EMPower Plus
extending mathematical power

Split It Up

More Fractions, Decimals, and Percents

TEACHER BOOK

Mathematical Concepts Covered for *Split It Up: More Fractions, Decimals, and Percents*

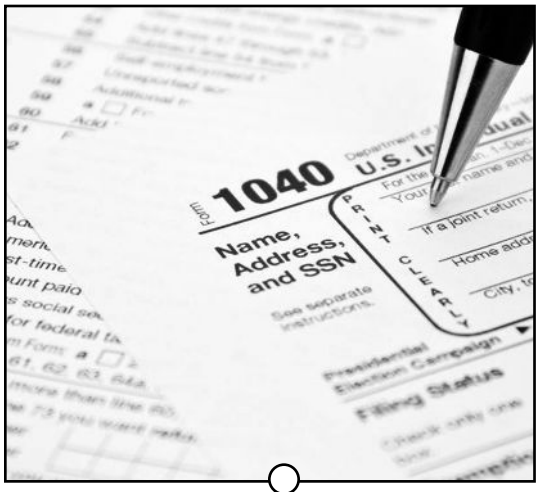
Book Description: Building upon their command of common benchmark fractions, students add 1/3's, 1/8's, and 1/100's, and their decimal and percent equivalents, to their repertoire of part-whole relationships.

Lesson Number:	Lesson Name:	Mathematical Concepts/Topics Covered
Opening the Unit	Split It Up	• Fractions, decimals, and percents in everday print materials • Problem solving with fractions and decimals and percents assessed
Lesson 1	One-Tenth	• One-tenth (and its multiples) related to benchmark fractions, particularly multiples of halves and thirds • Visual and numeric representations for one-tenth • Strategies for finding one-tenth of a quantity
Lesson 2	More About One-Tenth	• Representations equivalent to tenths • The role of place and the decimal point in a number's value
Lesson 3	What Is Your Plan?	• Strategies to determine multiples of 10% of an amount • The whole is equivalent to 100% • Arrays of 50 and 100 as a visual for percents • Multiples of 10% and their equivalent fractions
Lesson 4	One Percent of What?	• Strategies for finding 1% and its multiples of three- and four-digit numbers • Comparisons between 10% of an amount and 1% of another • The effect of the size of the whole on the size of a percent
Lesson 5	Taxes, Taxes, Taxes	• Multiples of 1% to find single-digit percentages • Multiples of 10% and 1% combined to find two-digit percentages
Lesson 6	Decimal Hundredths	• Visuals to show decimal place value in the tenths and the hundredths created • Fractions for decimal equivalents in the hundredths • Zeroes in numbers as optional or mandatory to expressing a number's value

Lesson 7	Smaller and Smaller	• Relationships among thousandths, hundredths, tenths, and ones • Expanded notation • Rounding decimals in the thousandths to the nearest 1, 0.1, and 0.01
Lesson 8	Adding and Subtracting Decimals	• Meanings for addition and subtraction operations with whole numbers and decimals • Place value to judge the soundness of answers to addition and subtraction problems involving fractions, decimals, and percents
Lesson 9	Multiplying Decimals	• Multiplication with whole numbers connected to fractions, especially to multiplication with decimal numbers • Reliable methods for multiplication with decimal numbers • Visual models and patterns for multiplication short-cuts with whole numbers and decimal numbers • Properties of arithmetic (e.g., commutative, distributive, associative) applicable to decimals
Lesson 10	Dividing Decimals	• Interpret division with decimals as splitting an amount or finding how many groups can “fit into” an amount • Matching verbal language and symbolic notation for division to a concrete model • Comparing and contrasting a/b with b/a
Lesson 11	Apply Decimal Learning	• Applying decimal operations and percents in real-life scenarios
Closing the Unit	Put It Together	• Identifying areas for future instruction • Problem-solving involving fractions, decimals, and percents • Reviewing conceptual understanding of operations involving decimals

FACILITATING LESSON 5

Taxes, Taxes, Taxes



How is the tax determined?

