LESSON 9: Percents in Real-Life Situations

[Objective]
The student will use proportional relationships to solve real-world percent problems, including multi-step problems.

[Prerequisite Skills]
ratios, percents, proportions, cross multiplying, solving one-step equations

[Materials]
Student pages S82 – S96
Calculators

[Essential Questions]
1. What does percent mean?
2. Explain how to find the total cost of an item that has 8% tax.
3. If a store has a sale of 20% off all merchandise and you have a 10% off coupon, will you get 30% off of the original price? Explain why or why not.

[Words for Word Wall]
percent, tax, markup, markdown, gratuity, commission,
\[
\frac{\text{part}}{\text{whole}} = \frac{\%}{100}
\]

[Grouping]
Cooperative Pairs (CP), Whole Group (WG), Individual (I)
*For Cooperative Pairs (CP) activities, assign the roles of Partner A & Partner B to students. This allows each student to be responsible for designated tasks within the lesson.

[Levels of Teacher Support]
Modeling (M), Guided Practice (GP), Independent Practice (IP)

[Multiple Representations]
SOLVE, Algebraic Formula, Verbal Description, Pictorial Representation

[Warm-Up] (IP, I, WG) S82 (Answers are on T179.)
• Have students turn to S82 in their books to begin the Warm-Up. Students find products of decimals and whole numbers. Monitor students to see if any of them need help during the Warm-Up. Have students complete the problems and then review the answers as a class. \{Verbal Description\}

[Homework]
Take time to go over the homework from the previous night.

[Lesson] [3 days (1 day = 80 minutes) - (M, GP, IP, WG, CP, I)]
LESSON 9: Percents in Real-Life Situations

Percent of a Number – Model with SOLVE

(M, GP, IP, CP, WG) S83, S84, S85 (Answers on T180, T181, and T182.)

M, GP, WG, CP: Have students turn to S83 in their books. Students will work with fraction bar models in SOLVE problems to find the percent of a number. Make sure students know their designation as Partner A or Partner B. {Pictorial Representation, SOLVE, Verbal Description, Graphic Organizer}

MODELING

Percent of a Number – Model with SOLVE

Step 1: Have student pairs read the problem about Terry and discuss what the problem is asking them to find. (the amount he saves each week)

Step 2: Partner A, describe to Partner B what the word percent means. Have student pairs share answers with the whole group. (Possible answers: out of 100, number based on 100)

Step 3: Read the problem again to have students identify the facts.
   • Partner B, are there any unnecessary facts? (No.)
   • Partner A, share one necessary fact. (Terry earns $50 per week.) Record.
   • Partner B, share another necessary fact. (saves 30% of money) Record.
   • Have we completed the O Step? (Yes.)

Step 4: Let’s move on to the L Step.
   • Ask student pairs to discuss a possible plan to line up where they could use a pictorial representation of the situation. Have student pairs share answers with the whole group.
   • Have students look at the bar that is represented. If we divide it into 10 equal parts, what would that represent? (10 parts, each one representing 10%)

Step 5: Partner B, what would be the first step for our plan? (Create a fraction bar model to represent the situation.) Record.
   • Partner A, what would be the second step of our plan? (Divide the bar into ten equal sections to show the sections, each representing 10%.) Record. Explain why we would use 10 sections. (Because there is a total of 100% and since we are using 30% we can count by tens.)
• Partner B, what would be the next step for our plan? (Divide the total amount earned weekly by ten to represent the amount that is equivalent to each group of 10%.) Record.

• Partner A, how will we complete the plan? (Shade the percent he saves and compare that to the amount.) Record.

• Partner A, what would our operation or operations be? (There is no specific operation because our plan is to create a fraction bar model and interpret the information from that.) Record fraction bar model.

**Step 6:** What is our next SOLVE step? (V – Verify the plan with Action.)

• Have partners discuss possible estimates and give students an opportunity to share an estimate. When they share the estimate, have them explain how they determined it.

*Teacher Note: The estimate given in the answer key is less than $25. You can choose to use that or another student estimate as long as it is supported with sound estimation. Record the estimate you will use as a class.

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$0  $5  $10  $15  $20  $25  $30  $35  $40  $45  $50

• Partner B, explain the second step of the plan. (Divide the bar into ten equal sections, each representing 10%.) Model for students how to divide the bar into 10 sections and label the scale for the percents from 0% to 100%.

• Partner A, explain the next step. (Take the total amount, $50, and divide by the number of sections, 10, to determine the scale for the money. Label the sections for the money from $0 to $50 by fives.)

• Partner B, how many sections will we need to shade to represent 30% (3) Shade the section.

