8-2008

Making Percents Make Sense

Melissa Leigh Abbott
The College at Brockport

Follow this and additional works at: http://digitalcommons.brockport.edu/ehd_theses
Part of the Junior High, Intermediate, Middle School Education and Teaching Commons, and the Mathematics Commons

To learn more about our programs visit: http://www.brockport.edu/ehd/

Repository Citation
http://digitalcommons.brockport.edu/ehd_theses/261

This Thesis is brought to you for free and open access by the Education and Human Development at Digital Commons @Brockport. It has been accepted for inclusion in Education and Human Development Master’s Theses by an authorized administrator of Digital Commons @Brockport. For more information, please contact kmyers@brockport.edu.
Making Percents Make Sense

by

Melissa Leigh Abbott

August 1st, 2008

A thesis or project submitted to the
Department of Education and Human Development of the
State University of New York College at Brockport
In partial fulfillment of the requirements for the degree of
Master of Science in Education
Making Percents Make Sense

by

Melissa Leigh Abbott

APPROVED BY:

[Signature]

Adviser

[Signature]

Director, Graduate Programs

[Signature]

Date

7/31/08

Date

8/1/08
Table of Contents

Chapter One: Introduction ................................................................. 1
Chapter Two: Literature Review ...................................................... 3
Chapter Three: Curriculum Project ................................................. 12
Chapter Four: Conclusions ............................................................. 67
Chapter Five: Appendix ................................................................. 73
Introduction

During the course of students’ mathematical endeavors throughout middle and high school we often hear students asking the nagging question, “When are we ever going to use this in real life?” The usefulness of mathematics taught in schools due to state standards is sometimes trivial for students who only see the need for basic mathematical procedures such as simple addition, subtraction, multiplication, and division. Sadly our American culture predominantly relies on calculators or cashier registers to do our math calculations especially when calculating percentages. The conceptual idea of figuring out percentages has been lost due to the enhancement of technology. In a sense, technology has allowed our culture to disengage their mathematical knowledge without any major apprehensions.

As educators of mathematics, it is our job to show the relevance of contextual material in a light that students find significant to do without the use of technology. Since percentages are used in everyday life when calculating income, store prices, restaurant bills, bank interest rates, and commission percentages students need to learn the fundamental basics of how to calculate these daily life encounters. Claudi Alsina (2002) said, “Education is for the majority of people the only key to their future. Mathematics is in this sense a major tool to allow this key to turn in the keyhole of our society.” (pg. 239). At the middle school level especially, students unfortunately lack the maturity level necessary to fully understand what math skills they need in order to be successful later on in life. The overall picture is distorted due to their immature brains which aren’t fully developed to think contextually.
Unfortunately the majority of my students lack basic math skills along with common sense to every day math applications that affect them. Similarly, they also possess deficient reading capabilities when it comes to pulling out important information and comprehending word problems. If I can get my students to understand different types of percentages and how they will affect their lives now and later on, I feel that they will be able to successfully solve percent proportion problems. Therefore I have decided to create a curriculum project to utilize in my eighth grade classes that uses hands on activities and different literacy techniques to help students set up and solve percent problems that they can relate to.

My curriculum project will be designed around self made notes, guided practices, hands on activities, homework worksheets, and self made quizzes and test. Throughout the unit different literacy strategies such as anticipation guides and graphic organizers will be incorporated to strengthen students' understandings of different percent proportions. Graphic organizers will also be used as great study tools before quizzes and their unit test. Word problem strategies will also be integrated in the percents unit such as highlighting, pulling out important information, underlining, and re-reading. After implementing numerous strategies to use for vocabulary development and reading comprehension, students will have a better understanding about percentages that they will encounter throughout their lives. Hopefully after seeing the benefits of including different math and reading strategies in the percents unit, I can continue using similar tactics in other units to increase students' math knowledge and academic success. Incorporating different reading
strategies and vocabulary development into my math classroom will help strengthen students’ general decoding processes and test taking strategies across the entire curriculum.

**Literature Review**

Implementing hands on activities is vital in any mathematics classroom to give students a sense of real world experiences. Hands on activities allow students to “engage in mathematics in ways that meet the needs of that individual’s current and future life as a constructive, concerned and reflective citizen.” Alsina (2002 pg, 241). The percents unit gives students the fundamentals for when they enter the job world and after they leave school and eventually buy a car or a house. Not only are students engaged in hands on activities, but it gives them an experience to relate back to when trying to figure out word problems and find the solution. As teachers “we can find in our home-made materials great opportunities to bring ‘real’ objects into the class and to provoke an experimental research” Alsina (2002 pg. 246) that intrigues students to want to learn more about different percentages that greatly affect their lives.

Across the country many students and adults will admit to hating math, mainly because they are forced to take three years in high school in order to graduate. This ever spreading negative attitude has also caused a scarcity of math teachers. One main reason that people see a problem with taking three years of math is because they are being taught “topics like quadratic equations and alternate exterior angles” Burke (1991 pg. 67) that become irrelevant to students once they step out of the math classroom. It is said by many that “Adults need percents, logic, statistics, a sense of
numbers, step-by-step thinking. That can be covered in one year of high school math," Burke (1991 pg. 67) in order to be prepared for the real world. “The topic of percents would include compound interest received on savings or paid on credit cards and mortgages,” Burke (1991 pg. 67) which are relevant to most people once they leave high school. Unless students see the relevance of any subject matter to their own life, it is unlikely that they will retain any concepts. A quote by Schorling, Clark and Mallory (1936) said making “mathematics meaningful and useful will enable the pupil to understand something of the great contribution which mathematics has made and is making to civilization.” (pg. 794) sums up expectations of math educators in the classroom. Since the topic of percents is needed for basic life skills, New York State has made it a state standard to teach at the middle school level (8.N.4—Apply percents to tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities). The percents unit has many “multi-level problems that are connected to real-world experiences” that teachers can “provide manipulatives for students to use, and offer opportunities for children to work collaboratively in pairs and small groups.” Kazemi and Stipek (2001 pg. 60).

Students struggle immensely with comprehending what different forms of percentages such as taxes, commission rates, interest rates, discounts, and tips mean in real life contexts. Comprehension in math problems causes a major dilemma because “On standardized assessments, students are increasingly challenged to read, create, use, and comprehend numerous mathematical representations as a way of demonstrating mathematical literacy.” Capraro (2006 pg. 92). Since I teach regular
education and special education students I need to create real life situations that students can relate to in order for them to grasp concepts. My special education students struggle especially because they already have “significant skill deficits” and are “highly unlikely ever to function at grade level in mathematics.” McLeod and Armstrong (1982 pg. 306). Given that I have had little training in how to meet special education students’ needs like many other regular education teachers, I “have minimal exposure to, and knowledge of, the problems and characteristics of intermediate and secondary school-age students with learning disabilities.” McLeod and Armstrong (1982 pg. 307). Likewise, teachers in general struggle with knowledge of information at the secondary level for students with disabilities because at the secondary level “little has been done to clarify the nature of mathematics disabilities in middle-grade, junior high, and senior-high students.” McLeod and Armstrong (1982 pg. 308). In general, students with disabilities struggle with percentages along with regular education students due to the lack of basic math skills, common sense, and reading comprehension. When learning percentages some math deficits can be noted as significant barriers that many students encounter such as: basic operations involving fractions, percentages in general and multiplication of whole numbers as stated by McLeod and Armstrong (1982 pg. 308).

Unfortunately for eighth grade middle school students, percent problems are almost always presented in the form of a word problem. Word problems usually present a problem for students because they lack reading comprehension skills. Students overall seem to be improving math skills yet reading skills are stagnant,
which presents a major problem when tackling word problems. One of the main reasons that reading skills are inferior to math skills is because “In 1989, educators agreed on a common standard for teaching math. For reading, no such agreement exists.” USA Today (2003 pg. 11a). Since students are not taught to read the same way, it is our job as math teachers to teach them appropriate reading strategies to use when approaching word problems. Sadly, students who struggle with reading potentially might also struggle with math because “mathematics success is dependent on reading skills” Capraro (2006 pg. 93).

Because reading has become an important aspect in the learning of mathematics, math teachers now need to incorporate “reading strategies to help students interpret and internalize mathematical concepts...by using multiple strategies across problems” Capraro (2006 pg. 91). One of the best ways to teach students reading strategies is believed to be modeling, especially at younger ages because “students learn significantly from observing” Warren (2005 pg. 52). At the beginning of the year I modeled how I solve word problems, and in turn students can copy or devise their own strategies to use when they encounter word problems. In math there is almost never one way to do a problem, therefore it is important to “stimulate students to develop and compare their own problem-solving methods” van Dijk, Oers, Terwel, and Eeden (2003 pg. 163) with each other to increase their number of math strategies. New York State standards also require us to teach students to “understand that there is no one right way to solve mathematical problems but that different methods have advantages and disadvantages.” Another step to getting students to
becoming better readers and problem solvers is to “encourage students to read aloud and discuss each passage as opposed to students reading to themselves” Capraro (2006 pg. 92). If students read aloud it forces them to make some sense of the words in the problem, versus reading to themselves and “blurring” the words and meanings together. To compliment the reading of word problems aloud is other reading strategies such as rereading the passage again one sentence at a time while underlining important information and then devising a plan as to what strategy to use with the information given. After modeling these techniques, students are able to attempt word problems at a more successful rate because they can break down what is being asked in the question. Lastly, I always encourage my students “to generate solutions and answers that make sense to them” Dijk, Oers, Terwel, and Eeden (2003 pg. 164). When dealing with percent word problems students often forget to make sure their answer makes sense. For example if a student is trying to find the total cost of an item after sales tax, many students will stop after finding just the tax instead of adding the tax to the total cost. Therefore if my students can use the reading strategies aforementioned, then students will have a better chance at successfully reaching the correct answer when dealing with percents or other word problems in general.