Synopsis

In this lesson, students practice finding multiples of 1% as they consider sales tax charges in various states. Multiples of 10% and 1% are then combined to analyze payroll deductions.

1. The whole class discusses taxes and tax rates encountered in daily life.
2. Students solve a series of problems involving the sales tax charged in different states. Pairs of students check each other's work.
3. The class discusses methods for finding single-digit percent amounts and the connection between percents and parts of wholes.
4. Student pairs solve a problem involving payroll deductions for two individuals.
5. The class discusses methods used to find two-digit percents and then considers using a decimal equivalent and the calculator to solve the same problems.
6. The class summarizes by compiling a list of methods for finding two-digit percent amounts.

Objectives

- Use multiples of 1% to find single-digit percents
- Combine multiples of 10% and 1% to find two-digit percents

Materials/Prep

- Calculators
- Colored pencils or markers
- Play money
- Sticky notes (optional)

Copy *Blackline Master 9: 100-Block Grid* for the class to use during the *Opening Discussion.*

Provide actual sales slips showing item costs and sales tax (from more than one state if possible) to share during *Activity 1* (optional).

Collect payroll stubs (with names blacked out) to share during *Activity 2* (optional).

Opening Discussion

Survey the class by asking:

Who has paid taxes? What kind of taxes? (income tax, sales tax, cigarette tax, gas tax)

What percent tax did you pay?

List some of the figures for your state that go with the examples given.

Be specific in your questioning and have available play money for demonstrations. Ask:

How do you figure sales tax on a $10 item? Who uses another way?

Show us your answer is correct using the 100-Block Grid or the play money.

Have available some copies of the *Blackline Master 10*: *100-Block Grids*, and allow time for students to work together in pairs or groups.

Heads Up!

If the percent of sales tax in your state includes a decimal, consider using another tax that does not or using a figure from a neighboring state.

The language "sales tax included" may confuse students. Talk through an example. For instance, the cost of a $10 item that is priced with sales tax included and the final cost of that $10 item if sales tax is added on.

Following are two ways students might demonstrate with the grid:

- Decide how the whole grid represents $10. Divide the grid into 10 columns representing 10 dollars, and mark each "dollar" (column) with the amount of tax (cents per dollar) on it. Then add the 10 figures together.

- Show that each block represents 10 cents. Shade the number of blocks representing the sales tax percent (five blocks for 5%, for example). Then multiply the number of blocks by 10 cents to determine the tax amount.

Ask volunteers to explain their reasoning with their grid.

Did any of you get an answer with the grid that surprised you? How?

Take time to reconcile differences and reach consensus on the total tax paid. Then prompt a review for finding 1% by asking:

What if the sales tax were 11%? How could you use what you know about finding 10% and finding 1% to figure the 11% tax on a $10 item?

Record strategies.

Introduce *Activity 1 Different States, Different Charges* (*Student Book*, p. 74) by saying:

Today you will look at several situations involving taxes. The first situation involves figuring out the sales tax charged in different states for three items.

You will see that you can use what you know about finding 10% and 1% of a number to find other percents.

Activity 1: Different States, Different Charges

Refer students to *Activity 1: Different States, Different Charges* (*Student Book*, p. 74). The additional practice in determining multiples of 1% will be valuable. Review directions.

Together determine what the rounded item amounts will be, and ask each student to record that information on the "Sales Tax Table." Assign pairs to check each other's work. Students complete the table and answer the questions on their own.

Pay attention to the following:

- Do students start with 1% multiplied or added? Or 5% because they can find 10% easily and then divide by two?
- Do they build percents by finding 4% (either by determining 1% and multiplying it by four or by finding 2% and then doubling it)? Do they then add 1% to find 5% or 2% to find 6%?

Some students will always begin by finding 1% and then adding or multiplying to find other single digit percents. Some will move the decimal point, while others will divide by 10 and then divide by 10 again to find 1%; some may use a calculator and divide by 100.

Talking about the varied strategies will allow you to connect these different approaches. You want students to see that the decimal point movement results from dividing and that dividing by 10 and then by 10 again results in the same answer as dividing by 100.