• Partner A, what is 30% of $50? ($15.00) Explain how you know the answer. (By looking at the line to the point of shading 30%, we look below the bar at the amounts and find that 30% of $50 is $15.00.)

**Step 7:** Have students complete the E step and share answers as a whole class.

• Does your answer make sense? (Compare your answer to the question.) (Yes, because I was looking for the amount he saves each week.) Record.

• Is your answer reasonable? (Compare your answer to the estimate.) (Yes, because my answer is less than $25.00.) Record.

• Is your answer accurate? (Check your work.) (Yes.) Record.

• Write your answer in a complete sentence. (Terry saves $15.00 each week.) Record.
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Step 8: Have students turn to S84 in their books.
- Students will work in student pairs to read the SOLVE problem on S84 and complete the S and O steps. Give students a few minutes to complete S and O and then go over the answers as a whole group before moving on to the L step.

Step 9: Have student pairs discuss possible ways to describe how to line up a plan to include everything you will need to do.
- Partner B, what would be the first step for our plan? (Create a fraction bar model to represent the situation.) Record.
- Partner A, what would be the second step of our plan? (Divide the bar into ten equal sections, each representing 10%.) Record. Explain why we would use 10 sections.

Step 10: Partner B, identify the percent of his money that Terry keeps to spend during the week. (15%)
- Partner A, is there a line to represent 15% on the fraction bar model? (No.)
- Have student pairs discuss possible solutions to finding 15% of the model and then have them share possible solutions with the whole group. Once several groups have shared, create a plan together. (Possible wording: 15% is halfway between 10% and 20%. We can draw a line halfway between 10 and 20 which would represent 15%.)
- Record the remaining steps of the plan created for Step L on S84.
- Partner A, what would our operation or operations be? (There is no specific operation because our plan is to create a fraction bar model and interpret the information from that.) Record fraction bar model.

Step 11: Move to the V Step
- Partner B, what would be a reasonable estimate? (Have students discuss and share estimates. The estimate given is less than $10. Choose an estimate from the class that can be justified and record.)
- Partner A, explain how to complete the first step of our plan. (Draw the fraction bar.)
- Partner B, what is the second step of the plan? (Divide the bar into ten equal sections, each representing 10%.) Model for students how to divide the bar into 10 sections and label the scale for the percents from 0% to 100%.
- Partner A, explain the next step. (Take the total amount, $50, and divide by the number of sections, 10, to determine the scale for the money. Label the sections for the money from $0 to $50 by fives.
- Partner A, how many sections represent 15%? (one and a half) Mark 15% on the fraction bar.
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• Partner B, how can we know how much money one and a half sections represent? (Since one section is worth $5, we divide $5 by 2, to get that half of a section is $2.50. So, one and a half sections is $5 + $2.50 = $7.50.) Mark $7.50 on the fraction bar and shade the one and one half sections.

Step 12: Have students complete the E step and share answers as a whole class.
• Does your answer make sense? (Compare your answer to the question.) (Yes, because I was looking for the amount he spends each week.) Record.
• Is your answer reasonable? (Compare your answer to the estimate.) (Yes, because my answer is less than $10.00.) Record.
• Is your answer accurate? (Check your work.) (Yes.)
• Write your answer as a complete sentence. (Terry keeps $7.50 for spending money each week.)

IP, CP, WG: Have students work with a partner to complete the SOLVE problem on S85. Remind them that if they need help they can refer back to the examples on S83 and S84. Then come back together as a class and share their results. {Pictorial Representation, Verbal Description, SOLVE, Graphic Organizer}

Finding Percents Using the Percent Proportion
(M, GP, CP, IP, WG) S86, S87, and S88 (Answers on T183, T184, and T185.)

M, GP, WG, CP: Have students turn to page S86 in their books. Students will work with vertical fraction bars and percent proportions to find the percent of a number. Make sure students know their designation as Partner A or Partner B. {Algebraic Formula, Verbal Description, Pictorial Representation, Graphic Organizer}

MODELING
Finding Percents Using the Percent Proportion

Step 1: Ask students if it is always convenient to draw a fraction bar model. (No.)
Step 2: Have students discuss any other method they may know to solve proportion problems. Have them share answers with the whole group and then look at the graphic organizer on S86.
Read the statement about Terry that is above the graphic organizer.
• Partner A, how much money does Terry earn each week? ($50)
• Partner B, what percent of that money does he save each week? (30%)
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Step 3: Direct students’ attention to the fraction bar in the graphic organizer.
- Partner B, describe how this fraction bar is different from the one on S83? [(It is turned so that it is up and down (vertical) instead of left and right (horizontal).] Record.
- Partner A, how is this model the same. (The percents and the dollar values are the same.) Record.
- Partner B, how much money does Terry earn each week? ($50) Circle the amount on the fraction bar and record in the graphic organizer.
- Partner A, what percent of that money does he save each week? (30%) Circle the percent on the fraction bar and record in the graphic organizer.

