 390 grams.

27. STOCKS The value of a share of stock in an electronics company increased by 33% during one week. If the value of a share of stock was $141 at the beginning of the week, estimate the increase in value of a share of stock at the end of the week. Sample answer: 13% of 141 = 18.33; 0.13 · 141 = 18.33; 1% of 141 = 1.41; 0.01 · 141 = 1.41; 2% of 141 = 2.82; 0.02 · 141 = 2.82; 3% of 141 = 4.23; 0.03 · 141 = 4.23; 4% of 141 = 5.64; 0.04 · 141 = 5.64; 5% of 141 = 7.05; 0.05 · 141 = 7.05. The increase in the value of a share of stock is about $0.90.

Chapter 7

Word Problem Practice

Percent and Estimation

1. ORCHESTRA The orchestra at Millard Middle School has 120 members. Of these, 17% are eighth-grade students. Estimate the number of eighth-grade students in the orchestra. Sample answer: 17% of 120 = 20 students

2. RESTAURANTS In one west coast city, 34% of the restaurants are on the river. The city has 178 restaurants. Estimate the number of restaurants that are on the river. Sample answer: 34% of 178 = 60 restaurants

3. FARMING Rhonda planted green beans on 67% of her farm. Rhonda’s farm has 58 acres of land. Estimate the number of acres of green beans on Rhonda’s farm. Sample answer: 67% of 58 = 39 acres

4. HOTELS At the Eastward Inn hotel, 47% of the rooms face the pool. The hotel has 92 rooms. Estimate the number of rooms that face the pool. Sample answer: 47% of 92 = 43 rooms

5. TREES The students in Leon’s seventh grade science class determined that 42% of the trees at a local park are pine trees. If there are 632 trees in the park, about how many of them are pine trees? Sample answer: 42% of 632 = 265.44; 0.42 · 632 = 265.44; 20% of 632 = 126.4; 0.20 · 632 = 126.4. There are about 265 trees that are pine trees.

6. BOOKS Jenna has read 0.7% of a book. If the book has 431 pages, estimate the number of pages Jenna has read. Sample answer: 0.7% of 431 = 3.017; 0.01 · 431 = 4.31. Jenna has read about 3 pages.

7. FITNESS At the office where Mika works, 40% of the 18 employees exercise at least three times a week. Estimate the number of people who exercise at least three times a week. Sample answer: 40% of 18 = 7.2; 0.40 · 18 = 7.2; 2 · 3 = 6; 6 people exercise at least three times a week

8. PETS Of all seventh grade students at Hart Middle School, 0.3% of the students own a pet iguana. If there are 610 seventh grade students at Hart, about how many own pet iguanas? Sample answer: 0.3% of 610 = 1.83; 0.003 · 610 = 1.83; 3 students own a pet iguana.
Lesson Reading Guide

Algebra: The Percent Equation

Remember What You Learned

Problem
Percent Proportion
Percent Equation

R 32% of 123
41
S 96% of 138
N 25% of 83
D 25.3% of 125
B 74% of 90

T 15% of 90
A 65% of 41
C 63% of 80
G 54% of 90

U 10% of 20
O 10% of 20
P 1/2% of 20
F 0.9% of 100

E 78% of 20
H 0.3% of 62

Answer: $0.801 billion.

Chapter 7

Answers (Lessons 7-3 and 7-4)
Lesson 7-4

Chapter 7

Algebra: The Percent Equation

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

1. 25% of 176 is what number?
   \[ 0.25 \cdot 176; \text{44} \]

2. What is 90% of 20?
   \[ 0.9 \cdot 20; \text{18} \]

3. 24 is what percent of 30?
   \[ \text{24} / \text{30} \times 100\%; \text{80}\% \]

4. 80% of what number is 94?
   \[ 0.8 \cdot n; \text{117}.5 \]

5. What is 60% of 45?
   \[ 0.6 \cdot 45; \text{27} \]

6. 9 is what percent of 30?
   \[ n / 30 \times 100\%; \text{30}\% \]

7. What percent of 125 is 25?
   \[ 25 / 125 \times 100\%; \text{20}\% \]

8. What is 120% of 60?
   \[ 1.2 \cdot 60; \text{72} \]

9. 2% of what number is 5?
   \[ 0.02 \cdot n; \text{250} \]

10. 15% of 290 is what number?
    \[ 0.15 \cdot 290; \text{43.5} \]

11. 16 is what percent of 4,000?
    \[ 16 / 4000 \times 100\%; \text{0.4}\% \]

12. What is 140% of 60?
    \[ 1.4 \cdot 60; \text{84} \]

13. 344.8 is what percent of 862?
    \[ 344.8 / 862 \times 100\%; \text{40}\% \]

14. 6% of what number is 21?
    \[ 0.06 \cdot n; \text{350} \]

15. What number is 60% of 605?
    \[ 0.6 \cdot 605; \text{363} \]

16. 32% of 250 is what number?
    \[ 0.32 \cdot 250; \text{80} \]

17. Find 30% of 70.
    \[ 0.3 \cdot 70; \text{21} \]

18. What is 80% of 65?
    \[ 0.8 \cdot 65; \text{52} \]
Lesson 7-4 ...

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

1. What number is 27% of 52?  
   \[ n = 0.27 \times 52; n = 14.0 \]
2. Find 41% of 48.  
   \[ n = 0.41 \times 48; n = 19.7 \]
3. What percent of 88 is 33?  
   \[ \frac{88}{n} = 33; n = 37.5\% \]
4. 8 is what percent of 18?  
   \[ \frac{8}{18} = n; n = 44.4\% \]
5. What number is 33% of 360?  
   \[ n = 0.33 \times 360; n = 118.8 \]
6. What percent of 62 is 58?  
   \[ \frac{58}{62} = n; n = 93.5\% \]
7. 55 is what percent of 100?  
   \[ \frac{55}{100} = n; n = 55\% \]
8. 22% of what number is 24.2?  
   \[ 0.22 \times n = 24.2; n = 110 \]
9. 19 is 50% of what number?  
   \[ \frac{19}{0.50} = n; n = 38 \]
10. 25 is 32% of what number?  
    \[ \frac{25}{0.32} = n; n = 78.1 \]
11. 40% of what number is 28?  
    \[ 0.40 \times n = 28; n = 70 \]
12. 30 is what percent of 60?  
    \[ \frac{30}{60} = n; n = 50\% \]
13. What percent of 5 is 2?  
    \[ \frac{2}{5} = n; n = 40\% \]
14. 44% of 10 is what number?  
    \[ 0.44 \times 10 = n; n = 4.4 \]
15. Find 110% of 88.  
    \[ 1.10 \times 88 = n; n = 96.8 \]
16. What number is 60% of 21.8?  
    \[ 0.60 \times 21.8 = n; n = 13.1 \]
17. What percent of 180 is 210?  
    \[ \frac{210}{180} = n; n = 116.7\% \]
18. 220 is 95.3% of what number?  
    \[ 220 = 0.953 \times n; n = 230.8 \]
19. BASEBALL A baseball player was at bat 473 times during the regular season. If he made a hit 31.5% of the times he was at bat, how many hits did he make during the regular season? Round to the nearest whole number if necessary. 149 hits