Teaching students different reading strategies to tackle word problems might not be enough for some. Consequently there are other things we as math teachers can do to better facilitate all students such as using graphic organizers, flashcards, anticipation guides, hands on activities, warm-ups, and tickets out the door that
involve writing to help increase the “construction of meaning and understanding” Dijk, Oers, Terwel, and Eeden (2003 pg. 166) when learning new vocabulary throughout new math topics. Anticipation guides can be a great asset when starting a new unit to see what information students already bring to the classroom and what vocabulary terms they have no background knowledge about. Anticipation guides can also “provide motivation for learning mathematics” Alsina (2002 pg 243) because they can get kids excited about the new topic about to be discovered. Another useful tactic is to have students do a writing activity everyday when they enter or leave the classroom about explaining how to find different life skills that involve percentages to strengthen vocabulary. Similarly graphic organizers can be very helpful when dealing with new vocabulary and “planning instruction for students with special needs” Andrews (1997 pg. 143). Since most of my special education students are visual learners, graphic organizers allow my students to arrange their thoughts in a form that makes sense to them. Graphic organizers help students with “organization, clarity, and stability” Lenz, Alley, and Schumaker (1987 pg. 54) as well as help with retention of material. Overall, vocabulary development can strengthen students reading comprehension and math skills by knowing what different words mean when they read word problems.

After looking at extensive research, it is clear that reading and mathematics go hand in hand. If a student is unable to successfully comprehend word problems then it is almost certain they will struggle in math and on high stake assessments. Devising reading strategies and vocabulary development is a key ingredient to
incorporate into your classroom in order for your math students to flourish. Currently my students are strong at using proportions to solve word problems dealing with percents; however they sometimes fail to obtain the correct answer due to lack of vocabulary knowledge/retention or lack of reading skills. Another way students can solve percent problems is by changing the percent to a decimal and multiply it by the original amount. Students are taught that there are numerous approaches they can use in my classroom to get the same answer, and that it is ok to solve a problem totally different than somebody else. Kennedy, Odell, Jensen, and Austin (1998) stated that “children would enjoy their educational experiences in school if more teachers provided engaging activities for their students” (pg. 938) which directly correlates with integrating hands on activities into your classroom. Activities help students internalize vocabulary and strengthen math skills by making the content material relative to their life. Making connections will not only get students interested, but also help them later on in life when trying to figure out total costs of items after sales tax or discounts, figuring out mortgage and interest rates, computing commission rates, figuring out their incomes, or even when calculating tips to give a waitress at a restaurant. These life skills using percents can be invaluable to eighth graders if made relevant to what their present or future may hold.
References


Curriculum Project

Making Percents Make Sense
Unit Plan

- Day 1: Introduction to Percents
- Day 2: Percent Proportions
- Day 3: Percent Applications
- Day 4: Percent of Change (Increase/Decrease)
- Day 5: Quiz/Anticipation Guide
- Day 6: Sales Tax & Tip
- Day 7: Commission
- Day 8: Simple Interest
- Day 9: Shopping Activity/Graphic Organizer
- Day 10: Quiz/Withholding Tax
- Day 11: Sales Price/Discount
- Day 12: Discount/Markup
- Day 13: Estimating Percents
- Day 14: Review
- Day 15: Unit Test
Day: ___1____  Topics: _______Percents________

Performance Indicator: 8.N.3

Objectives:
Students will understand the concept of percent, including amounts less than 1% and greater than 100%.

Set:
Overhead Day 1 (Warm-up)

Procedures:
M & M activity: Students will work in groups of 2 – 4. Each group will be given a bag of M & M’s to count. Students will count and record all the M & M’s in their bags. They will use this information to determine the percent of each color. After all groups have completed this task, all information will be shared in order to obtain class totals. Then each group should consider the following questions.

1. What percent of the entire class total of M & M’s are your groups green M & M’s?

2. The class’s entire amount of red M & M’s is what percent of your red M & M’s?

Closing:
When a teacher, parent, or coach asks you to give 110%, is this possible?

Homework:
The Basic Not Boring Middle Grades Math Book, Can You Canoe? p.147
Overhead Day 1 (Warm-up):

Change the following fractions to percents.

1. \(\frac{1}{2}\)  
2. \(\frac{1}{4}\)  
3. \(\frac{1}{10}\)  
4. \(\frac{4}{5}\)  
5. \(\frac{3}{8}\)  
6. \(\frac{3}{2}\)

Can you ever have a percent greater than 100?
Class Work Day 1

Math 8                     Name ________________________
M&M Lab                    Per. ______

Step 1: Count all of the M&M’s. ________________________

Which percent does this represent? ________________________

Step 2: Record the number of each color and class totals.

<table>
<thead>
<tr>
<th>Color</th>
<th>Group Amount</th>
<th>Class Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Class Total:

Step 3: Calculate the percent of each color found in your bag.

<table>
<thead>
<tr>
<th>Color</th>
<th>Fraction</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 4:

1. Find the percent of green M&M’s that your group had compared to the total number of all M&M’s in the class.

2. Find the percent of all the red M&M’s in the entire class compared to the number of red M&M’s that your group had.
CAN YOU CANOE?

Three friends have gone on a four-day canoe trip that will take them 42 miles down the Buffalo River. They have practiced their canoeing skills and boating safety on the lake and are ready to tackle a new challenge.

1. A normal 12-hour camping day consists of: 1 hour for breakfast and cleanup, 1 hour to load the canoes and take down the tents, 3 hours of morning paddling, 1 hour for swim break and lunch, 3 hours of afternoon paddling, 1 hour to unload canoes and set up camp, 2 hours for firebuilding, dinner, and cleanup.

   a. What percent of the day is used for canoeing?
   b. What percent of the day is used to swim and to prepare, eat, and clean up from meals?
   c. What percent of the day is used to load and unload canoes and set up and take down the camp?

2. Their plan calls for the following miles to be canoed each day: day one 6 miles, day two 12 miles, day three 16 miles, and day four 8 miles.

   a. What percent of the trip will be covered on the last day?
   b. The first and second day taken together represent what portion of the trip?
   c. Day three covers the most miles. What percent of the trip does this represent?

3. Sheila, Jamie, and Tony will be sharing a canoe. Each one will take turns bowing (paddling in the front of the boat), sterning (paddling and steering from the rear, and duffing (sitting in the middle resting). The chart below represents how many miles each paddler spent in each position in the canoe.

<table>
<thead>
<tr>
<th>Bowing</th>
<th>Sterning</th>
<th>Duffing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheila</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Jamie</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Tony</td>
<td>17</td>
<td>9</td>
</tr>
</tbody>
</table>

   a. Who spent the largest portion of the trip in the bow?
   b. Who spent the least amount of time duffing?
   c. Who spent the most time sterning?
   d. Who paddled the most (spent the most miles bowing and sterning)?
   e. What percent of the trip did he or she spend paddling?
Day: 2

Topics: Percents

Performance Indicator:
8.N.4

Objectives:
1.) Students will know how to use the percent proportion to find the missing information.
2.) Students will know how to write an equation to solve a percent problem.

Set:
Overhead Day 2 (Warm-up)

Procedures:
Choose three students to demonstrate their work and explain on the overhead/whiteboard. Give notes to review the percent proportion. Ask if students know of other ways to solve these problems.

Ex. Find 45% of 80.

\[ .45 \times 80 = \]

Guided/Independent Practice:
Practice Day 2

Closing:
Write a problem that one of your peers could use the percent proportion to solve?

Homework:
Pre-Algebra: Skills for Success, Middle School, Three kinds of percent problems p. 79
Overhead Day 2 (Warm-up)

Please write as a proportion and solve.

Recall: Is over Of!

1. Find 35% of 95.

2. 25 is what percent of 40?

3. 13 is 5% of what number?
Practise Day 2

1. Find 16% of 30.

4. What is 45% of 500?

2. What percent of 80 is 32?

5. 3 is what percent of 60?

3. 15% of what number is 76?

6. 50 is 25% of what number?
Three kinds of percent problems

When using proportions to solve percent problems, the denominator of one of the fractions is always going to be 100. Any of the other three numbers can be unknown and asked to be solved. Three problems are presented below in which a different unknown is solved for in each problem.

1. 15 is what percent of 75?

\[
\frac{15}{75} = \frac{n}{100}
\]

Identify what is being asked for: the percent. Set up a proportion.

\[15 \cdot 100 = 75 \cdot n\]

Multiply cross products.

\[15 \cdot 100 = 75n\]

Divide both sides by 75.

\[20 = n\]

Solve for the unknown. Thus, 15 is 20% of 75.

2. \(q\) is 30% of what number?

\[
\frac{q}{n} = \frac{30}{100}
\]

Identify what is being asked for: denominator of the fraction.

\[q \cdot 100 = 30 \cdot n\]

Multiply cross products.

\[\frac{900}{30} = \frac{30n}{30}\]

Divide both sides by 30.

\[30 = n\]

Solve for the unknown. Thus, \(q\) is 30% of 30.

3. What is 85% of 120?

\[
\frac{n}{120} = \frac{85}{100}
\]

Identify what is being asked for: numerator of the fraction.

\[\frac{100n}{100} = \frac{85 \times 120}{100}\]

Multiply cross products. Divide both sides by 100.

\[n = 102\]

Solve for the unknown. Thus, 102 is 85% of 120.

Note: In example 3, it would be just as easy to change the % to a decimal and multiply by 120, because “of” in mathematics simply means multiply.

Set up a proportion to represent each problem. Solve the proportion.

1. 45 is what percent of 90?

2. What percent of 100 is 19?

3. What is 75% of 60?

4. 35% is 7 out of what?

5. 62% of what number is 9.3?

6. 60% of what number is 50.4?

7. 7 out of 28 is what percent?

8. 90 is 100% of what number?

9. How much is 72% of 54?

10. What percent of 132 is 76.56?
Day: _____3_____

Topics: ___Percent Proportion Application

Performance Indicator:
8.N.4

Objectives:
3.) Students will know how to use the percent proportion to find the missing information.
4.) Students will know how to write an equation to solve a percent problem.

Set:
New York Middle School Mathematics: A Review Book p.77 #1-4

Procedures:
Go over warm-up with students and underline key terms for reference ...is & of. Work through Guided Practice problems together.

Guided/Independent Practice:
Practice Day 3

Closing:
Discuss #8 from warm-up

Homework:
Pre-Algebra: Skills for Success, Middle School, Solving Percent Word Problems p.80
Focus on the Idea
Percent problems can be solved by writing a proportion and using the cross-products rule or by changing the percent to a decimal and multiplying.

Practice
Write and solve a proportion for each question. Round your answers to the nearest tenth, if necessary. The first one is done for you.