Step 4: Partner B, describe to Partner A how you would create a percent as a ratio. How many ways are there?
- Partner A, could you draw a ratio to describe what Partner B described? Explain. (part to whole) Record in the 3rd column in the graphic organizer.
- Partner B, can 30% be written as a ratio? (Yes.)
- Partner A, describe the ratio that would represent 30% since percent means out of 100? (30/100) Record in the 3rd column of the graphic organizer.
- Partner B, what can you say about the two ratios you have created. (They are equal.)
- Partner A, explain what Partner B discussed about the 2 ratios and determine if there is anything you can substitute for the words in the ratio.

Step 5: Have students look at Column 4 and have them discuss ways they could take what they have done in Column 3 to create 2 ratios with the given information.
- Partner A, describe to Partner B what we are looking for on our fraction bar model. (how much is saved out of $50)
- Partner A, what does the 50 represent? (total money)
- Partner B, what does the 30 represent? (the percent of money he is saving)
- Partner A, what does the 100 represent? (Percent is always written as a fraction out of a total of 100%.)
- Partner B, describe to Partner A what you are missing and how you could represent that. (The amount he will save because that is our unknown value. Represent the unknown value with the variable (x).)
- Partner A and Partner B, record what you have come up with.
LESSON 9: Percents in Real-Life Situations

**Step 6:** Have student pairs discuss possible strategies for solving for the missing variable.
- Use an equation.
- Use equivalent ratios.
- Solve a proportion.

**Step 7:** Partner A, describe a way to solve for the missing information. Partner B, discuss another way you could solve the problem. One way of cross multiplication is below.

\[
\frac{x}{50} = \frac{30}{100} \\
100x = 1,500 \\
x = \frac{1,500}{50} \\
x = \$15
\]

**Step 8:** Partner A, is this the same answer we got when using the fraction bar. (Yes.) Record.

**Step 9:** Complete the remainder of the questions on S86 as a whole group.

**IP, CP, WG:** Have students work with a partner to complete the problems on S87 and S88. Then come back together as a class and share their results. {Algebraic Formula, Verbal Description, Graphic Organizer}

**Percents in Real-Life Situation** (M, GP, CP, IP, WG) S89, S90, S91, S92, S93 and S94 (Answers on T186, T187, T188, T189, T190 and T191.)

**M, GP, WG, CP :** Students will work with the percent proportions to find the percent of a number in real-life situations using SOLVE. Make sure students know their designation as Partner A or Partner B. {Graph, Algebraic Formula, Verbal Description}

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**MODELING**

Percents in Real-Life Situations

**Step 1:** Have student pairs brainstorm real-life situations where they use percents. Give students a chance to share with the whole group and list them on the board. Have students write down the list below and have them offer definitions.
*Teacher Note: If you choose, you can use another strategy to explore the percent vocabulary with students. Be sure to post these on the word wall as they may be unfamiliar to some students.

**Tax:** Tax is paid at the store on items you purchase, or income tax on what you earn. (You may want to make up a sample paycheck showing taxes paid.)

**Markups and Markdowns:** When you purchase a pair of jeans at a store, the store paid the distributor the wholesale price. The store then “marks” the price up to the retail price to sell it to the customer. When the jeans get old, they “mark” the price down to sell faster.

**Gratuities:** Tip (like you pay in a restaurant.)

*Teacher Note: A tip at a restaurant does not need to include the tax. The lesson does not include the tax.

**Commissions:** Some sales people do not make a salary. Instead they get paid a percent of the cost of the merchandise they sell. This is called commission.

**Fees:** Fees can be charged for many things. Some stores charge a restocking fee that is a percent of the cost of the item if you return it. On-line stores charge shipping fees, which can be a percent of the amount you spend.

**Shipping and Handling:** When calculating the tax for a purchase, most states include the shipping and handling cost.

*Have students turn to S89 and explain this page can be used as a resource for the vocabulary that was discussed.

**Step 2:** Have students turn to page S90. Have student pairs complete the S and O steps and review as a whole group.

**Step 3:** Partner A, explain how you would line up a plan in the L Step.

What is the plan of action? (Set up a percent proportion and solve.)

Record. What is the operation(s) we will use? (Multiplication, division)

Record.