ANALYZE GRAPHS For Exercises 20 and 21, use the graph shown. The total enrollment at Central High School is 798 students.

20. About what percent of the students at Central High are freshmen? Round to the nearest tenth if necessary. 30.7%
21. About what percent of the students at Central High are seniors? Round to the nearest tenth if necessary. 19.7%

1. DINING Jonas and Linda's restaurant bill comes to $23.40. They are planning to tip the waiter 15% of their bill. How much money should they leave for a tip? $3.51
2. CHESS The Briarwood Middle School chess club has 55 members. 22 of the members are in seventh grade. What percent of the members of the chess club are in seventh grade? 40%
3. TENNIS In the city of Springfield, 75% of the parks have tennis courts. If 15 parks have tennis courts, how many parks does Springfield have altogether? 20 parks
4. COLLEGE There are 225 students in eighth grade at Jefferson Middle School. A survey shows that 64% of them are planning to attend college. How many Jefferson eighth grade students are planning to attend college? 144 students
5. BASEBALL In the 2005 season, the Chicago White Sox won 99 out of 162 games. What percent of games did the White Sox win? Round to the nearest tenth if necessary. 61.1%
6. HOUSING In the Stoneridge apartment complex, 35% of the apartments have one bedroom. If there are 49 one-bedroom apartments, what is the total number of apartments at Stoneridge? 140 apartments
7. SPACE On Mars, an object weighs 38% as much as on Earth. How much would a person who weighs 165 pounds on Earth weigh on Mars? 62.7 pounds
8. FOOTBALL In the 2005 season, quarterback Jake Plummer of the Denver Broncos had 7 passes intercepted out of 456 attempts. What percent of Jake Plummer's passes were intercepted? Round to the nearest tenth if necessary. 1.5%
SALES TAX

There is 4.8% sales tax on all clothing items purchased. Danielle wants to buy a shirt, which costs $18.95. Danielle figures that if she has $20 she will have enough to buy the shirt. After adding in sales tax, is $20 a reasonable amount for Danielle to bring?

1. TIP

The total bill at a restaurant for a family of 5 is $64.72. They want to leave a 20% tip. They decide to leave $10.00. Is this estimate reasonable? Explain your reasoning. No; 20% of $65.00 is $13.00 so a $10.00 tip is too low.

2. TELEVISION

A survey shows that 67% of students watch 3 or more hours of television a night. Suppose there are 892 students in your school. What would be a reasonable estimate of the number of students in your school who watch 3 or more hours of television a night? Explain your reasoning. 630 students; 70% of 900 students is 630 students.

When solving problems, often times it is helpful to determine reasonable answers by using rounding and estimation. Checking answers with a calculator is always helpful in determining if the answer found is in fact reasonable.

### Example

**SALES TAX** There is 4.8% sales tax on all clothing items purchased. Danielle wants to buy a shirt, which costs $18.95. Danielle figures that if she has $20 she will have enough to buy the shirt. After adding in sales tax, is $20 a reasonable amount for Danielle to bring?

**Explore**

The cost of the shirt is $18.95. Sales tax is 4.8%. Danielle has $20.

**Plan**

Round $18.95 to $19.00 and 4.8% to 5%. Then use mental math to find 5% of $19.00.

**Solve**

Round $18.95 to $19.00

10% of $19.00 = 0.1 \times 19 = 1.90

Use mental math. $1.90 is close to 2.00.

5% is \frac{1}{2} of 10%

\frac{1}{2} of $2.00 = $1.00

$1.00 is the amount of sales tax.

$19.00 + $1.00 = $20.00

Add $1.00 to $19.00.

So $20 is a reasonable amount of money for Danielle to bring to buy the shirt.

**Check**

Use a calculator to check.

$0.048 \times 18.95 \approx 0.9096$

Since 0.9096 is close to 1, the answer is reasonable.

### Exercises

1. **TIP**

   The total bill at a restaurant for a family of 5 is $64.72. They want to leave a 20% tip. They decide to leave $10.00. Is this estimate reasonable? Explain your reasoning. No; 20% of $65.00 is $13.00 so a $10.00 tip is too low.

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### Study Guide and Intervention

**Problem-Solving Investigation:**

Determine Reasonable Answers

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### Inherited Traits

Everyone inherits traits like eye color, hair color, and skin pigmentation from their parents and grandparents, but there are other interesting traits that are also inherited. Right or left handedness is an inherited trait, as are dimples in one’s cheeks. The chart below shows some inherited traits and the percentage of the general population that shows the trait.

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1. Based on the information presented above, predict how many of your classmates will have each of these traits.

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4. How do the class traits compare to the traits of the general population? Sample answer: The percentage of students with dimples is higher than the percentage in the general population, but the percentage of students who can roll their tongues is lower than that of the general population.

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Determine reasonable answers for each. Sample answers are given.