1. 25 is what percent of 300?
   \[
   \frac{25}{300} = \frac{x}{100}
   \]
   \[
   2,500 = 300x
   \]
   \[
   x = \frac{2,500}{300}
   \]
   8.3% = x

2. 8 is 20% of what number?
   \[
   8 = \frac{20}{100} \times x
   \]
   \[
   8 = 0.2x
   \]
   \[
   x = \frac{8}{0.2}
   \]
   40

3. What is 30% of 90?
   \[
   0.3 \times 90 = x
   \]
   \[
   x = 27
   \]

4. 40 out of 50 is what percent?
   \[
   \frac{40}{50} = \frac{x}{100}
   \]
   \[
   4000 = 50x
   \]
   \[
   x = \frac{4000}{50}
   \]
   80%

Apply the Idea
Write a proportion or use a decimal to solve each exercise.

5. A survey reported that 62% of the town residents support the mayor. The town has 17,500 residents. How many residents support the mayor? ____________

6. If 234 grams of ore produce 36 grams of copper, what percent of copper does the ore contain? Round to the nearest tenth of a percent. ____________

7. A sales representative's commission is 3% of the total of her sales. How much commission will she earn if she sells a car for $15,000? ____________

Write About It
8. Write a few sentences using some of the following words: often, never, sometimes, always, seldom, usually, once in a while, rarely. Then rewrite each sentence, using a percent instead of the word in the list.

______________________________
______________________________
______________________________
______________________________
Practice Day 3

Directions: Write and solve proportions for the following problems. Underline important information to help you set up the proportion.

1.) A survey reported that 62% of the town residents support the mayor. The town has 17,500 residents. How many residents support the mayor?

2.) If 234 grams of ore produce 36 grams of copper, what percent of copper does the ore contain? Round to the nearest tenth of a percent.

3.) There were 120 questions on the test. Darla answered 87.5% of the questions correctly. How many questions did Darla answer correctly?

4.) During basketball practice Jaquan made 32 free throws. He made 40% of the free throws he attempted. How many free throws did Shawn attempt during practice?
Solving percent word problems

Just as word problems are solved through mathematics, the same methods can be used to solve those problems involving percents.

1. Bob must make at least 75% of his free throws to advance to the final competition. How many free throws must Bob make out of 52 to advance?

First, identify what you are looking for: # of free throws.

\[
\frac{n}{52} = \frac{75}{100}
\]

Set up a proportion with given information and solve.

\[
n \times 100 = 52 \times 75
\]

Multiply cross products.

\[
\frac{100n}{100} = \frac{3900}{100}
\]

Divide both sides by 100.

\[
n = 39
\]

Solve for the unknown. Thus, Bob must make 39 free throws.

2. Each item at a sale was reduced 25%. What was the regular price of a shirt that is reduced $9?

First, identify what you are looking for: item’s regular price.

\[
\frac{q}{n} = \frac{25}{100}
\]

Set up a proportion with given information and solve.

\[
\frac{100q}{25} = \frac{25n}{25}
\]

Multiply cross products. Divide both sides by 25.

\[
36 = n
\]

Solve for the unknown. Thus, the regular price of the shirt is $36.

Solve each problem by setting up a proportion.

1. Molly made $30 in tips from her customers. If the total of her customers’ bills was $200, what percent did her customers tip?

2. How many problems did Robert get right out of 40 if he received an 87.5% on his test?

3. Mary has sold 90 boxes of cookies. If her goal was to sell 120 boxes, what percentage of her goal has she sold?

4. How much did Tom pay in income tax on a gross income of $50,000 if 9% of his income was taxed?

5. How much is a $48 shirt that is on sale for 25% off?

6. Janet borrowed $5,500 from the bank at an interest rate of 7\(\frac{1}{2}\)% for one year. Assuming she pays it back on time, how much interest will she pay?
Day: 4

Topics: Percent Increase/Decrease

Performance Indicator: 8.N.4

Objectives:
Students will know how to use the concept of percent of increase or percent of decrease to find the missing information.

Set:
Overhead Day 4 (Warm-up)

Procedures:
To find the percent of change, first find the amount of change (see set). Then set up the following proportion:

\[
\frac{\%}{100} = \frac{Amount\text{OfChange}}{Original\text{Amount}}
\]

Guided/Independent Practice:
Find the percent of change using the problems from Overhead Day 4 (Warm-up)

Closing:
Real life example: Since the price of gas has increased, the price of food has also increased. Macaroni and Cheese used to cost $0.33. Now it cost $0.45. Find the percent of change.

Homework:
Masterminds Riddle Math Series, Pre-Algebra: Why does an empty wallet always stay empty? Pg 66.
Determine if the original amount increased or decreased, and find the amount of change.

1. Original amt: $52  
   New amount: $37

2. Original amt: $126  
   New amount: $154

3. Original amt: $5000  
   New amount: $2500

4. Original amt: $85  
   New amount: $100
**Why does an empty wallet always stay empty?**

DIRECTIONS: Find the percent of change in the problems below. Round to the nearest whole percent.

1. old: $325
   new: $375
   percent of change = ______ (y)

2. old: $65.00
   new: $68.25
   percent of change = ______ (r)

3. old: $75
   new: $85
   percent of change = ______ (v)

4. Greg weighed 140 pounds. On his diet he lost 15 pounds. What was the percent of decrease in Greg's weight? ______ (g)

5. You can warm up your spaghetti on a gas range in 10 minutes. You can warm up that same spaghetti in the microwave in 2 minutes. Find the percent of decrease in cooking time. ______ (a)

6. A $12 cassette disc is increased to $18.00. What is the percent of increase? ______ (i)

7. old: $57.30
   new: $37.60
   percent of change = ______ (e)

8. old: $150
   new: $135
   percent of change = ______ (s)

9. old: $3.00
   new: $3.60
   percent of change = ______ (t)

10. old: $16
    new: $28
    percent of change = ______ (c)

11. $38 sweater increased to $48
    percent of increase = ______ (h)

12. old: $2,200
    new: $1,600
    percent of change = ______ (n)
Day: ____5____

Topics: ___Percents Review___

Performance Indicator:
8.N.4

Objectives:
5.) Students will know how to use the percent proportion to find the missing information.
6.) Students will know how to write an equation to solve a percent problem.

Warm-up:
Review different percent proportions we’ve learned thus far.

Set:
Quiz Day 5

Closing:
Anticipation Guide→ get students thinking ahead about tomorrow’s topics

Homework/Assignment:
None
Quiz Day 5

Round to the nearest tenth when necessary.

1.) Find 19% of 100.  
2.) What percent is 18 of 28?

3.) What is 30% of 70.  
4.) 15 is 35% of what number?

Find the percent of change and round to the nearest whole percent. Label your answer as an increase or decrease.

5.) Old: $175  
   New: $150

6.) Before: $60  
   After: $87

7.) A sweater that was originally marked $50 is on sale for $35. Find the percent decrease.

8.) Aaron’s math grade went from a 72 to an 83. Find the percent increase.
**ANTICIPATION GUIDE**

**PERCENTAGES**

In the column labeled "Me", place a check next to any statement with which you think is true. After taking notes, re-read through your notes and underline where each statement is found. In the column labeled "Notes", place a check next to any statement with which you think is now true. For any statement that is false, change the statement to make it true.

<table>
<thead>
<tr>
<th>ME</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.) Sales tax is subtracted from your total cost.</td>
</tr>
<tr>
<td></td>
<td>2.) Interest is the amount of money earned added to the original.</td>
</tr>
<tr>
<td></td>
<td>3.) Tip is money added to your total bill.</td>
</tr>
<tr>
<td></td>
<td>4.) Discount of an item is added to the bill.</td>
</tr>
<tr>
<td></td>
<td>5.) Commission is extra money earned on sales.</td>
</tr>
<tr>
<td></td>
<td>6.) The bigger the discount the smaller the cost of an item.</td>
</tr>
</tbody>
</table>
Day: ___6____  Topcis: ____Taxes____

Performance Indicator: 8.N.4

Objectives:
Students will know how to use their knowledge of percents to calculate taxes.

Set:
Overhead Day 6 (Warm-up)

Procedures:
- Sales Tax: cost + sales tax = total cost  \( \frac{\text{tax}}{\text{cost}} = \frac{\%}{100} \)
  
  Ex. Find the cost of a $200 bicycle with 7% sales tax.

- Tip: cost + tip = total cost  \( \frac{\text{tip}}{\text{cost}} = \frac{\%}{100} \)
  
  Ex. Your meal at the Perkins is $20.75. You want to leave a 15% tip. What is your total bill?

- Show students how to use the diamond graphic organizer when reading word problems.

Guided/Independent Practice:
Overhead Day 6

Closing:
Why do we pay sales tax? Why do we leave waitresses tips?

Homework:
*Real Life Math Series, Department Store Math*: Sales Receipts pg 49-50
When you go to the mall and buy a new pair of jeans for $55 and a sweatshirt that costs $45; will a $100 bill cover the cost? Why?

What would you pay if the sales tax rate is 8%?
1. Restate the problem/question

2. Find needed data:

3. Plan what to do:

4. Find the answer:
   Step 1
   Step 2
   Step 3

Answer: _______________

5. Check: Is your answer reasonable?
1. Mrs. Green is buying a new television. It costs $479.00 and the tax rate is 7.25%. What is the total cost?

2. Tina Peach bought four items at the drug store: a comb for $1.00, deodorant for $2.75, toothpaste for $3.00, and floss for $2.00. If the tax rate is 8% and the items were taxable, how much tax does she pay? What is her total cost?

3. The Peaches go to dinner on Friday night. Mr. Peach has Prime Rib for $16.99, Mrs. Peach enjoys the Seafood Platter for $19.99, and Tina has a salad which costs $7.95. They all drink water and do not order dessert. They want to leave a 15% gratuity (tip). How much money will they leave for their gratuity and what will be their total dinner cost?
Use the price list to complete these sales receipts.