**Step 4:** Have partners discuss and give an estimate. (Answers will vary.) Carry out your plan.

\[
\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{100} \quad \Rightarrow \quad \frac{x}{130} = \frac{12}{100} \quad \Rightarrow \quad 100x = 1,560 \quad \Rightarrow \quad x = 15.60
\]
LESSON 9: Percents in Real-Life Situations

**Step 7:** Discuss the questions in the E Step together.
- Does your answer make sense? (Compare your answer to the question.) Yes, because I found the amount of the convenience fee.
- Is your answer reasonable? (Compare your answer to the estimate.) Yes, because $15.60 is more than $13.00.
- Is your answer accurate? (Check your work.) Yes.
- Write your answer in a complete sentence. (The fee will be $15.60.)

**IP, CP, WG:**

Have students work with a partner to complete the SOLVE problems on S91 - S94. Have students refer to S89 on the different scenarios. Problems will have more than one proportion to set up. Have pairs of students share their results. {Algebraic Formula, Verbal Description, SOLVE, Graphic Organizer}

*Teacher Note: You can assign SOLVE problems to different pairs or groups of students and have them present them to the whole class as an option.

**If time permits...**

Have students complete the problem on S95. Students will see how the answer would change if discounts were combined instead of taken separately at the store. This is an excellent extension or challenge problem for students.

[CLOSURE]

To wrap up the lesson, go back to the essential questions and discuss them with students.

- What does percent mean? (how many out of 100)
- Explain how to find the total cost of an item that has 8% tax. (First, find the amount of the tax. Use the percent proportion to find 8% of the cost. Then add that amount to the original cost.)
- If a store has a sale of 20% off all merchandise and you have a 10% off coupon, will you get 30% off of the original price? Explain why or why not. (No, the store will take 20% off the original price and then take 10% off of the reduced price. The store takes off less money this way.)

[HOMEWORK] Assign S96 for homework. (Answers on T193.)

[QUIZ ANSWERS] T194 – T196

The quiz can be used at any time as extra homework or to see how students progress on finding percents and applying percents in real-life situations.
Warm-Up

**Directions:** Find each product.

1. $300 \times 0.5$
   - 150

2. $120 \times 0.75$
   - 90

3. $1.5 \times 0.5$
   - 0.75

4. $10.8 \times 0.4$
   - 4.32

5. $20.8 \times 0.25$
   - 5.2

Here is the key to S82.
Terry makes $50 a week babysitting his brothers and sisters. He saves 30% of the money each week to go on a trip with his school. How much does he save each week?

S Underline the question.
This problem is asking me to find the amount Terry saves each week.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts.
**Terry earns $50 per week; saves 30% of money**

L Write in words what your plan of action will be. Create a fraction bar model to represent the situation. Divide the bar into ten equal sections, each representing 10%. Divide the total amount earned weekly by ten to represent the amount that is equivalent to each group of 10%. Shade the percent he saves and compare that to the amount saved.

Choose an operation or operations. Fraction bar model

V Estimate your answer. **Less than $25**
Carry out your plan.

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<td>$30</td>
<td>$35</td>
<td>$40</td>
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</table>

30% of $50 is equal to $15.00.

E Does your answer make sense? (Compare your answer to the question.) Yes, because I was looking for the amount he saves each week.
Is your answer reasonable? (Compare your answer to the estimate.) Yes, because my answer is less than $25.00.
Is your answer accurate? (Check your work.) Yes.
Write your answer in a complete sentence. **Terry saves $15.00 each week.**
Terry makes $50 a week babysitting his brothers and sisters. After saving his money and spending 40% on baseball cards, Terry puts 15% of his weekly earnings in his pocket to spend however he wants during the week. How much does he keep to spend each week?

S Underline the question.
This problem is asking me to find the amount Terry keeps to spend each week.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts.
Terry earns $50 per week; keeps 15% to spend

L Write in words what your plan of action will be. Create a fraction bar model to represent the situation. Divide the bar into ten equal sections, each representing 10%. Divide the total amount earned weekly by ten to represent the amount that is equivalent to each group of 10%. Shade the percent he saves and compare that to the amount saved.
Choose an operation or operations. Fraction bar model

V Estimate your answer. Less than $10
Carry out your plan.

$0 $5 $7.50 $10 $15 $20 $25 $30 $35 $40 $45 $50

Terry keeps $7.50.

E Does your answer make sense? (Compare your answer to the question.) Yes, because I was looking for the amount he keeps for spending money each week.
Is your answer reasonable? (Compare your answer to the estimate.) Yes, because my answer is less than $10.00
Is your answer accurate? (Check your work.) Yes.
Write your answer in a complete sentence. Terry keeps $7.50 for spending money each week.
Terry makes $50 a week babysitting his brothers and sisters. Besides the money he saves, he also spends 40% each week on baseball cards. How much does he spend on baseball cards each week?