1. **MONEY** Gillian and Roger have lunch at a restaurant and Gillian needs to determine how much tip to leave based on their bill. If their bill was $21.87 and Gillian wants to leave a 15% tip, what is a reasonable estimate for how much she should leave? **$3.00 ($3.28 exactly)**

2. **SPORTS** Of the 82,000 fans that attended a bowl game between Ohio State and Notre Dame, 60% were Ohio State fans. About how many fans at the game were for Notre Dame? **32,000 (32,800 exactly)**

3. **ICE CREAM** A survey of 1,950 people found that 39% preferred chocolate ice cream to vanilla. About how many people preferred chocolate ice cream according to the survey? **800 (761 exactly)**

4. **EARTH** The surface area of Earth is approximately 70% water. If the surface area is about 510,000,000 square kilometers, about how many square kilometers are water? **357,000,000 km² (350,000,000 km²)**

5. **COLLEGE** Of 7,450 first-year college students interviewed, 72% had changed their major area of study since the beginning of the academic year. About how many students had kept the same major? **2,250 (2,086 exactly)**

6. **MONEY** While shopping, Hilary spent $149. If the amount she spent was 20% of her savings, how much savings did she have before she shopped? **$750 ($745 exactly)**

---

4. **ANALYZE GRAPHS** The graph shows the percent of community attendance during a little league season. Is 90% a reasonable estimate for the percent of community attendance for September? Explain. **No; 82% would be a better estimate since the change would be only 1% to 2% from August to September.**

4. **ANALYZE GRAPHS** The graph shows how the Forenzo family spent their money on their summer vacation. Is 25% a reasonable estimate of how much money they spent on dining? Justify your answer. **Yes; 1,100 is about 25% of 4,500.**

4. **ANALYZE GRAPHS** The graph shows how the number of fans attending a little league game changed during the season. What is a reasonable estimate for the percent of community attendance during September? **76%**

---

3. **NUMBER SENSE** 12 is added to 25% of a number. The result is 30. What is the number? **The number is 72.**

---

**Mixed Problem Solving**

For Exercises 1 and 2, determine a reasonable answer.

1. **HOMES** In a retirement village, 88% of the residents own their home. If the village has 540 homes, how many homes are owned by the residents? **450 homes**

2. **ANALYZE GRAPHS** The graph shows how the number of fans attending a little league game changed during the season. What is a reasonable estimate for the percent of community attendance during September? **76%**

For Exercises 5 and 6, select the appropriate operation to solve the problem. Justify your solution(s) and solve the problem.

5. **TRAVEL** Cecil averages 31 miles per gallon when driving his car on the highway to visit friends 461 miles away. If he filled the 16-gallon gasoline tank before leaving and did not buy any gasoline along the way, about how many gallons of gasoline are left in the tank when he arrives? **Divide and subtract; 461 ÷ 31 = 15, 16 − 15 = 1; 1 gallon**

6. **FABRIC** Mrs. Tillman is making identical dresses for her three granddaughters. She needs 5 1/4 yards of fabric for each dress. If she purchased 5 3/4 yards of fabric, how much fabric will be leftover? **Multiply and subtract; 3 · 2 1/8 = 6 3/8 − 6 3/8 = 2 1/8; 2 1/8 yards remain**
Get Ready for the Lesson

Complete the Mini Lab at the top of page 369 in your textbook. Write your answers below.

Model each percent of change.

1. 25% increase
2. 75% increase
3. 30% increase
4. Describe a model that represents a 100% increase, a 200% increase, and a 300% increase. Sample answer: a strip that is twice as long, 3 times as long, and 4 times as long, respectively
5. Describe how this process would change to show percent of decrease. Subtract the percent of change from the original strip.

Read the Lesson

6. In a percent of change, what are the two numbers that are being compared? the number that represents the amount of change and the number that represents the original amount
7. How can you tell if a percent of change is a percent of increase or a percent of decrease? Sample answer: Compare the new amount to the original amount. If the original quantity is increased, then it is called a percent of increase. If the original quantity is decreased, then it is called a percent of decrease.
8. Tell how to find the amount of increase and the amount of decrease. The amount of increase is the new amount minus the original amount. The amount of decrease is the original amount minus the new amount.

Remember What You Learned

9. Find an example of something in your life that has increased or decreased, such as your height in the past year. Calculate the percent of change and share your results with your class. See students' work.
A percent of change is a ratio that compares the change in quantity to the original amount. If the original quantity is increased, it is a percent of increase. If the original quantity is decreased, it is a percent of decrease.

Example 1: Last year, 2,376 people attended the rodeo. This year, attendance was 2,950. What was the percent of change in attendance to the nearest whole percent?

Since this year’s attendance is greater than last year’s attendance, this is a percent of increase. The amount of increase is 2,950 – 2,376 or 574. 

\[ \text{percent of increase} = \frac{\text{amount of increase}}{\text{original amount}} \]

\[ = \frac{574}{2,376} \approx 0.24 \text{ or } 24\% \]

Rodeo attendance increased by about 24%.

Example 2: John’s grade on the first math exam was 94. His grade on the second math exam was 86. What was the percent of change in John’s grade to the nearest whole percent?

Since the second grade is less than the first grade, this is a percent of decrease. The amount of decrease is 94 – 86 or 8.

\[ \text{percent of decrease} = \frac{\text{amount of decrease}}{\text{original amount}} \]

\[ = \frac{8}{94} \approx 0.09 \text{ or } 9\% \]

John’s math grade decreased by about 9%.

Exercises

Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an increase or decrease.

1. original: 4
   new: 5
   25%; increase
2. original: 1.0
   new: 1.3
   30%; increase
3. original: 15
   new: 12
   20%; decrease
4. original: $30
   new: $18
   40%; decrease
5. original: 60
   new: 63
   5%; increase
6. original: 160
   new: 136
   15%; decrease
7. original: 7.7
   new: 10.5
   38%; increase
8. original: 9.6
   new: 5.9
   39%; decrease
9. original: $350
   new: $400
   14%; increase
10. original: $75
    new: $60
    20%; decrease
11. original: $30
    new: $110
    267%; increase
12. original: $120
    new: $100
    25%; decrease
13. original: $210
    new: $105
    50%; decrease
14. original: 84
    new: 111
    32%; increase
15. original: $84
    new: $100
    19%; increase
16. original: 8.2
    new: 2.5
    21%; increase
17. original: 1.5
    new: 0.8
    67%; increase
18. original: 91
    new: 77
    15%; decrease
19. original: $465.50
    new: $350
    25%; decrease
20. original: $87.05
    new: $100
    15%; increase
21. original: 144
    new: 122
    41%; decrease
22. original: 20.8
    new: 12.2
    80%; decrease
23. original: $75
    new: $15
    19%; decrease
24. original: 8.6
    new: 9.1
    9%; increase
Lesson 7–6
Word Problem Practice
Percent of Change