<table>
<thead>
<tr>
<th>QTY</th>
<th>ITEM</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Golf Balls</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Kite</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Pocket Calculator</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Pencils</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Shorts</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Scrapbook</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Beach Towels</td>
<td>@</td>
<td></td>
</tr>
</tbody>
</table>

Subtotal: ___________
6% Sales Tax: ___________
TOTAL DUE: ___________

<table>
<thead>
<tr>
<th>QTY</th>
<th>ITEM</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Frisbees</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Coffee Pot</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Socks</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Paper Clips</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Shampoo</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Party Cups</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Party Plates</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Balloons</td>
<td>@</td>
<td></td>
</tr>
</tbody>
</table>

Subtotal: ___________
5% Sales Tax: ___________
TOTAL DUE: ___________
Use the price list to complete these sales receipts.

<table>
<thead>
<tr>
<th>QTY</th>
<th>ITEM</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Wrapping Paper</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Tennis Balls</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Baseball Cards</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Basketball</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Glue</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Scissors</td>
<td>@</td>
<td></td>
</tr>
</tbody>
</table>

Subtotal

4% Sales Tax

TOTAL DUE

Mrs. Wheeler gave the clerk two $20 bills for the items above. How much change did she receive? $ __________

<table>
<thead>
<tr>
<th>QTY</th>
<th>ITEM</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Rubber Bands</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stapler</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Answering Machine</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Placemats</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pens</td>
<td>@</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Crock Pot</td>
<td>@</td>
<td></td>
</tr>
</tbody>
</table>

Subtotal

5% Sales Tax

TOTAL DUE

Mr. and Mrs. Castillo gave the clerk $110 for the items above. How much change should they have received? $ __________
Objectives:
Students will know how to calculate total salary taking into account commission, commission rate (percent) and salary.

Set:
Overhead Day 7 (Warm-up)

Procedures:
1.) Overhead Day 7 (Notes)
Commission is an amount of money given to a salesperson for selling items. The commission rate is usually a percent of the cost of the items sold.
\[
\frac{\text{Commission}}{\text{Sales}} = \frac{%}{100}
\]
Commission + Base Salary = Total Paycheck

Guided Practice/Independent Practice:
Overhead Day 7 (Practice)

Closing:
Overhead Day 7 (Closing)

Homework:
Worksheet Day 7
What is commission and where might it be used?

What is 3% of $275?

What is 10% of $26,500?

Find 9% of $270 and add it to $220.
Commission is _______ _____ given to a salesperson for selling items. The _______ _______ _____ is usually a ___ of the cost of the items _______.

Example: Mike earns a salary of $150 per week. That same week he sold $3,597 worth of bicycle equipment. If he earns 7% commission, how much will he earn in total for the week?

Step 1: What is 7% of $3,597?

Step 2: Add the step 1 result to Mike’s weekly salary of $150.
1. Beth receives a base salary of $215 per week plus a commission of 8% on all sales. How much does Beth earn in a week in which her sales total $2,200?

2. Nathan receives a commission of 18% on appliance sales in excess of $2,000 per week. One week, his sales were $6,850. How much was his commission that week?

3. Find the commission rate if George earned $110 on $1,375 worth of sales.

4. Mark made $504 last week. He earns a base salary of $300, plus 8% on all his sales. What was the value of the merchandise Mark sold last week?
When hired for a job you are given the following two pay options. Which would you choose if you know that most employees at the company average $5400 in sales each week?

Option 1:
Base salary: $150; Commission: 10%

Option 2:
Base Salary: $375; Commission: 6.5%
Worksheet Day 7

Name ____________________________  Per. ____________________________
Math 8                                  Date ___________________________
Commission

Solve the following problems. Show all work.

1. Bernice receives a base salary of $355 per week plus a commission of 7.5% on all sales. How much does Bernice earn in a week in which her sales total $8,650?

2. Ophelia receives a commission of 18% on appliance sales in excess of $5,000 per week. One week, her sales were $13,330. How much was her commission that week?

3. Find the commission rate if Georgina earned $592.20 on $6,580 worth of sales.

4. Donald made $2,325 last week. He earns a base salary of $400 and has a commission rate of 11%. How much was the value of the merchandise he sold?
Day: ____8____

Topics: _Simple Interest_

Performance Indicator: 8.N.4

Objectives:
- Students will know how to convert between percents and decimals. Students will understand the concept of simple interest. Students will be able to apply their knowledge of simple interest to calculate interest, principal, rate, or time.

Set:
Why do you put money in the bank? If you put $500 in the bank, will you have $500 to withdrawal 8 years later? If you borrow $1000 from the bank is that all you will owe?

Procedures:
**Time to get your FSSL on!!!**
F – Formula
S – Substitute
S – Solve
L – Label

1.) Calculating Simple Interest: Notesheet Day 8
   a. Vocabulary
      i. **Interest**: the product of the principal, the rate, and the time. 
         
         \[
         \text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time (in years)}
         \]
      ii. **Principal**: the amount of money invested or borrowed
      iii. **Rate**: the % which received or charged
      iv. **Time**: the number of years the principal is being invested or borrowed
      v. **Total amount**: the sum of the principal and the interest

Guided/Independent Practice:
Overhead Day 8 (Practice)

Homework:
Worksheet Day 8
SIMPLE INTEREST

Interest (simple) –

Principal –

Time –

Rate –

Recall – How do you convert from a percent to a decimal?

Total Amount –

Simple Interest = Principal \times Rate \times Time

\[ I = PRT \] (Use "I party" to remember the formula)

Examples:
Find the interest.
1) Tom borrowed \$800 for 3 years at an interest rate of 8%.

2) Abby borrowed \$15525 for 8\frac{1}{2} \text{ years} at an interest rate of 6.5%.

3) Dawn borrowed \$7950 for 6 months at an interest rate of 7.25%.
Overhead Day 8 (Practice)

Directions: Solve.

1) Harold put $200 dollars in the bank he received from his grandparents. The bank is giving him an interest rate of 8%.

a. How much interest will he have after 5 years?

b. What is the total amount of money he has after 5 years?

2) Ian invested $1500 dollars in the bank. After 2 years he withdrew all his money. He received $1590. What interest rate was he getting for his bank account?

3) Robin borrowed money to buy a car. She borrowed for 5 years at a 6% rate. After 5 years she had paid $6000 in interest. How much did she borrow to buy the car?
Worksheet Day 8

Name ________________________ __
Math 8
Simple Interest

Per. ________________ Date ____________

Solve the following problems. Show all work.

1. For Melinda’s 12th birthday, her family gave her $225. She decided to put it in the bank. The bank offered an interest rate of 3.5%. At age 18, Melinda decides she needs this money to put toward a new car. When she withdraws her money, how much interest has it gained? What is the total value of the money she invested?

2. Juan invested $3250 dollars in the bank. After 4 years he withdrew all his money. He received $3607.50. What interest rate was he getting for his bank account?

3. Lynette borrowed money to buy a car. She borrowed for 5 years at a 4% rate. After 5 years she had paid $4000 in interest. How much did she borrow to buy the car?

4. The Smith’s buy a new home for $145,000. They take out a mortgage at a 5.5% interest rate for 15 years. At the end of 15 years, their house is paid off. How much did they pay total?
Day: 9

Performance Indicator: 8.N.4

Objectives:
Students will know how to use their knowledge of percents to perform a variety of applications

Warm-up:
Graphic organizer-Percents

Procedures:
Shopping Activity

Homework:
Worksheet Day 9
**Directions:** Write the different types of problems that involve percents in the graphic organizer below. Include the percent proportion used to solve the problems.
Shopping Activity Day 9

Name ___________________________ Per. ______________
Math 8 __________________________ Date _____________

STATION 1:

Please choose two items from The Clothes Corner.

What are the two items? ________________________________

What are their prices? ________________________________

What is their price altogether? _________________________

What would the cost be after a 35% discount? ______________

What would the total cost be with 6.5% sales tax? ______________

WORK SPACE!!!

STATION 2:

Pick one of the cards in station 2 and figure out how much money you will have earned in interest or paid in interest given a 3 year period at a 5% interest rate.

WORK SPACE!!!
STATION 3:

Please order a meal from using one of two provided menus at Abbott's Diner.

List your meal items and their prices.

What is the cost of your meal?

You should leave 15% tip. When you do this, what will the total meal expense be?

WORK SPACE!!!

STATION 4:

You are a traveling salesperson and need to sell $5,430 worth of ipods to the local school. Your base salary is only $120, so start selling!! Pick a card at station 4 for the commission rate you’ll make for your sales. Find your weekly earnings.

WORK SPACE!!!
Find the total cost. (Round to the nearest cent)

1. Bob sells magazines for a living. He sells $800 worth of magazines a week and makes 8% commission rate. If Bob already makes $450, what will his total paycheck be for the week?

2. Maggie goes to Hollister and buys a pair of jeans for $32.50 and a hoodie for $39.95. What will her total bill be if she has to pay 8% sale tax?

3. Tanya and four of her friends went to Applebee's for dinner. Their meal cost $83.49. They want to leave a 15% tip. What will their total bill be for the meal?

4. Harry borrowed $5400 from the bank when he turned 16 to buy a car. The bank’s interest rate was 6%. Harry’s loan was for 5 years. What was the total amount Harry had to repay for his car loan?
Day: ___10__

Topics: __Withholding Tax__

Performance Indicator:
8.N.4

Objectives:
7.) Students will know how to use the percent proportion to find the missing information.
8.) Students will know how to write an equation to solve a percent problem.

Warm-up:
Review different percent proportions → use graphic organizer
Quiz Day 10

Set:
• Withholding Tax: Salary → Salary – Taxes = Paycheck

\[
\frac{\text{tax}}{\text{salary}} = \frac{\%}{100}
\]

• Overhead Day 10 (practice)

Closing:
Why are taxes withheld from money that we earn? Is this fair?

Homework/Assignment:
Money Sense: Gross Pay/Net Pay pg 3
Quiz Day 10

Solve.  \textit{Show all your work for full credit.}  (3 points each)

1. Find 18\% of 98.  
2. 29 is 40\% of what number?

3. 15 is what percent of 40.  
4. What is 82\% of 63?

Solve.  \textit{Show all your work for full credit.}  (4 points each)

5. Jamal borrowed money to buy a fishing boat. He borrowed money for 6 years at a 5\% rate. After 6 years he had paid $6000 in interest. How much did he borrow to buy the boat?

6. Angel makes $250 dollars a week. She also makes 8\% commission on all her sales. Last week she sold $935 worth of merchandise. How much did Angel make total?