Underline the question.
This problem is asking me to find the amount Terry spends each week on baseball cards.

Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts.
Terry earns $50 per week; spends 40% on baseball cards

Write in words what your plan of action will be. Create a fraction bar model to represent the situation. Divide the bar into ten equal sections, each representing 10%. Divide the total amount earned weekly by ten to represent the amount that is equivalent to each group of 10%. Shade the percent he spends on baseball cards and compare that to the amount spent on baseball cards.
Choose an operation or operations. Fraction bar model

Estimate your answer. Less than $25

Carry out your plan.

He spends $20.00 on baseball cards.

Does your answer make sense? (Compare your answer to the question.) Yes, because I was looking for the amount he spends each week on baseball cards.
Is your answer reasonable? (Compare your answer to the estimate.) Yes, because my answer is less than $25.00
Is your answer accurate? (Check your work.) Yes.
Write your answer in a complete sentence. Terry spends $20.00 each week on baseball cards.
Here is the key to S86.

**Directions:** Complete this page with your teacher and partner.
The fraction bar model is useful, but what if it is not convenient to draw a model? When we have percents that make the model impractical, we can use equivalent ratios.
Let’s look at the problem from S83 in another way.
Terry makes $50 a week babysitting his brothers and sisters. He saves 30% of the money each week to go on a trip with his school. How much does he save each week?

We have written our fraction bar as a **vertical** fraction bar.
Describe how this fraction bar is different from the one on S83. **It is turned, so that it is up and down (vertical) instead of left and right (horizontal).**
Describe how it is the same. **The percents and the dollar values are the same.**

Writing our fraction bar in a vertical position will help us to set up the problem in a different way.

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<th>Terry’s money</th>
<th>Percent</th>
<th>Percent as a ratio</th>
<th>Percent Proportion</th>
<th>Solving the percent proportion for $x$</th>
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<td>$50$</td>
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Is this the same answer we got when we used the fraction bar model on S83 to determine the amount he saved each week? **Yes.**

Explain why. **We drew a line at the 30% mark on the fraction bar. That corresponded to the amount of $15 on the side that was marked into sections of dollars with a total of $50.**

How did we solve the problem on this page? **by using a vertical fraction bar to represent the percent proportion and solving for $x$**; $\frac{part}{whole} = \frac{\%}{100}$

Make a prediction about whether or not this will work with the other amounts that Terry spent. **Yes.** Explain why or why not? **We can use the same formula and find the other amounts.**
**LESSON 9: Percents in Real-Life Situations**

**Directions:** Complete this page with your partner.

Use the information from the problems on S84 and S85 and a vertical fraction bar to solve the problems using a percent proportion.

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<td>$15$</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$20$</strong></td>
<td>40%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$25$</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$30$</td>
<td>60%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$35$</td>
<td>70%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$40$</td>
<td>80%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$45$</td>
<td>90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$50$</strong></td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Olivia took a survey of 200 students to find their favorite type of movie. 48% chose comedy. Use the percent proportion to find the number of students who chose comedy as their favorite type of movie.

**S** Underline the question.
This problem is asking me to find the number of students who chose comedy.

**O** Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts.
Survey of 200 students; 48% chose comedy; use a percent proportion

**L** Write in words what your plan of action will be. Write a ratio that compares the part who chose comedy to the total number of students surveyed. Then, set up a proportion using the two ratios of part to whole and solve it by cross multiplying.
\[
\frac{\text{part}}{\text{whole}} = \frac{48}{100}
\]
Choose an operation or operations. Multiplication, division

**V** Estimate your answer. About 100 people

Carry out your plan.
\[
\frac{x}{200} = \frac{48}{100}
\]
\[
100x = 9,600
\]
\[
x = 96
\]

**E** Does your answer make sense? (Compare your answer to the question.) Yes, because I was looking for the number of students who chose comedy.

Is your answer reasonable? (Compare your answer to the estimate.) Yes, because my answer is less than 100.

Is your answer accurate? (Check your work.) Yes.

Write your answer in a complete sentence. The number of students who chose comedy was 96.
LESSON 9: Percents in Real-Life Situations

Here is the key to S89.

**Directions:** Complete this page with your teacher and partner.

There are many real-life situations in which percents are used. Below are a few examples.