1. SHOES A popular brand of running shoes costs a local store $68 for each pair. If the store sells the shoes for $119, what is the percent of increase in the price? 75%

2. CLUBS Last year the backgammon club had 30 members. This year the club has 24 members. Find the percent of decrease in the number of members. 20%

3. READING In the seventh grade, Rachel read 15 books. In the eighth grade, she read 18 books. Find the percent of increase in the number of books Rachel read. 20%

4. VOTES Last year 762 students voted in the student council election at San Bruno Middle School. This year 721 students voted. To the nearest tenth, what was the percent of change in the number of students that voted? 5.4% decrease

5. HEIGHT When Hugo was 9 years old he was 56 inches tall. Hugo is now 12 years old and he is 62 inches tall. Find the percent of increase in Hugo’s height to the nearest tenth. 10.7%

6. PLANTS Alicia planted 45 tulip bulbs last year. This year she plans to plant 65 bulbs. Find the percent of increase in the number of tulip bulbs to the nearest tenth. 44.4%

7. PICTURES The 2006 yearbook at Middleton Middle School had 236 candid pictures of students. The 2005 yearbook had 214 candid pictures of students. To the nearest tenth, what was the percent of change in the number of candid student pictures from 2005 to 2006? 10.3% increase

8. POPULATION In 1990, there were 4,298,000 Mexican immigrants living in the United States. In 2000 this number had increased to 7,856,000. Find the percent of increase to the nearest tenth. 82.8%
Lesson 7–6

TI-73 Activity

Simple Interest

Use the Equation Solver on your calculator to solve problems involving simple interest. Use the simple interest formula: \( I = prt \).

Example

Find the amount of money you would need to deposit in a savings account that earns 5% interest, if you want to earn $250 interest in 1 year.

Step 1
Choose Equation Solver.

Step 2
Enter the formula after the symbol eqn.

Step 3
Enter the values given in the problem: Interest \( 250 \), rate \( 5\% \), time \( 1 \).

Step 4
Solve for \( P \), the principal.

The principal amount is $5,000.

Use this same formula and enter different values to solve the following problems. Round money to the nearest cent; round time to the nearest tenth of a year.

1. Find the amount of interest you would earn if you deposited $500 for 4 years in a savings account that earns 3.4% interest.
   $68

2. Find the amount of money you would need to deposit in a savings account that earns 5.1% interest if you want to earn $1000 in interest in 2 years.
   $9,803.92

3. Find the amount of time you would need to leave a deposit of $500 in a savings account that earns 5.3% interest if you want to earn $500 in interest.
   18.9 years

4. Find the amount of money you would need to deposit in a savings account earning 4.9% interest if you want to earn $800 in interest in 3 years.
   $5,442.18
Lesson Reading Guide
Sales Tax and Discount

Get Ready for the Lesson
Read the introduction at the top of page 375 in your textbook. Write your answers below:

1. Calculate the sales tax by finding 6% of $1,299. \[ \text{Sales tax} = 0.06 \times 1,299 = 77.94 \]
2. What will be the total cost including the sales tax? \[ \text{Total cost} = 1,299 + 77.94 = 1,376.94 \]
3. Use a calculator to multiply 1.06 and 1,299. How does the result compare to your answer in Exercise 2? \[ \text{Total cost} = 1,376.94; \text{It is the same.} \]

Read the Lesson

4. In Example 1, the \( \times \) is used when the sales tax is found. Why is the value of 0.0425 times 90 rounded? \[ \text{Sample answer: For dollar amounts, if the decimal has more than two places the amount is rounded to the nearest cent.} \]
5. In Method 2 of Example 1, why is the sales tax added to 100%? \[ \text{Sample answer: 100% represents the cost of the item; the cost of the item plus the sales tax equals 100% plus the percent that is sales tax.} \]
6. In Examples 2 and 3, the percent equation is used to find discount price and to find the original price. When using the percent equation, how do you represent the percent? \[ \text{Sample answer: as a decimal} \]

Remember What You Learned

7. Use the Internet to find the state sales tax in your state, including tax on food, prescription drugs, and nonprescription drugs, if applicable. Then suppose you have a cold and you go to a local pharmacy. You purchase a box of crackers for $2.99 and a bottle of over-the-counter pain reliever for $8.49. Your doctor ordered a prescription for you for your cold and you pay $10 for this prescription. Using the sales tax for your state, what is your total cost at the pharmacy, including taxes? \[ \text{See students' work.} \]
Chapter 7

Skills Practice

Sales Tax and Discount

Find the total cost or sale price to the nearest cent.

1. $49.95 CD player; 5% discount  
   $47.45

2. $69 shoes; 6% sales tax  
   $73.14

3. $2.99 socks; 5.5% sales tax  
   $3.15

4. $119 coat; 10% discount  
   $110.10

5. $299 DVD player; 7% sales tax  
   $319.93

6. $49 tie; 15% discount  
   $41.65

7. $59 power tool; 6% sales tax  
   $61.95

8. $17.99 CD; 10% discount  
   $16.19

9. $79 cell phone; 20% discount  
   $63.20

10. $65 concert ticket; 7.5% sales tax  
    $69.88

Find the original price to the nearest cent.

11. $312.30 television; 30% discount  
    $357.00

12. $19,995 car; 6.5% sales tax  
    $20,201.34

13. $89.29 boots; discount, 30%  
    sale price, $62.50

14. $12.64 video game; discount, 15%  
    sale price, $10.42

15. $1,221.11 drum set; discount, 10%  
    sale price, $1,099

16. $16.40 gloves; discount, 30%  
    sale price, $11.48

17. $34 sweater; discount, 30%  
    sale price, $24

18. $62.95 sunglasses; discount, 20%  
    sale price, $50.36

19. $70 dinner for two; discount, 5%  
    sale price, $66

20. $147.85 bicycle; discount, 25%  
    sale price, $110.39

Practise

Sales Tax and Discount

Find the total cost or sale price to the nearest cent.