7. Gina bought a shirt for $18 and a coat for $74. What was her total cost if there is 7.5\% sales tax charged?
Directions: Find out how much money each person brings home after taxes.

1.) Mr. Smith makes $45,000 per year as a warehouse manager. If Mr. Smith has 35% withheld from his paycheck for taxes, how much money does he really bring home?

2.) Brynn works at American Eagle in the mall. She makes $8 an hour and works 25 hours a week. If she gets 20% taken out for taxes, how much does she take home?
1. Tom has a summer job while he is on vacation from school. He is working at a riding stable taking care of the horses. He earns $8.00 an hour and works six hours a day six days a week. How much does he earn in a week? _______

2. When Tom received his paycheck, it was less than he expected. The amount deducted from the gross amount for F.I.C.A. was 6%. How much is that? _______

3. Even though Tom’s employer knows Tom will be working only 3 months, he has to withhold the same amount that would be withheld if Tom were a full-time employee. The deduction for federal tax is 16%. How much of Tom’s gross pay was taken for this tax? _______

4. The amount of state tax withheld is 5%. What amount was deducted from Tom’s check? _______

5. What was the net amount of Tom’s check? ________ Fill in the amounts on Tom’s check stub.

|-----------|---------|---------|-----------|---------|

6. Tom worked at the stable for 12 weeks. How much gross pay did Tom earn at his summer job? ________

7. What was his total “take-home” pay (total gross minus total deductions) for the summer? ________
Day: 11

Performance Indicator:
8.N.4

Objectives:
1.) Students will know how to find the sale price of an item when given the sale percent.
2.) Students will know how to find the sale percent when given the sale price.

Set:
How many of you enjoy shopping? How many of you enjoy shopping when there are sales? I am the type of shopper that only looks for sales. Today we are going to explore sale prices and discount. These topics are things that you can use next time you go shopping.

Procedures:
1.) Finding the sale price or discount (two ways to find sale price)
   - Original price – discount = sales price
     \[
     \frac{\text{discount}}{\text{original}} = \frac{\%}{100}
     \]
   - \% Pay = 100 - \% off \rightarrow this will give you the sale price when you solve the proportion
     \[
     \frac{\text{saleprice}}{\text{original}} = \frac{\% \text{paid}}{100}
     \]

Guided Practice/Independent Practice:
Overhead Day 11 (practice)

Homework/Assignment:
Worksheet Day 11
1.) Susan bought a shirt that was 20% off. She paid $19.76. How much was the shirt originally?

2.) Margie wanted to buy a pair of shorts that cost $15.50. The shorts were on sale for 25% off. What price did Margie pay for the jeans?

3.) Matt just bought a new hat for $24. The hat originally cost $30. What is the percent of discount?

4.) Bart wanted to buy a TV for his new house. He really like a 42" flat screen TV from Target that costs $849. Unfortunately that was too expensive for Bart. Bart said his budget was $650. If the TV was 25% off could Bart afford the TV? Explain your answer.
Solve each problem below by finding the missing part.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Original Price</th>
<th>Sale Percent</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.)</td>
<td>$30.00</td>
<td>25% off</td>
<td></td>
</tr>
<tr>
<td>2.)</td>
<td>$55.00</td>
<td>30% off</td>
<td></td>
</tr>
<tr>
<td>3.)</td>
<td>$75.00</td>
<td>40% off</td>
<td>$75.00</td>
</tr>
<tr>
<td>4.)</td>
<td>$85.00</td>
<td></td>
<td>$68.00</td>
</tr>
</tbody>
</table>

5.) A leather coat is on sale for 35% off. If the original price is $90, what is the sale price of the coat?

6.) The sale price on a pair of Nike Shocks is $68.75. If Dick’s is having 45% off sale, what is the original price of the shoes?
Worksheet Day 11

Name __________________________ Math 8 __________________________ Per. ____________
Sales Price & Discount Date ____________

1. The $26 shirt that Dustin wants is on sale for 30% off. What is the price he must pay, rounded to the nearest cent?

2. Jenna just bought a new sweater for $26.25. The sweater originally cost $35. What is the percent of discount?

3. A pair of khaki’s from the Sears cost $22 on sale. They were marked 60% off. What is the original price?

4. Ginger wanted to buy a laptop that costs $980. Her budget to buy the laptop was only $800. If they were on sale for 15% off, is the laptop in her budget?

5. Everything at Macy’s was 40% off. Breanna bought a sweater for $39.95 and a pair of jeans for $42.50. After the discount, how much did Breanna pay?
Day: 12  
Topics: Discount and Markup

Performance Indicator:  
8.N.4

Objectives:  
Students will be able to use percent applications to solve problems involving sales discounts and markups.

Set:  
Overhead Day 12 (Set)

Procedures:  
Work through Practice Day 12 with class.

Guided Practice/Independent Practice:  
Practice Day 12

Closing:  
Overhead Day 12 (Closing)

Homework/Assignment:  
Worksheet Day 12
True or False.

1. A discount is added to the total cost. ____________

2. Sales Tax is added to the price of an item. __________

3. The smaller the discount the less the price. __________

4. If an item is marked up the customer pays more. ________

Please respond.

1. A factory makes jeans and sells them to a retail store for $12.99 a pair. What does the retail store do with the jeans?

2. When a store puts an item on sale are they losing money?

3. To purchase an item that has been discounted 30%, what percent do you pay?
1. The Gap is having a holiday sale. Loni wants to buy a winter sweater that normally cost $45.99 but is on sale at 30% off.
   
   a. What percent of the original price does Loni have to pay?
      
      
   b. How much does the sweater cost Loni?
      
   
2. When The Gap originally purchased the winter sweaters from the factory they were $10.50 each.
   
   a. How much did The Gap markup the price of each sweater?
      
      
   b. What is the percent of Markup?
      
      
   c. As a consumer, how does this make you feel?
      
      
3. Loni also bought jeans for $24.99. They were on sale for 25% off. What was the original price of the jeans?
Jean bought a shirt that was marked down 20%. She paid $23.95. How much was the shirt originally?

A store purchased a shipment of jeans, each pair for $17.50. The store wanted to make a profit of 40%. What price did they mark the jeans?
Worksheet Day 12

Name ___________________________                  Per. ______________
Math 8                                            Date ______________
Sales Price, Discount, & Markup

SHOW ALL WORK

1. John went shopping at Abercrombie because he heard there was a big sale. His favorite shorts which normally cost $33.50 were marked down by 40%.
   a. What percent of the original price did John have to pay? ______________
   b. How much did the shorts now cost?

2. John also bought a belt. The belt was 15% off and John was charged $17.50, what was the original price of the belt? (Round to the nearest cent)

3. If Abercrombie purchased the belts for $5 each from the distributor.
   a. How much did they originally markup the price?
      ____________________
   b. What was the percent of markup?
Topics: Estimating a percent of a quantity, given an application

Performance Indicator: 8.N.5

Objectives:
1.) Students will know how estimate a percent when given the original and sale prices.
2.) Students will know how to estimate the sale price when given the original price and the sale %.

Set:
It is important to know how to find the sale price and sale percent when you are shopping. But let’s be real, who takes a calculator with them to the store? So instead of using a proportion we need to learn about how estimate with percents. This will give us an approximate value of the sale price, but in the store this is all you really need.

Procedures:
1.) What to we need to know about estimating?
   a. Need to try to make the numbers manageable, but not totally inaccurate.
   b. Good Examples
      i. $19.99 can be rounded to $20.00
      ii. $128.50 can be rounded to $130.00
   c. Bad Examples
      i. $128 can’t be rounded to $100.
      ii. $7.90 can’t be rounded to $10.

2.) Estimating the sale price
   a. First you need to estimate the price by rounding (remember the rules of rounding that we talked about)
   b. Use the %’s that you know to find the sale price
      i. Use multiples of 10%
      ii. Divide by 4 if it is 25%

Guided Practice/Independent Practice:
Overhead Day 13 (Guided Practice)

Closing:
Amid’s bill at a restaurant was $39.24. He is planning on leaving a 20% tip. Explain how Amid can ESTIMATE the amount for the tip.

Homework/Assignment: Worksheet Day 13
Use estimation to find the sale price.

1.) Original price = $39.99, with a 30% off sale

2.) Original price = $21.79, with a 40% off sale

3.) Original price = $19.50, with a 70% off sale

4.) Original price = $34.99, with a 45% off sale
Worksheet Day 13

Estimating Percents

Solve the following word problems.

1. Janice’s family went out to dinner. The total bill came to $58.21. They are planning on leaving a twenty percent tip. Estimate the amount of tip they need to leave.

2. After dinner, Janice’s family went to the movies. Her parents each get a 25% senior citizen’s discount. If the tickets are $6.75, estimate the amount of money her parents save.

3. If Janice has two brothers and a sister, how much did it cost for the family to go to the movies?
Do You Want to Pass the Test??

Simply complete this review sheet to succeed!!

Vocabulary to know:

1. Percent
2. Amount of Change (increase/decrease)
3. Sales Tax
4. Withholding Tax
5. Commission
6. Base Salary
7. Simple Interest
8. Principal
9. Rate
10. Time
11. Gratuity (Tip)
12. Sales Price
13. Total Amount
Percents

The Percent Proportion:

\[
\frac{IS\text{(part)}}{OF\text{(whole)}} = \frac{\%}{100}
\]

Practice:

1. 135% of what number is 47.25?  
   a. 36  
   b. 45  
   c. 63.79  
   d. 35

2. Which is the greatest?  
   a. 100% of 25  
   b. 10% of 251  
   c. 1% of 2,499  
   d. 50% of 52

3. Hannah read 51 pages out of a 340 page book. What percent does she have left to read?  
   a. 15%  
   b. 85%  
   c. 75%  
   d. 25%

Percent Increase/Decrease (Sales Price):

Practice:

1. A pair of sneakers that used to cost $80 are on sale for $55. What is the percent of decrease in the price?
2. Find the price of a sweatshirt that is originally $75. It is discounted by 30%. Then at the register it is discounted an additional 10%.

Would this give the same sale price as a 40% discount originally? Explain.