<table>
<thead>
<tr>
<th>Real-Life Percents</th>
<th>Explanation</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tax</td>
<td>Tax is paid at the store on items you purchase or as income tax paid on what you earn.</td>
<td>An item costs $12.00. The tax is 8%. The total cost of the item is $12.00 + tax which is $0.96 for a total of $12.96.</td>
</tr>
<tr>
<td>2. Markups and Markdowns</td>
<td>When you purchase an item at a store, the store paid the distributor the wholesale price. The store then “marks” the price up to the retail price to sell it to the customer. When the jeans get old, they “mark” the price down to sell faster.</td>
<td>The Jeans Depot pays $12.00 for each pair of jeans they buy from the factory. They sell the jeans for $24.00. That is a markup of 100%.</td>
</tr>
<tr>
<td>3. Gratuities</td>
<td>paying a tip at a restaurant or for a service such as parking the car or cleaning a hotel room is a gratuity</td>
<td>A family of six goes to a restaurant. Their total bill is $120. There is a note on the menu that says, for groups of 6 or more, a gratuity of 18% will be added to the bill. The cost of the meal is $120 + $21.60 = $141.60</td>
</tr>
<tr>
<td>4. Commissions</td>
<td>the percent of the cost of the merchandise a person sells</td>
<td>Mr. Jones sells a car that has a selling price of $18,000. His commission on the sale is 3%. That means he earned $540 for selling the car.</td>
</tr>
<tr>
<td>5. Fees</td>
<td>Fees can be charged for many things. Some stores charge a restocking fee that is a percent of the cost of the item if you return it. On-line stores charge shipping fees, which can be a percent of the amount you spend.</td>
<td>You order a DVD set online for a gift. The DVD set has a price of $35.00, but there is a 5% shipping charge. That means the DVD set will cost $35.00 + $1.75 or a total of $36.75 before tax.</td>
</tr>
<tr>
<td>6. Shipping and Handling</td>
<td>Most states tax on the shipping and handling charges.</td>
<td>A washer cost $1,000 and the company charges a 10% shipping and handling charge. Sales tax is 7%. This means the cost is $1,000 + $100 = $1,100. Now add the tax $1,000 + $77 = $1,177.</td>
</tr>
</tbody>
</table>
Jeannie bought concert tickets online for $130.00. There is a 12% convenience fee. How much is the fee?

S Underline the question.
This problem is asking me to find the amount of the fee.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. $130.00, 12% fee

L Write in words what your plan of action will be. Set up a percent proportion and solve.
Choose an operation or operations. Multiplication, division

V Estimate your answer. More than $13.00
Carry out your plan.
\[
\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{100}; \quad \frac{x}{130} = \frac{12}{100}; \quad 100x = 1,560; \quad x = $15.60
\]

E Does your answer make sense? (Compare your answer to the question.) Yes, because I found the amount of the convenience fee.
Is your answer reasonable? (Compare your answer to the estimate.) Yes, because $15.60 is more than $13.00.
Is your answer accurate? (Check your work.) Yes.
Write your answer in a complete sentence. The fee will be $15.60.
LESSON 9: Percents in Real-Life Situations

Here is the key to S91.

Directions: Complete the following SOLVE problem with your partner.

Jillian works at a Sports Store. She just got a shipment of new baseball gloves. The wholesale price for the baseball gloves is $10.50. Jillian has been told to give the gloves a mark-up of 80% before putting them on the shelf to sell. What should she put as the selling price of the gloves?

S Underline the question.
This problem is asking me to find the price to put on the gloves before putting them on the shelf.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. Wholesale price $10.50, Mark-up of 80%

L Write in words what your plan of action will be. Set up a percent proportion comparing 80% to the part of $10.50 of the wholesale price. Add the answer to the original wholesale price. Choose an operation or operations. Multiplication, division, addition

V Estimate your answer. Less than $20.

Carry out your plan.

\[
\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{100} \\
\frac{x}{10.50} = \frac{80}{100} \\
100x = 840 \\
x = 8.40 \text{ is the mark-up} \\
$10.50 + $8.40 = $18.90
\]

E Does your answer make sense? (Compare your answer to the question.) Yes, I found the amount of money for which the gloves should be sold.

Is your answer reasonable? (Compare your answer to the estimate.) Yes, because $18.90 is less than $20.

Is your answer accurate? (Check your work.) Yes.
Write your answer in a complete sentence. Jillian should price the baseball gloves at $18.90.
Directions: Complete the following SOLVE problem with your partner.

Mr. Sheldon took his family out to dinner. | The total cost of the dinner without tax was $52.00.| The tax in their state is 8%. | Mr. Sheldon would also like to leave a tip of 18% of the bill, not including the tax. | How much will the entire dinner cost Mr. Sheldon, including tax and tip?