1. $18 haircut; 10% discount  
   $16.20

2. $299 lawn mower; 5% tax  
   $313.95

3. $9.99 meal; 25% discount  
   $7.49

4. $149 guitar; 20% discount  
   $119.20

5. $15.75 music CD; 4% tax  
   $16.38

6. $24 gym bag; 8% tax  
   $25.92

7. $32.88 jacket; 50% discount  
   $16.44

8. $3.45 coffee; 33% discount  
   $2.31

9. $9.99 chair; 8\% tax  
   $10.84

Find the original price to the nearest cent.

10. bracelet: discount, 40%  
    sale price, $13.80

11. bicycle: discount, 35%  
    sale price, $23.00

12. TICKETS  
    State residents get discounts at various theme parks throughout the state. One theme park charges a state resident $51.70. If this price represents a 15% discount from the regular adult admission, find the cost of a regular adult admission to the nearest cent. 
    $60.82

13. TRUCKS  
    What is the sales tax on a $17,500 truck if the tax rate is 6%?  
    $1,050

14. COMPUTERS  
    For Exercises 14–16, use the following information. 
    Lionel is buying a computer that normally sells for $890. The state sales tax is 6%.

15. If the computer is on sale with a 10% discount, what is the sale price of the computer before adding the sales tax?  
    $801.00

Computers

16. What is the sales tax on the discounted price?  
    $48.06
1. **SKATEBOARDS** Ines wants to buy a skateboard but she does not know if she has enough money. The price of the skateboard is $85 and the sales tax is 6%. What will be the total cost of the skateboard? **$90.10**

2. **PRETZELS** The Spanish club sold hot pretzels as a fund-raiser. The pretzels normally sold for $1.50, but near the end of the sale they wanted to sell as many as possible, so they reduced the price by 30%. What was the new price for a hot pretzel? **$1.05**

3. **COMPUTERS** Andrea ordered a computer on the Internet. The computer cost $1,499 plus 7.25% sales tax. What was the total amount Andrea paid for her computer? **$1,611.43**

4. **BOOKS** Nate went shopping at a bookstore. The price of the book he selected was $14.95, but it had a sale sticker on it. When he paid for the book, he was charged $12.71 before sales tax was added. What was the percent of discount to the nearest percent? **15%**

5. **CELL PHONES** Justin is buying a cell phone that has a regular price of $149. The cell phone is on sale for 15% off the regular price. What will be the sale price? **$126.65**

6. **MAGAZINES** Ivan bought two magazines for $4.95 each. If the sales tax was 6.75%, what was the total amount that he paid for the magazines? **$10.57**

7. **MOVIES** A video store is having a sale in which DVDs are on sale for 20% off. During this sale, what is the cost of three DVDs that regularly cost $16.99? **$40.78**

8. **MODELS** The original price of a collectible model airplane is $115. The discounted price is $99. What is the percent of discount to the nearest percent? **14%**

**Taxes**

Texas is one of the few states that does not impose a state income tax on residents. However, the state does collect sales and use taxes. The Texas state sales tax rate is 6.25%. Local taxing authorities can require additional tax of up to 2%, raising the total possible tax rate to 8.25%.

Use the Sales and Use Tax Chart below to solve the following problems.

<table>
<thead>
<tr>
<th>Texas City</th>
<th>Total Sales and Use Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abilene</td>
<td>8.25%</td>
</tr>
<tr>
<td>Corral City</td>
<td>8%</td>
</tr>
<tr>
<td>Sadler</td>
<td>7.25%</td>
</tr>
<tr>
<td>Ackerly</td>
<td>7.75%</td>
</tr>
<tr>
<td>San Antonio</td>
<td>8.125%</td>
</tr>
<tr>
<td>Raccoon Bend</td>
<td>6.75%</td>
</tr>
<tr>
<td>Dallas</td>
<td>8.25%</td>
</tr>
</tbody>
</table>

1. Kendra purchases a sweater that costs $24.99 at the Corral City Mall. What is the total cost of the sweater? **$26.99**
2. Brandon agrees to buy a new car for $21,525. As an employee of the company that produces the car, he is entitled to an additional 15% discount. He must pay the Dallas City sales tax. What is the total amount Brandon will pay for his new car? **$19,805.69**
3. While at the Abilene Outlet Store, Barbara purchases an outfit that is regularly priced $113.49 on sale for $99.00. What is the percent of discount? **12.8%**
4. Sara pays a total of $32.43 for an item after a 25% discount and the Ackerly City tax were applied. What is the original amount of Sam’s purchase? **$40.13**
5. Davis makes a list of the cost of each item he would like to buy with his $100.00 gift card. Determine if Davis has enough money to purchase everything on his list after the Sadler City tax is applied. If not, how much more money will he need? If so, what is the gift card balance?

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost of Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD</td>
<td>$14.99</td>
</tr>
<tr>
<td>DVD</td>
<td>$19.99</td>
</tr>
<tr>
<td>Headphones</td>
<td>$59.99</td>
</tr>
</tbody>
</table>

No, Davis will need an additional $1.86 to purchase all of the items on his list.
Lesson Reading Guide

Get Ready for the Lesson

Read the introduction at the top of page 379 in your textbook. Write your answers below:

1. Calculate 2.25% of $1,000 to find the amount of money that Jin can earn in one year for a CD at State Credit Union. $22.50

2. Find the amount of money that she can earn in one year at the other three banks. $31; $26.50; $32.50

Read the Lesson

3. In Example 4, why is \( t \) replaced with \( \frac{1}{12} \)? Sample answer: because the length of time is one month, one-twelfth of a year

4. Complete the following table that gives the conversion of months to years.

   | Number of months | 2   | 3   | 4   | 6   | 8   | 9   | 10  |
---|------------------|-----|-----|-----|-----|-----|-----|-----|
| Ratio of number of months to 12 months | \( \frac{2}{12} \) | \( \frac{3}{12} \) | \( \frac{4}{12} \) | \( \frac{6}{12} \) | \( \frac{8}{12} \) | \( \frac{9}{12} \) | \( \frac{10}{12} \) |
| Simplified ratio | \( \frac{1}{6} \) | \( \frac{1}{4} \) | \( \frac{1}{3} \) | \( \frac{1}{2} \) | \( \frac{2}{3} \) | \( \frac{3}{4} \) | \( \frac{5}{6} \) |

Remember What You Learned

5. Write the formula for simple interest and explain what each of the letters in the formula stands for. \( I = prt \): \( I \) represents the simple interest; \( p \) represents the principal, the amount of money originally deposited, invested, or borrowed; \( r \) represents the annual interest rate written as a decimal; \( t \) represents the amount of time in years that the principal is invested or borrowed.