Sales Tax/Tip

Practice
1. James bought a bike for $158. If the sale’s tax rate was 6.5%, find the total cost of the bike?
   a. $10.27
   b. $10.20
   c. $168.27
   d. $158.27

Withholding Tax

Practice
1. Renee makes $22 per hour and she works 38 hours a week. If the government withholds 28% of her paycheck for taxes, how much does she get to bring home per week? Per year?
**Commission**

**Practice**

1. Sally makes $350 dollars per week. She also makes 8% commission on all her sales. Last week she sold $4500 worth of merchandise. How much was her pay check?

**Simple Interest**

**Practice**

1. John deposited $3250 in the bank. If he was receiving a 3.5% interest rate. How much would he have after 2 years?
Part I: Vocabulary – Match each word with the appropriate definition.

____ 1.) Commission
____ 2.) Principal
____ 3.) Withholding Tax
____ 4.) Interest
____ 5.) Sales Tax

   a. Money received from investing
   b. Amount of money borrowed
   c. Percent earned on merchandise sold
   d. Money deducted from paycheck
   e. Money added to most purchases

Part II: Multiple Choice

6. Margaret bought a baseball hat for $12. If the sale’s tax rate was 3.5%, find the total cost of the hat?
   d. $0.42
   e. $11.58
   f. $12.42
   g. $42.00

7. A loaf of bread that used to cost $1.50 now costs $1.70. What was the percent of increase of the price?
   a. 11.8%
   b. $13\frac{1}{3} $
   c. 20%
   d. 88%

8. Andrea is paid an 18% commission on her cosmetic sales. She sold $550 worth of cosmetics. Find her commission.
   a. $220
   b. $199
   c. $118
   d. $99
9. Ian deposits $900 in a savings certificate that pays 6.5% annually. How much money will Ian have at the end of one year?
   a. $958.50
   b. $965.80
   c. $1,048.50
   d. $58.50

10. Which of these two coins is worth 60% of a dollar?
   a. Penny and Quarter
   b. Half Dollar and Dime
   c. Half Dollar and Quarter
   d. Penny and Dime

11. 225% of what number is 81?
   a. 36
   b. 45
   c. 108
   d. 182.25

12. Of 1,600 radios inspected, 112 didn’t work properly. What % of the radios did work properly?
   a. 93%
   b. 22%
   c. 7%
   d. 14.3%

13. Which is the greatest?
   a. 1% of 3,999
   b. 10% of 421
   c. 25% of 160
   d. 100% of 42
Part III: Open-Ended Questions

14. A sweatshirt with the regular price of $34 is first discounted by 20% and then by an additional 10%.
   a. What is the final sale price?

   b. How do these two discounts compare to a single discount of 30%? Explain.

15. Mr. Orangeapple makes $16 per hour and he works 36 hours per week.
   a. How much does he earn in a week?

   b. If Mr. Orangeapple’s withholding rate is 18%, how much money is leftover after withholding taxes?

   c. How much money does Mr. Orangeapple make in a year? (Remember that there are the same amount of weeks in a year as there are cards in a deck.)
Conclusions

The percents unit is a key component in eighth grade math and every day life skills. During the percents unit it is important to make problems relevant to students’ lives in order for them to grasp the concepts being taught. The most significant aspect that was incorporated into the percents unit according to my students’ surveys was making up different hands on activities that the students would not only enjoy, but learn from. The “Shopping Activity” was a huge success in my class as ninety-nine percent of my students said they really enjoyed the activity because it was like “real-life”. The activity showed them “how much items really cost” and “real life prices” that you actually have to pay. Some students noted that it made them think about what happens when they go shopping or out to eat, so they can already link the activity to their own life experiences. Many students also said it was “fun” because they got to pick what they wanted to buy, or how much money they would earn for commission or on saving accounts. Similarly, ninety-nine percent of my students also liked making sales receipts. Some said they have never really looked at a receipt before and thought it was cool because it was “realistic”. Other students noted that it was neat because it made them realize what their parents have to pay and why some parents say no to things because they’re too expensive with sales tax. Finally, some students said “It was a fun activity that I could remember how to do.” which is exactly what I hoped for. Students could relate to both activities either with their own experience or things their parents have done that they knew about. Hands on activities help engage students while providing visuals to meet the learning needs of
more students. All in all I think that both activities helped strengthen students’ understanding about percents by linking them to the real world.

Graphic organizers are considered a literacy technique used to help students visually represent important data. During the course of my curriculum project I used two different graphic organizers. One organizer was a spider web used to write down the different types of percent proportions used to solve percent problems. According to the surveys, ninety-two percent of my students liked using this graphic organizer because they’re “visual” learners. Many students stated that “it helped them memorize the different formulas” because they were “all in one spot”. Majority of my students liked this particular graphic organizer to use as a “study guide” before quizzes and their unit test. On the other hand, my students had mixed opinions about using the diamond graphic organizer. Fifty percent of my students said that they liked using the diamond graphic organizer because it helped organize information from word problems so they knew what the question was asking them. Others stated that they didn’t like it because it was “too confusing” or took too long to fill out. Graphic organizers help pull out the important pieces of information so students are less distracted with a lot of words. Overall I think that graphic organizers can be effective if they are simplistic and easy to read for young adolescence, as many of my students saw benefits to using them.

Another literacy strategy I employed in my curriculum project was an anticipation guide to see what knowledge students already knew versus what would be brand new. Eighty six percent of students said they liked the anticipation guide
because “it gave us an idea of what we would be doing” and “it helped build on what they already knew”. I especially like using anticipation guides in my classroom because it gives me a starting point as a teacher. It allows me to set up a time line of how many days we’ll need to spend on each lesson depending on if they’ve had experience with each topic before.

The last literacy strategy I incorporated into my curriculum project dealt with breaking down word problems by underlining, crossing out irrelevant information, highlighting, and re-reading the problem line by line. Eighty three percent of my students stated that these different word problem strategies were helpful so they knew “what to use in the problem”. Some students also said that “it helps break down the question” in order to figure out how to solve the problem. These different literacy strategies are something that students can use to help them grasp what word problems are really asking them, but more importantly it forces them to slow down and digest the word problem. Not only do I teach students how to solve word problems, but I try to make the word problems something they can relate to. Many times I devise situations that students could see themselves in to help them comprehend what is going on in each problem. Once again real world situations help students relate to what is going in their daily life.

After implementing hands on activities, graphic organizers, and word problem strategies into the percents unit I compared grades from 2007 versus grades from 2008 on two quizzes and the unit test. The classes I compared from each year both consisted of eighteen students in the eighth grade. The first assessment I used to see
if the different aspects I integrated into my curriculum made a difference was quiz #5. The quiz was out of twenty two points. Students from 2007 scored on average just over sixteen points on quiz #5, while students from 2008 scored on average just under twenty one points. Similarly, scores from 2008 were within 1.223 standard deviations of the mean; meanwhile scores from 2007 were 3.371 standard deviations from the mean. These results show that students from 2008 scored higher on quiz #5 and were closer in range versus students from 2007. Results from quiz #10 are comparable to those results from quiz #5. Students from 2007 averaged just over nineteen points out of a possible twenty three points on quiz #10. The standard deviation for students from 2007 on quiz #10 was 2.553 away from the mean. Both the mean and standard deviation were considerably different for students from 2008. The average score for students from 2008 was 21.5 with students being within 1.317 standard deviations from the mean. Results from both quizzes were significantly different as far as the average quiz scores and the range in which students were scoring. Consequently, students from 2008 also scored better on the unit test which accounted for fifty two points in the grade book. This year’s students averaged just below forty eight points, while last year’s students averaged almost forty two points. Similarly, students from 2008 were 2.594 standard deviations from the mean, while students from 2007 had a bigger spread at 5.997 standard deviations from the mean.

Overall, I think the results show that students definitely benefited from learning different word problem strategies to use during their quizzes and test. The
averages on all three assessments increased from one year to the next, as well as the range of scores decreased getting closer to the mean.

The spider web graphic organizer certainly helped students study for all of the assessments and really helped visual learners meeting their learning needs. Since the percents unit I have created other graphic organizers to use in other units such as measurement conversions. Students have been able to recreate the conversion charts after studying the visual aids fairly easy, and consequently their scores have also increased compared to previous years. The hands on activities also were a great asset to my students because they had an experience to relate word problems back to when trying to get the final answer. In 2007 I noticed that my students would stop after finding the sales tax on an item, instead of adding it to the total cost. This year I noticed that more students understood that the answer isn’t just the sales tax because you still need to add it to the original price to get the total cost. I truly feel the activities such as making receipts that related to real world situations helped students’ complete problems successfully because they had an experience to relate to.

In future units I would like to use similar tactics to help students be more successful on assessments. The more literacy strategies I can use to help students decode and comprehend word problems the better, because students continue to struggle with finding out what the question is really asking them. I firmly believe that underlining important information and re-reading the questions can help many students, but not all so I will continue to research other ways to help students comprehend word problems. Many students also like web diagrams to use for study.
guides or notes because they are visual learners. I will continue to change notes and study guides into user friendly organizers that are easy for students to read and understand. Lastly, I am going to try and come up with more hands on activities to do in other units because activities give students something to relate back to. Hands on activities engage students and meet kinesthetic learners’ needs. Students usually enjoy hands on activities and it forces them to participate and take responsibility for their own learning. In closing, the curriculum project on percents is just one of many units that need to be altered. Students greatly benefit from teachers doing research to change units to fit their learning needs, as I will continue to do for many years.
Probability Plot of Quiz 5 2007

Normal

Mean 16.19
StDev 3.371
N 16
AD 0.140
P-Value 0.965
Probability Plot of Unit 1 test 2008

Normal

Mean 47.94
StDev 2.594
N 16
AD 0.447
P-Value 0.245
Appendix

CONSENT FOR MINORS

This form describes a research study being conducted with students about their understanding of percentages. The purpose of this research is to see if student achievement increases, while using different literacy strategies with percents. The person conducting the research is a student at SUNY College at Brockport. This study is being conducted as part of requirements for the investigator's graduate degree. If you agree to participate in this study, you will be asked to complete a survey about the effectiveness of the different literacy strategies taught during our percent unit. Your quiz and test scores will also be used without exposing your identity.

The possible benefit from being in this study could be that information will be learned that would allow teachers to better prepare young people about life skills dealing with percents. Your participation in this study is completely voluntary and will not affect your grades or class standing. You are free to change your mind or stop being in the study at any time.