S Underline the question.
This problem is asking me to find the cost of dinner including tax and tip.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. Cost $52.00
Tax – 8%
Tip – 18%, not including the amount for tax

L Write in words what your plan of action will be. Set up two percent proportions comparing 8% and 18% to the part of $52.00 that dinner cost. Add them both to the original cost of dinner.
Choose an operation or operations. Multiplication, division, addition

V Estimate your answer. About $67.
Carry out your plan.

\[
\begin{align*}
\frac{\text{part}}{\text{whole}} &= \frac{\text{percent}}{100} \\
\frac{x}{52} &= \frac{8}{100} \\
100x &= 416 \\
x &= 4.16 \text{ tax} \\
\text{part} &= \frac{\text{percent}}{100} \\
\frac{x}{52} &= \frac{18}{100} \\
100x &= 936 \\
x &= 9.36 + \text{tip} \\
$52.00 + $4.16 + $9.36 &= $65.52
\]

E Does your answer make sense? (Compare your answer to the question.) Yes, I found the amount of money that dinner will cost with tax and tip.
Is your answer reasonable? (Compare your answer to the estimate.) Yes, because $65.52 is less than $67.
Is your answer accurate? (Check your work.) Yes.

Write your answer in a complete sentence. Mr. Sheldon should pay $65.52 including tax and tip.
LESSON 9: Percents in Real-Life Situations

Here is the key to S93.

**Directions:** Complete the following SOLVE problem with your partner.

Betsy works at an electronics store. She gets a 22% commission for every computer she sells. This week, she sold $2,540 worth of computers. How much money should she expect in her commission check?

**S** Underline the question.
This problem is asking me to find the amount of money in Betsy’s commission check.

**O** Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. 22% of sales
Sold $2,540 worth of computers

**L** Write in words what your plan of action will be. Set up a percent proportion comparing 22% to the part of $2,540 that Betsy sold.

Choose an operation or operations. Multiplication, division

**V** Estimate your answer. A little more than $500.

Carry out your plan.

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

\[
x \times \frac{22}{100} = \frac{2540}{100} \times \frac{100}{100} = \frac{55880}{100}
\]

\[x = 558.80\]

**E** Does your answer make sense? (Compare your answer to the question.) Yes, I found the amount of money that should be in Betsy’s commission check.

Is your answer reasonable? (Compare your answer to the estimate.) Yes, because $558.80 is more than $500.

Is your answer accurate? (Check your work.) Yes.

Write your answer in a complete sentence. Betsy should get a commission check of $558.80 for the week.
LESSON 9: Percents in Real-Life Situations

Here is the key to S94.

Directions: Complete the following SOLVE problem with your partner.

Norma is going shopping for new clothes. The store she is shopping at is having a 25% off everything sale. Norma also has a 10% off coupon. She has picked out two pair of jeans and three shirts. Her purchases come to a total of $212.45 before any of the discounts. How much will she have to pay after the discounts, not including the tax?

S Underline the question.
This problem is asking me to find the amount of Norma’s purchases after the discounts, but before tax.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts. Total of $212.45
25% off store-wide
10% off coupon

L Write in words what your plan of action will be. Set up two percent proportions, one comparing 25% to the part of the total she purchases. Take that amount away from the original price. Then set up a new percent proportion comparing 10% to the part of the new purchase price. Subtract this amount.

Choose an operation or operations. Multiplication, division, subtraction

V Estimate your answer. Less than $150.

Carry out your plan.

\[
\begin{align*}
\frac{\text{part}}{\text{whole}} &= \frac{\text{percent}}{100} \\
\frac{212.45}{100} &= \frac{25}{100} \\
100x &= 5311.25 \\
x &= 53.11 \\
212.45 - 53.11 &= 159.34
\end{align*}
\]

\[
\begin{align*}
\frac{\text{part}}{\text{whole}} &= \frac{\text{percent}}{100} \\
\frac{x}{100} &= \frac{10}{100} \\
x &= 15.93 \\
159.34 - 15.93 &= 143.41
\end{align*}
\]

E Does your answer make sense? (Compare your answer to the question.) Yes, I found the amount of money that Norma should pay before taxes.
Is your answer reasonable? (Compare your answer to the estimate.) Yes, because $143.41 is less than $150.
Is your answer accurate? (Check your work.) Yes.
Write your answer in a complete sentence. Norma’s purchases are $143.41 after the discounts, but without tax.
Here is the key to S95.

**Directions:** Complete this page with your partner.

Look back at the solve problem on page S94. When stores have more than one “percent off” coupon, they take off the percent of one coupon, then apply the percent of the second coupon to the remaining price.

Here is a situation which might help explain why.