6. Look up the word interest in a dictionary. Write the meaning that matches the way the word is used in this lesson. Sample answer: money paid for the use of money

7. When do you earn interest? When do you have to pay interest? You earn interest on money you deposit or invest. You pay interest on money you borrow.

---

Lesson 7–8

Study Guide and Intervention

Simple Interest

Simple interest is the amount of money paid or earned for the use of money. To find simple interest \( I \), use the formula \( I = \text{prt} \). Principal \( p \) is the amount of money deposited or invested. Rate \( r \) is the annual interest rate written as a decimal. Time \( t \) is the amount of time the money is invested in years.

Example 1
Find the simple interest earned in a savings account where $136 is deposited for 2 years if the interest rate is 7.5% per year.

\[
I = \text{prt} \\
I = 136 \times 0.075 \times 2 \\
I = 20.40
\]

The simple interest earned is $20.40.

Example 2
Find the simple interest for $600 invested at 8.5% for 6 months.

6 months = \( \frac{6}{12} \) or 0.5 year Write the time as years.

\[
I = \text{prt} \\
I = 600 \times 0.085 \times 0.5 \\
I = 25.50
\]

The simple interest is $25.50.

Example 3
Find the interest earned to the nearest cent for each principal, interest rate, and time.

1. $300, 5%, 2 years $30
2. $650, 8%, 3 years $156
3. $575, 4.5%, 4 years $103.50
4. $735, 7%, 2\frac{1}{2} years $128.63
5. $1,665, 6.75%, 3 years $337.16
6. $2,105, 11%, 1\frac{3}{4} years $405.21
7. $903, 8.75%, 18 months $118.52
8. $4,275, 19%, 3 months $203.06

---

Get Ready for the Lesson

Answer:

1. Calculate 2.25% of $1,000 to find the amount of money that Jin can earn in one year for a CD at State Credit Union. $22.50

2. Find the amount of money that she can earn in one year at the other three banks. $31; $26.50; $32.50

---

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Find the simple interest earned in a savings account where $136 is deposited for 2 years if the interest rate is 7.5% per year.

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I = \text{prt} \\
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I = 20.40
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The simple interest earned is $20.40.

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Find the simple interest for $600 invested at 8.5% for 6 months.

6 months = \( \frac{6}{12} \) or 0.5 year Write the time as years.

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I = \text{prt} \\
I = 600 \times 0.085 \times 0.5 \\
I = 25.50
\]

The simple interest is $25.50.

---

Example 3
Find the interest earned to the nearest cent for each principal, interest rate, and time.

1. $300, 5%, 2 years $30
2. $650, 8%, 3 years $156
3. $575, 4.5%, 4 years $103.50
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5. $1,665, 6.75%, 3 years $337.16
6. $2,105, 11%, 1\frac{3}{4} years $405.21
7. $903, 8.75%, 18 months $118.52
8. $4,275, 19%, 3 months $203.06

---

Remember What You Learned

5. Write the formula for simple interest and explain what each of the letters in the formula stands for. \( I = \text{prt} \): \( I \) represents the simple interest; \( p \) represents the principal, the amount of money originally deposited, invested, or borrowed; \( r \) represents the annual interest rate written as a decimal; \( t \) represents the amount of time in years that the principal is invested or borrowed.

6. Look up the word interest in a dictionary. Write the meaning that matches the way the word is used in this lesson. Sample answer: money paid for the use of money

7. When do you earn interest? When do you have to pay interest? You earn interest on money you deposit or invest. You pay interest on money you borrow.
**Skills Practice**

**Simple Interest**

Find the interest earned to the nearest cent for each principal, interest rate, and time.

1. $500, 4%, 2 years
   - Interest: $40

2. $350, 6.2%, 3 years
   - Interest: $65.10

3. $740, 3.25%, 2 years
   - Interest: $48.10

4. $725, 4.3%, 2\(\frac{1}{2}\) years
   - Interest: $77.94

5. $955, 6.75%, 3\(\frac{1}{4}\) years
   - Interest: $209.50

6. $1,540, 8.25%, 2 years
   - Interest: $254.10

7. $3,500, 4.2%, 1\(\frac{3}{4}\) years
   - Interest: $257.25

8. $568, 16%, 8 months
   - Interest: $60.59

Find the interest paid to the nearest cent for each loan balance, interest rate, and time.

9. $800, 9%, 4 years
   - Interest: $288

10. $280, 5.5%, 4 years
    - Interest: $61.60

11. $1,150, 7.6%, 5 years
    - Interest: $437

12. $366, 5.2%, 3 years
    - Interest: $41.50

13. $450, 22%, 1 year
    - Interest: $99

14. $2,180, 7.7%, 2\(\frac{1}{2}\) years
    - Interest: $419.65

15. $2,650, 3.65%, 4\(\frac{1}{2}\) years
    - Interest: $435.26

16. $1,245, 5.4%, 6 months
    - Interest: $336.22

**Practice**

**Simple Interest**

Find the simple interest earned to the nearest cent for each principal, interest rate, and time.

1. $750, 7%, 3 years
   - Interest: $157.50

2. $1,200, 3.5%, 2 years
   - Interest: $84.00

3. $450, 5%, 4 months
   - Interest: $7.50

4. $1,000, 2%, 9 months
   - Interest: $15.00

5. $530, 6%, 1 year
   - Interest: $31.80

6. $600, 8%, 1 month
   - Interest: $4.00

Find the simple interest paid to the nearest cent for each loan, interest rate, and time.