I understand that:

1. My participation is voluntary and I have the right to refuse to answer any questions. I will have a chance to discuss any questions I have about the study with the researcher after completing the survey.

2. My confidentiality is guaranteed. My name will not be written on the survey. There will be no way to connect me to the written survey. If any publication results from this research, I would not be identified by name. Results will be given anonymously and in group form only, so that neither the participants nor their schools can be identified.

3. There will be no anticipated personal risks because of participation in this project.

4. My participation involves reading a written survey of six questions and answering those questions in writing. It is estimated that it will take three to five minutes to complete the survey. My quiz and test grades from the percents unit will also be used.

5. Approximately forty five people will take part in this study. The results will be used for the completion of a research project by Miss Abbott.

6. Data and consent forms will be kept separately in a locked cabinet by the
investigator and will be destroyed by shredding when the research has been completed.

You are being asked whether or not you want to participate in this study. If you wish to participate, and you agree with the statement below, please sign in the space provided. Remember, you may change your mind at any point and withdraw from the study. You can refuse to participate even if your parent/guardian gives permission for you to participate.

If you have any questions you may contact:

**Primary researcher**
Name: Melissa Abbott
Phone Number: [Redacted]
Email: [Redacted]

**Faculty Advisor**
Name: Conrad VanVoorst
Department and phone #: Education and Human Development [Redacted]
Email: Cvanvoor@brockport.edu

I understand the information provided in this form and agree to participate in this project.

______________________________   _______________________
Signature of participant          Date

______________________________
Birth date of participant

______________________________   _______________________
Signature of a witness 18 years of age or older          Date
CONSENT FOR PARENTS

This form describes a research study being conducted with students about their understanding of percentages. The purpose of this research is to see if student achievement increases, while using different literacy strategies with percents. The person conducting the research is a student at SUNY College at Brockport. This study is being conducted as part of requirements for the investigator’s graduate degree. If you agree to have your child participate in this study, s/he will be asked to complete a survey about the effectiveness of the different literacy strategies taught during our percent unit. Your son/daughter’s quiz and test scores will also be used without exposing their identity.

The possible benefit from being in this study could be that information will be learned that would allow teachers to better prepare young people about life skills dealing with percents. Your child’s participation in this study is completely voluntary and will not affect your child’s grades or class standing. S/he is free to change her/his mind or stop being in the study at any time.

I understand that:

1. My child’s participation is voluntary and s/he has the right to refuse to answer any questions. S/he will have a chance to discuss any questions s/he has about the study with the researcher after completing the survey.

2. My child’s confidentiality is guaranteed. Her/his name will not be written on the survey. There will be no way to connect my child to the written survey. If any publication results from this research, s/he would not be identified by name. Results will be given anonymously and in group form only, so that neither the participants nor their schools can be identified.

3. There will be no anticipated personal risks because of participation in this project.

4. My child’s participation involves reading a written survey of six questions and answering those questions in writing. It is estimated that it will take three to five minutes to complete the survey. My child’s quiz and test grades from the percents unit will also be used.

5. Approximately forty five people will take part in this study. The results will be used for the completion of a research project by Miss Abbott.

6. Data and consent forms will be kept separately in a locked cabinet by the investigator and will be destroyed by shredding upon completion of this study.
You are being asked whether or not you will permit your child to participate in this study. If you wish to give permission to participate, and you agree with the statement below, please sign in the space provided. Remember, you may change your mind at any point and withdraw from the study. Your child can refuse to participate even if you have given permission for her/him to participate.

I understand the information provided in this form and agree to allow my child to participate as a participant in this project. I am 18 years of age or older. I have read and understand the above statements. All my questions about my child’s participation in this study have been answered to my satisfaction.

If you have any questions you may contact:

**Primary researcher**
Name: Melissa Abbott
Phone Number: [redacted]
Email: [redacted]

**Faculty Advisor**
Name: Conrad VanVoorst
Department and phone #: Education and Human Development
Email: Cvanvoor@brockport.edu

_________________________________________  __________________________
Signature of Parent                      Date

______________________________
Child’s name
Survey about Percents

Directions: Circle the answer that best applies to the question and write a brief explanation of why you selected your answer.

1.) Did the anticipation guide help introduce the percents unit and get you thinking about things you already knew?

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Somewhat</th>
<th>Yes</th>
</tr>
</thead>
</table>

2.) Do you think the graphic organizer helped you remember the percent proportions?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
</table>

3.) Does underlining important information help you determine what you need to do in order to solve the problem?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
</table>

4.) Did the diamond graphic organizer help you pull out information and devise a plan to solve the problem?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
</table>

5.) Did the "Shopping Activity" with stations help connect percents to real life activities?

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Somewhat</th>
<th>Yes</th>
</tr>
</thead>
</table>

6.) Did making receipts when doing discount and sales tax help show the real world relevance?

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Somewhat</th>
<th>Yes</th>
</tr>
</thead>
</table>
Results For Survey About Percents

Directions: Circle the answer that best applies to the question and write a brief explanation of why you selected your answer.

1.) Did the anticipation guide help introduce the percents unit and get you thinking about things you already knew?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>14%</td>
</tr>
<tr>
<td>Somewhat</td>
<td>39%</td>
</tr>
<tr>
<td>Yes</td>
<td>47%</td>
</tr>
</tbody>
</table>

2.) Do you think the graphic organizer helped you remember the percent proportions?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>8%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>36%</td>
</tr>
<tr>
<td>Always</td>
<td>56%</td>
</tr>
</tbody>
</table>

3.) Does underlining important information help you determine what you need to do in order to solve the problem?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>17%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>50%</td>
</tr>
<tr>
<td>Always</td>
<td>33%</td>
</tr>
</tbody>
</table>

4.) Did the diamond graphic organizer help you pull out information and devise a plan to solve the problem?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>50%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>42%</td>
</tr>
<tr>
<td>Always</td>
<td>8%</td>
</tr>
</tbody>
</table>

5.) Did the “Shopping Activity” with stations help connect percents to real life activities?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>3%</td>
</tr>
<tr>
<td>Somewhat</td>
<td>22%</td>
</tr>
<tr>
<td>Yes</td>
<td>75%</td>
</tr>
</tbody>
</table>

6.) Did making receipts when doing discount and sales tax help show the real world relevance?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>3%</td>
</tr>
<tr>
<td>Somewhat</td>
<td>25%</td>
</tr>
<tr>
<td>Yes</td>
<td>72%</td>
</tr>
</tbody>
</table>
Quiz Day 5

Round to the nearest tenth when necessary.

1.) Find 19% of 100.
   \[
   \frac{x}{100} = \frac{19}{100} \quad 100x = 100 \times 19
   \]
   \[
   x = \frac{19 \times 100}{100} = 19
   \]

2.) What percent is 18 of 28?
   \[
   \frac{18}{28} = \frac{x}{100} \quad 1800 = 28 \times x
   \]
   \[
   x = \frac{1800}{28} = 64.285714286
   \]
   \[
   x = 64.29
   \]

3.) What is 30% of 70.
   \[
   \frac{x}{70} = \frac{30}{100} \quad 70x = 30 \times 100
   \]
   \[
   x = \frac{30 \times 100}{70} = 42.857142857
   \]
   \[
   x = 42.86
   \]

4.) 15 is 35% of what number?
   \[
   \frac{15}{35} = \frac{x}{100} \quad 1500 = 35 \times x
   \]
   \[
   x = \frac{1500}{35} = 42.857142857
   \]
   \[
   x = 42.86
   \]

Find the percent of change and round to the nearest whole percent. Label your answer as an increase or decrease.

5.) Old: $175
   New: $150
   \[
   \frac{25}{150} = \frac{x}{100} \quad 2500 = 150 \times x
   \]
   \[
   x = \frac{2500}{150} \approx 16.67
   \]
   \[
   x = 16.7%
   \]

6.) Before: $60
   After: $87
   \[
   \frac{27}{87} = \frac{x}{100} \quad 2700 = 87 \times x
   \]
   \[
   x = \frac{2700}{87} \approx 31.03
   \]
   \[
   x = 31.0%
   \]

7.) A sweater that was originally marked $50 is on sale for $35. Find the percent decrease.
   \[
   \frac{15}{50} = \frac{x}{100} \quad 1500 = 50 \times x
   \]
   \[
   x = \frac{1500}{50} = 30
   \]
   \[
   x = 30%
   \]

8.) Aaron’s math grade went from a 72 to an 83. Find the percent increase.
   \[
   \frac{11}{72} = \frac{x}{100} \quad 1100 = 72 \times x
   \]
   \[
   x = \frac{1100}{72} \approx 15.28
   \]
   \[
   x = 15.28%
   \]
Quiz Day 10

Solve. Show all your work for full credit. (3 points each)

1. Find 18% of 98.
   \[ \frac{x}{98} = \frac{18}{100} \]
   \[ x = 17.64 \]

2. 29 is 40% of what number?
   \[ \frac{x}{29} = \frac{40}{100} \]
   \[ x = 11.6 \]

3. 15 is what percent of 40.
   \[ \frac{15}{40} = \frac{x}{100} \]
   \[ x = 37.5\% \]

4. What is 82% of 63?
   \[ \frac{x}{63} = \frac{82}{100} \]
   \[ x = 51.66 \]

Solve. Show all your work for full credit. (4 points each)

5. Jamal borrowed money to buy a fishing boat. He borrowed money for 6 years at a 5% rate. After 6 years he had paid $6000 in interest. How much did he borrow to buy the boat?
   \[ I = PRT \]
   \[ 6,000 = .05 \cdot 6 \cdot P \]
   \[ P = 20,000 \]

6. Angel makes $250 dollars a week. She also makes 8% commission on all her sales. Last week she sold $935 worth of merchandise. How much did Angel make total?
   \[ \text{Total} = 128.98 \]
   \[ \frac{x}{935} = \frac{8.2}{100} \]
   \[ x = 74.80 \]

7. Gina bought a shirt for $18 and a coat for $74. What was her total cost if there is 7.5% sales tax charged?
   \[ \frac{100x}{100} = \frac{18 + 74}{92} \]
   \[ \frac{x}{92} = \frac{7.5}{100} \]
   \[ \text{Total} = 98.90 \]
Part I: Vocabulary – Match each word with the appropriate definition.