Mrs. Roberts wanted to buy herself a pair of diamond earrings. The one-carat diamond earrings normally cost $1,200. This weekend they are on sale for 60% off. Saturday morning between 7 and 9 am, they are an additional 15% off. Mrs. Roberts also got a 30% off coupon in the mail, as long as she uses her store credit card. Find the cost of the diamond earrings, once all discounts are taken.

Discounts applied separately

<table>
<thead>
<tr>
<th>Discount</th>
<th>Formula</th>
<th>Calculation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>60% off</td>
<td>$\frac{x}{1200} = \frac{60}{100}$</td>
<td>$100x = 72,000$</td>
<td>$x = 720$ off</td>
</tr>
<tr>
<td>15% off</td>
<td>$\frac{x}{480} = \frac{15}{100}$</td>
<td>$100x = 7200$</td>
<td>$x = 72$</td>
</tr>
<tr>
<td>30% off</td>
<td>$\frac{x}{408} = \frac{30}{100}$</td>
<td>$100x = 12,240$</td>
<td>$x = 122.40$</td>
</tr>
</tbody>
</table>

Discounts together

$60\% + 15\% + 30\% = 105\%$

<table>
<thead>
<tr>
<th>Formula</th>
<th>Calculation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{x}{1200} = \frac{105}{100}$</td>
<td>$100x = 126,000$</td>
<td>$x = 1260.00$ off</td>
</tr>
</tbody>
</table>

The store would owe Mrs. Sanders $60!

Final cost: $285.60
LESSON 9: Percents in Real-Life Situations

Here is the key to S96.

Name ___________________  Date ____________________

Directions: Complete each problem.

1. Use the fraction strip to find 60% of 330. 198

2. Use the fraction strip to find 45% of 600. 270

3. What is 42% of 450? 189

4. What is 79% of 800? 632

5. Tiffany sells cars. She gets an 18% commission. How much will she make on a $28,000 car? $5,040

6. In a survey, 30% of 180 students said math was their favorite subject. How many students chose math? 54

7. Misty returned a $655 washing machine. The store charges a 12% re-stocking fee. How much of her money will Misty get back? $576.40

8. Jeffrey ate out for lunch. His meal cost $10.50. He would like to leave a 18% tip. What is the total cost? $13.36

9. Pam works for a toy store. A new shipment of games just arrived. The wholesale price was $9.00, and the store has a 120% mark up. What is the retail price? $19.80

10. Trina is purchasing a new bike. The store is having a 20% off sale, and she has a 10% coupon. The original price of the bike is $89.75. What is the final price? $64.62
LEsson 9: Percents in Real-Life Situations

Name ________________________________ Date __________

Quiz

1. What is 80% of 300?

0% 100%

0

A. 80  B. 100  C. 180  D. 240

2. What is 35% of 550?

0% 100%

0

A. 165  B. 192.5  C. 200.5  D. 220

3. What is 48% of 380?

A. 12.63  B. 79.17  C. 132.8  D. 182.4
4. Nolan surveyed 350 students at his middle school. Pizza was the favorite lunch of 42% of the students. How many students chose pizza?
   A. 84
   B. 103
   C. 147
   D. 157

5. Reshaun sells houses. He gets a 4% commission for every house he sells. This month he sold $518,000 worth of houses. How much does he earn in commission?
   A. $2,072
   B. $20,720
   C. $22,720
   D. $200,720

6. Nico works at a clothing store. The store paid a wholesale price of $12.00 for a pair of sneakers. They then marked the price up by 80%. After two months, they discounted the sneakers by 30%. What is the final price of the sneakers?
   A. $6.72
   B. $15.12
   C. $16.32
   D. $25.20

7. Jerry is purchasing books on-line. The books cost $65.00. There is a shipping and handling fee of 6%. How much will the books cost him including tax and the shipping and handling fee?
   A. $66.30
   B. $68.90
   C. $70.20
   D. $74.41
LESSON 9: Percents in Real-Life Situations

8. Jessica took her friends out to lunch. The cost of lunch for all of them was $38.00. The tax rate is 6%, and Jessica would like to leave a 15% tip. How much did lunch cost her including tax and tip? (Jessica only pays the tip on the $38.00.)

A. $7.91
B. $30.09
C. $43.70
D. $45.98

9. Marco is purchasing a present for his mother. He found a great watch that is normally $115.00 for 35% off. He also has a 15% off coupon. How much will the watch cost before tax?

A. $57.50
B. $63.54
C. $65.90
D. $74.75

10. Victoria has a coupon for 30% off of any item in a department store. She decides to purchase a treadmill. The original price of the treadmill is $595. There is also 7% sales tax in her state. What is the final price of the treadmill, including tax?

A. $416.50
B. $445.66
C. $458.15
D. $636.65