7. $668, 5%, 2 years
   - Interest: $33.40

8. $720, 4.25%, 3 months
   - Interest: $7.65

9. $2,500, 6.9%, 6 months
   - Interest: $86.25

10. $500, 12%, 18 months
    - Interest: $90.00

11. $300, 9%, 3 years
    - Interest: $81.00

12. $2,000, 20%, 1 year
    - Interest: $400.00

13. **ELECTRONICS** Rita charged $126 for a DVD player at an interest rate of 15.9%. How much will Rita have to pay after 2 months if she makes no payments?
    - Total: $129.34

14. **VACATION** The average cost for a vacation is $1,050. If a family borrows money for the vacation at an interest rate of 11.9% for 6 months, what is the total cost of the vacation including the interest on the loan?
    - Total: $1,112.48

**For Exercises 15–17, use the following information.**

Robin has $2,500 to invest in a CD (certificate of deposit).

15. If Robin invests the $2,500 in the CD that yields 4% interest, what will the CD be worth after 2 years?
    - Value: $2,600

16. Robin would like to have $3,000 altogether. If the interest rate is 5%, in how many years will she have $3,000?
    - Years: 4 years

17. Suppose Robin invests the $2,500 for 3 years and earns $255. What was the rate of interest?
    - Rate: 3.4%
**Exercises**

**Example**

A customer deposited $1,500 in an account that earns 8% per year. If interest is compounded and earned semiannually, how much is in the account after 1 year?

Use the formula $A = P(1 + r)^n$.

Since interest is earned semiannually, $r = \frac{8}{2} = 4\%$ and $n = 2$.

$A = 1,500(1 + 0.04)^2$

Use a calculator.

$= 1,622.40$

After 1 year, there is $1,622.40 in the account.

**Use the compound interest formula and a calculator to find the value of each of these investments. Round each answer to the nearest cent.**

1. $2,500 invested for 1 year at 6% interest compounded semiannually $\$2,652.25$

2. $3,600 invested for 2 years at 7% interest compounded semiannually $\$4,131.08$

3. $1,000 invested for 5 years at 8% interest compounded annually $\$1,469.33$

4. $2,000 invested for 6 years at 12% interest compounded quarterly $\$4,065.59$

5. $4,800 invested for 10 years at 9% interest compounded annually $\$11,363.35$

6. $10,000 invested for 15 years at 7.5% interest compounded semiannually $\$30,174.71$
Chapter 7 Assessment Answer Key

Quiz 1 (Lessons 7-1 and 7-2) Page 61

1. 68
2. 30.7
3. 0.13
4. 186
5. 400
6. 380%
7. 98.5

Quiz 2 (Lessons 7-3 and 7-4) Page 61

1. \( \frac{2}{3} \cdot 27 = 18 \)
2. \( 0.1 \cdot 90 = 9 \)
3. \( \text{and } 6 \cdot 9 = 54 \)
4. \( 0.45w = 72; 160 \)
5. \( p = 0.09 \cdot 63; 5.7 \)
6. \( 4 = n \cdot 38; 10.5\% \)
7. \( n = 0.216 \cdot 400; 86.4 \)

Quiz 3 (Lessons 7-5 and 7-6) Page 62

1. \( C \)
2. 9% dec.
3. 40% dec.
4. 50% increase
5. 30% increase

Quiz 4 (Lessons 7-7 and 7-8) Page 62

1. \$14.99
2. \$5.29
3. 30%
4. 15%
5. \( \frac{1}{2} \cdot 80 = 40 \)
6. \( (2 \cdot 240) + \left( \frac{1}{4} \cdot 240 \right) = 480 + 60 = 540 \)
7. \( p = 0.85 \cdot 29; 24.7 \)
8. \( 2 = 0.13 \cdot w; 15.4 \)
9. \( 46 = n \cdot 55; 83.6\% \)
10. 320

Mid-Chapter Test Page 63

1. \( D \)
2. \( G \)
3. \( A \)
4. \( H \)
5. \( \frac{1}{2} \cdot 80 = 40 \)
# Chapter 7 Assessment Answer Key

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<thead>
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<th>Page 66</th>
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<td>1. <em>B</em></td>
<td>11. <em>B</em></td>
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<tr>
<td>2. <em>b</em></td>
<td>2. <em>H</em></td>
<td>12. <em>H</em></td>
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<tr>
<td>3. <em>c</em></td>
<td>3. <em>A</em></td>
<td>13. <em>C</em></td>
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<td>4. <em>g</em></td>
<td>4. <em>J</em></td>
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<td>5. <em>d</em></td>
<td>5. <em>C</em></td>
<td>15. <em>C</em></td>
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<tr>
<td>7. <em>e</em></td>
<td>7. <em>D</em></td>
<td>17. <em>C</em></td>
</tr>
<tr>
<td>8. <em>e</em></td>
<td>8. <em>J</em></td>
<td>18. <em>F</em></td>
</tr>
<tr>
<td>9. <em>a</em></td>
<td>9. <em>A</em></td>
<td>19. <em>D</em></td>
</tr>
<tr>
<td>10. Sample answer: Compares part of a quantity to the whole quantity using a percent</td>
<td>10. <em>G</em></td>
<td>20. <em>G</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B: $186.38_</td>
</tr>
</tbody>
</table>

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Chapter 7 Assessment Answer Key

Form 2A
Page 67

1. B
2. J
3. A
4. G
5. A
6. H
7. A
8. F
9. C

Form 2B
Page 69

1. B
2. H
3. A
4. H
5. B
6. H
7. A
8. G
9. B

Page 68

10. H
11. C
12. J
13. C
14. H
15. C
16. F
17. A
18. J
19. B
20. H

B: $20.20

Page 69

10. F
11. D
12. F
13. C
14. H
15. B
16. F
17. A
18. J
19. B
20. H

B: $47.93
Chapter 7 Assessment Answer Key

Form 2C
Page 71

1. 136
2. 50
3. 12.5%
4. \( \frac{1}{4} \times 800 = 200 \)
5. \( 0.1 \times 30 = 3 \) and \( 6 \times 3 = 18 \)
6. \( 5 \times 11 = 55 \)
7. \( 19 = n \times 53; \) \( \frac{35.8}{100} \)
8. \( 955 = 0.37 \times n; \) \( 2,581.1 \)
9. 216 tickets

10. Yes, she will need $14.75
11. No, he will need $10.50
12. No, she will need $20.50

Page 72

13. 60% increase
14. 25% decrease
15. 66% decrease
16. 125% increase
17. $41.93
18. $7.40
19. $1,400
20. 25%
21. $247.50
22. $21
23. $54.84
24. $12.33
25. $1,872