- 1.) Commission: Money received from investing
- 2.) Principal: Amount of money borrowed
- 3.) Withholding Tax: Percent earned on merchandise sold
- 4.) Interest: Money deducted from paycheck
- 5.) Sales Tax: Money added to most purchases

Part II: Multiple Choice

6. Margaret bought a baseball hat for $12. If the sale’s tax rate was 3.5%, find the total cost of the hat?
   a. $0.42
   b. $11.58
   c. $12.42
   d. $42.00

\[
\frac{12}{1.05} = \frac{3.5}{100} \quad \frac{4.2}{100} = \frac{100x}{100}
\]

7. A loaf of bread that used to cost $1.50 now costs $1.70. What was the percent of increase of the price?
   a. 11.8%
   b. $13\frac{1}{3}$%
   c. 20%
   d. 88%

\[
\frac{.20}{1.50} = \frac{x}{100} \quad \frac{1.50y}{1.50} = \frac{20}{1.50}
\]

8. Find the equivalent value for $6^3 \cdot 6^2$.
   a. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$
   b. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$
   c. $6 \cdot 6 \cdot 3 \cdot 2$
   d. $12 \cdot 18$

\[
6 \cdot 6 \cdot 6 \cdot 6 \cdot 6
\]
13. 225% of what number is 81?

\[ \frac{225x}{100} = \frac{8100}{225} \]

\[ x = 36 \]

14. Of 1,600 radios inspected, 112 didn't work properly. What % of the radios did work properly?

\[ \frac{112}{1,600} = \frac{x}{100} \]

\[ x = 7\% \]

15. Which is the greatest?

a. 1% of 3,999
b. 10% of 421
c. 25% of 160
d. 100% of 42
Part III: Open-Ended Questions

16. A sweatshirt with the regular price of $34 is first discounted by 20% and then by an additional 10%.
   a. What is the final sale price?

   \[
   \frac{100x}{100} = \frac{272.00}{100} \quad X = \frac{10\%}{272.00} \quad 27.20 \quad -0.27.20 \quad 29.92
   \]
   \[
   x = 27.20 \cdot 0.80
   \]
   The total cost would be $29.92.

   b. How do these two discounts compare to a single discount of 30%? Explain.

   If you did 20% then 10% your answer would be 27.20 but if you did 30% at once you would get 23.80. It would be different because on Part A you add and subtract but on Part B you don't.

17. Mr. Orangeapple makes $16 per hour and he works 36 hours per week.
   a. How much does he earn in a week?

   \[
   \frac{36}{576.00} \times 1 \quad \text{week} = \$576.00
   \]

   b. If Mr. Orangeapple's withholding rate is 18%, how much money is leftover after withholding taxes?

   \[
   \frac{x}{576.00} \times 100 = \frac{10368}{100} \quad \frac{103.68}{100} = \frac{472.32}{100} \quad \$472.32 \quad \text{leftover}
   \]

   c. How much money does Mr. Orangeapple make in a year? (Remember that there are the same amount of weeks in a year as there are cards in a deck.)

   \[
   \frac{24560.64}{52} \times \frac{472.32}{100} \quad \$24560.64 \quad 1 \text{year}
   \]
Quiz Day 5

Round to the nearest tenth when necessary.

1.) Find 19% of 100.

\[ \frac{x}{100} = \frac{19}{100} \]
\[ x = 19 \]

2.) What percent is 18 of 28?

\[ \frac{18}{28} = \frac{x}{100} \]
\[ x = \frac{1800}{28} \times \frac{1}{100} \]
\[ x = 64.29\% \]

3.) What is 30% of 70.

\[ \frac{x}{70} = \frac{30}{100} \]
\[ 100x = 2100 \]
\[ x = 21 \]

4.) 15 is 35% of what number?

\[ \frac{15}{x} = \frac{35}{100} \]
\[ 1500 = \frac{35x}{35} \]
\[ x = 42.86 \]

Find the percent of change and round to the nearest whole percent. Label your answer as an increase or decrease.

5.) Old: $175
New: $150

\[ \frac{150}{175} \times 100 = \frac{87\%}{\downarrow} \]

6.) Before: $60
After: $87

\[ \frac{87}{60} \times 100 = \frac{145\%}{\uparrow} \]

7.) A sweater that was originally marked $50 is on sale for $35. Find the percent decrease.

\[ \frac{35}{50} \times 100 = \frac{70\%}{\downarrow} \]

8.) Aaron's math grade went from a 72 to an 83. Find the percent increase.

\[ \frac{83}{72} \times 100 = \frac{114.58\%}{\uparrow} \]
Solve. *Show all your work for full credit.* (3 points each)

1. Find 18% of 98.
   \[
   \frac{x}{98} = \frac{18}{100} \\
   17.64 = 100x \\
   x = 17.64
   \]

2. 29 is 40% of what number?
   \[
   \frac{x}{100} = \frac{29}{40} \\
   40x = 2900 \\
   x = 72.5
   \]

3. 15 is what percent of 40.
   \[
   \frac{15}{40} = \frac{x}{100} \\
   1500 = 40x \\
   x = 37.5
   \]

4. What is 82% of 63?
   \[
   \frac{x}{100} = \frac{82}{63} \\
   51.66 = 100x \\
   x = 51.66
   \]

Solve. *Show all your work for full credit.* (4 points each)

5. Jamal borrowed money to buy a fishing boat. He borrowed money for 6 years at a 5% rate. After 6 years he had paid $6000 in interest. How much did he borrow to buy the boat?
   \[
   I = \frac{PRT}{100} \\
   I = 6000 \\
   P = ? \\
   R = 5 \Rightarrow 0.05 \\
   T = 6 \\
   P = 180000
   \]

6. Angel makes $250 dollars a week. She also makes 8% commission on all her sales. Last week she sold $935 worth of merchandise. How much did Angel make total?
   \[
   \frac{x}{935} = \frac{6}{100} \\
   7480 = \frac{100x}{100} \\
   x = 74.80
   \]

7. Gina bought a shirt for $18 and a coat for $74. What was her total cost if there is 7.5% sales tax charged?
   \[
   \frac{x}{92} = \frac{7.5}{100} \\
   690 = \frac{100x}{100} \\
   x = 6.90
   \]
Part I: Vocabulary – Match each word with the appropriate definition.

1.) Commission  a. Money received from investing
2.) Principal       b. Amount of money borrowed
3.) Withholding Tax c. Percent earned on merchandise sold
4.) Interest        d. Money deducted from paycheck
5.) Sales Tax       e. Money added to most purchases

Part II: Multiple Choice

6. Margaret bought a baseball hat for $12. If the sale's tax rate was 3.5%, find the total cost of the hat?
   a. $0.42
   b. $11.58
   c. $12.42
   d. $42.00

   $12 \times \frac{3.5}{100} = \frac{42}{100} + \frac{12.42}{12.42} = 12.42$

7. A loaf of bread that used to cost $1.50 now costs $1.70. What was the percent of increase of the price?
   a. 11.8%
   b. 13\frac{1}{3}%
   c. 20%
   d. 88%

   $\frac{1.70 - 1.50}{1.50} \times 100 = 13.33\%$

8. Find the equivalent value for $6^3 \cdot 6^2$.
   a. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$
   b. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$
   c. $6 \cdot 6 \cdot 3 \cdot 2$
   d. $12 \cdot 18$
13. 225% of what number is 81?

- a. 36
- b. 45
- c. 108
- d. 182.25

\[ \frac{81}{x} = \frac{225}{100} \]
\[ \frac{100 \cdot 81}{225} = \frac{225 \cdot x}{225} \]
\[ x = 36 \]

14. Of 1,600 radios inspected, 112 didn't work properly. What % of the radios did work properly?

- a. 93%
- b. 22%
- c. 7%
- d. 14.3%

\[ \frac{112}{1,600} = \frac{x}{100} \]
\[ \frac{112 \cdot 100}{1,600} = \frac{1,600 \cdot x}{1,600} \]
\[ x = 7 \]

15. Which is the greatest?

- a. 1% of 3,999 = 39.99
- b. 10% of 421 = 42.1
- c. 25% of 160 = 40
- d. 100% of 42 = 42

\[ \frac{x}{421} = \frac{1}{100} \]
\[ 100 \cdot x = 4210 \]
\[ x = 42.1 \]

\[ \frac{x}{3999} = \frac{1}{100} \]
\[ 100 \cdot x = 3999 \]
\[ x = 39.99 \]

\[ \frac{x}{160} = \frac{25}{100} \]
\[ 100 \cdot x = 4000 \]
\[ x = 40 \]
9. Andrea is paid an 18% commission on her cosmetic sales. She sold $550 worth of cosmetics. Find her commission.

   a. $220  
   b. $199  
   c. $118  
   d. $99

10. Ian deposits $900 in a saving’s certificate that pays 6.5% annually. How much money will Ian have at the end of one year?

   a. $958.50  
   b. $965.80  
   c. $1,048.50  
   d. $58.50

11. Which of these two coins is worth 60% of a dollar?

   a. Penny and Quarter  
   b. Half Dollar and Dime  
   c. Half Dollar and Quarter  
   d. Penny and Dime

12. What is $4^{-5}$ expressed as a positive exponent?

   a. $-4^5$  
   b. $\frac{1}{5^4}$  
   c. $\frac{1}{256}$  
   d. $\frac{1}{4^5}$
Part III: Open-Ended Questions

16. A sweatshirt with the regular price of $34 is first discounted by 20% and then by an additional 10%.
   a. What is the final sale price?

\[
\frac{x}{34} = \frac{30}{100} \quad 1000 = \frac{100x}{100} = 10.20 \quad \frac{34}{.5} = 68.00
\]

They both are $34 dollars but have $20 taken off of one and 30% on another.

17. Mr. Orangeapple makes $16 per hour and he works 36 hours per week.
   a. How much does he earn in a week?

\[
\frac{3.6}{16} \times 36 = \$576.00
\]

b. If Mr. Orangeapple's withholding rate is 18%, how much money is leftover after withholding taxes?

\[
\frac{576}{100} = \frac{18}{18} \times 320 = 320 \times 1.5 = 480
\]

C. How much money does Mr. Orangeapple make in a year? (Remember that there are the same amount of weeks in a year as there are cards in a deck.)

\[
\frac{320}{52} = \$61.54
\]