B: 8%
Chapter 7 Assessment Answer Key

Form 2D
Page 73

1. 12

2. 100

3. 12.5%

4. $\frac{4}{5} \cdot 50 = 40$

5. $0.1 \cdot 140 = 14$

6. $3 \cdot 13 = 39$

7. $15 = n \cdot 36; 41.7\%$

8. $63 = 0.45 \cdot n; 140$

9. 7 students

10. No, he will need $16.25$

11. Yes, he will need $11.50$

12. No, she will need $22.50$

13. 50% decrease

14. 23% decrease

15. 76% increase

16. 500% increase

17. $24.30$

18. $1,823.25$

19. $76.91$

20. 20%

21. $225$

22. $3.51$

23. $6.74$

24. $192.94$

25. $1,135$

B: 5%
Chapter 7 Assessment Answer Key

Form 3
Page 75

1. 1.26

2. 6,500

3. 6.25%

4. \( \frac{3}{4} \cdot 160 = 120 \)

5. \( 0.1 \cdot 130 = 13 \)

6. \( 4 \cdot 15 = 60 \)

7. \( 12 = n \cdot 48; 25\% \)

8. \( 42 = 0.7 \cdot n; 60 \)

9. 33

10. No, they will need $29.50

11. No, she will need $11.50

12. Yes, she will need $20.50

Page 76

13. 77\% decrease

14. 38\% increase

15. 57\% decrease

16. 161\% increase

17. $15.04

18. $23.38

19. $51.94

20. 31\%

21. $279

22. $65.10

23. $16.39

24. $19.38

25. $6,468.75

B: \( 7\frac{1}{2} \) yr
## Scoring Rubric

<table>
<thead>
<tr>
<th>Level</th>
<th>Specific Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The student demonstrates a <strong>thorough understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student has responded correctly to the task, used mathematically sound procedures, and provided clear and complete explanations and interpretations. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.</td>
</tr>
<tr>
<td>3</td>
<td>The student demonstrates an <strong>understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student's response to the task is essentially correct with the mathematical procedures used and the explanations and interpretations provided demonstrating an essential but less than thorough understanding. The response may contain minor errors that reflect inattentive execution of the mathematical procedures or indications of some misunderstanding of the underlying mathematics concepts and/or procedures.</td>
</tr>
<tr>
<td>2</td>
<td>The student has demonstrated only a <strong>partial understanding</strong> of the mathematics concepts and/or procedures embodied in the task. Although the student may have used the correct approach to obtaining a solution or may have provided a correct solution, the student's work lacks an essential understanding of the underlying mathematical concepts. The response contains errors related to misunderstanding important aspects of the task, misuse of mathematical procedures, or faulty interpretations of results.</td>
</tr>
<tr>
<td>1</td>
<td>The student has demonstrated a <strong>very limited understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student's response to the task is incomplete and exhibits many flaws. Although the student has addressed some of the conditions of the task, the student reached an inadequate conclusion and/or provided reasoning that was faulty or incomplete. The response exhibits many errors or may be incomplete.</td>
</tr>
<tr>
<td>0</td>
<td>The student has provided a <strong>completely incorrect</strong> solution or uninterpretable response, or no response at all.</td>
</tr>
</tbody>
</table>
1. \[ P = (20\%)(2,000) \]
   \[ P = 0.2(2,000) \]
   \[ P = 400 \]

2. a. The amount of change is $23.01. So if $23.01 is divided by the original amount, $65, the result multiplied by 100 is the percent of change, about 35%.

   b. First multiply the original price, $16.95, by the sale percent, 22%, to get the discount amount, $3.73. Then subtract the discount amount from the original price and multiply by the tax percent, 0.065($13.22), to get the amount of tax, $0.86. Add the tax to the discounted price to get the total sale price, $14.08.

3. a. \( I = prt \) is the equation to use. By multiplying the principal, $1,200, by the rate of interest, 8%, and by the amount of time, 6 months = 0.5 year, the amount of interest paid, $48, will be the result.

   b. Year 1: \( $900 \cdot 0.06 \cdot 1 = $54 \)
   Year 2: \( $954 \cdot 0.06 \cdot 1 = $57.24 \)
   Year 3: \( $1,011.24 \cdot 0.06 \cdot 1 \)
   \( = $60.67 \)
   Year 4: \( $1,071.91 \cdot 0.06 \cdot 1 \)
   \( = $64.31 \)
   Interest after year 4: \( $54 + $57.24 + $60.67 + $64.31 = $236.22 \)
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>20.</td>
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</tbody>
</table>
Chapter 7 Assessment Answer Key

Standardized Test Practice
Page 80

21. \[
\frac{5}{2}
\]

22. \[
\frac{7}{7}
\]

23. \$6.90

\[
0.1 \times 400 = 40
\]

24. \[
9 \times 40 = 360
\]

25. \[
25\%
\]

26. \$182.61

27. \[400\%\text{ inc.}
\]

28. \[
25\%
\]

29. \$629.38

30a. \$2,200

The CD at 4.25% for 6 years earns more money because after 6 years it is worth $2,510.

30b. 5 years

\[
l = p \times r \times t \quad \Rightarrow \quad t = \frac{l}{pr};
\]

30c. 5 years
Chapter 7 Assessment Answer Key

Unit 3 Test Page 81

1. \[ \frac{58}{65} \]

2. 525 mi

3. 48 mi per h

4. $2.25 per lb

5. 4

6. 13.5

7. \[ \frac{1}{16} \]

8. 970%

9. 0.7%

10. 312.5

11. \[ \frac{1}{4} \cdot 200 = 50 \]

12. \[ 58 = n \cdot 30; 193.3\% \]

13. \[ p = 0.19 \cdot 216; 41.0 \]

14. 34.4

15. 6.9%

16. 45

17. 44% decrease

18. $264.30

19. $297

Page 82

20. 71% increase

21. 29% decrease

22. $161.78

23. \[ \frac{4^2}{3} \]

24. 44

25. \[ 6 \frac{1}{4} \]

26. 13

27. 16.67%

28. 12 mph

29. 48

30. 150%

31. \[ \frac{1}{4} \cdot 400 = 100 \]

32. 27.2

33. $7.40