When everyone has completed at least the third column for Problem 1, call the class together. Say:

I saw many different approaches to finding the sales tax amounts. What was one strategy that you used to find 5%? Who used another way?

Connect the strategies whenever possible, discussing in detail why both ways work. For instance, point out that to start with dividing by 10 (finding 10%) means you need to divide further because 10% is *more* than 5%, while to start with dividing by 100 (finding 1%) means you need to multiply because 1% is *less* than 5%. However, in both cases the first step requires division.

Keep sharing. Then ask:

Which of these strategies is easiest to do in your head?

Which of these would be easiest to use if the whole were $9,750, not $100 or $40?

Students will likely have varying opinions about "easiest" methods. It is not important to reach consensus here; rather you want students to realize that different strategies may be easier in certain cases, although they yield the same results.

When you ask students how they determined the final cost of a sound system (sales tax included) in Florida, point out the need to add two amounts—tax and cost—in order to find the solution.

Problem solving remains the focus when you discuss how much more a sound system costs (sales tax included) in Michigan than in Alabama. Highlight the need to find total final costs (by adding the amount of the tax to the price of the item) in both states before subtracting to find the difference. On Problem 4, you can also move students toward a generalized rule about percents: The higher the percent charged, the higher the amount paid. Ask:

Is it true that the higher the tax percent, the more you pay? Why?

If students do not mention that the higher the percent charged, the larger the part of the whole being considered, ask about the part/whole relationship.

Close the discussion by asking:

How could you use what you know about finding 1% **of a whole to find *any* percent?**

Expect students to arrive at the conclusion that they can divide the whole amount by 100 (or by 10 and then 10 again) and multiply by the number of the percent. Check the rule by practicing on a few amounts such as 250, 1,000, and 5,475, using calculators as well as mental math.

Activity 2: Take-Home Pay

Introduce the activity by telling students:

Sales taxes are only one type of tax. Almost all taxes, though, are described in terms of percents paid, as you will see in the next activity which looks at payroll deductions and take-home pay for two people.

Refer students to *Activity 2: Take-Home Pay* (*Student Book*, p. 76). Read the first problem and take a quick poll on whether students agree that Mara would be taking home four times as much pay as her brother.

Students work individually or in pairs. Notice how students determine percents that involve multiples of 10% and 1%.

When students have completed the table, ask:

What did you discover about the take-home pay for these two people?

Ask students to justify their discoveries by explaining why it turned out that the more highly-paid person took home about three times as much money even though she earned four times as much as her brother.

Then turn the discussion to calculation of percents:

How did you find 28% of $1,600?

How did you find 15% of $400?

Did anyone use a calculator? How?

Discuss the methods used for each problem. Suggest alternative approaches if everyone solved the problems the same way.

How might knowing one-fourth, or 25%, of $1,600 ($400) **have helped you solve the problem?**

Focus as well on the whole and the part:

What was the whole in Mara's case? ($1600) **In her brother's case?** ($400)

What part was paid for federal income tax?

If students report the part as 28%, ask:

What fraction is 28%? How do you know?

How can you find 28/100 of $1,600 using the calculator?

Once students have realized they can find the answer by dividing $1,600 by 100 and then multiplying by 28, practice with a few more dollar amounts. Double-check by using non-calculator methods for finding 28%.

If students are using multiplication, reinforce this method by saying:

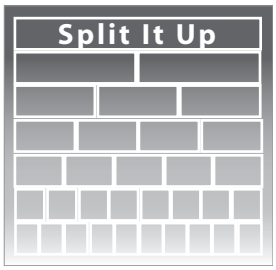
How could you use the decimal 28 hundredths (0.28) **to find 28% of $1,600 on the calculator?**

When students understand that they should multiply, revisit some earlier problems to employ this method. You might also practice calculating with some different percents such as 37% or 82%. Always prove that results are accurate by checking with the method of finding 10% and 1% and their multiples and then either adding or subtracting.

Establish as a class that to find 28% on the calculator you can do one of the following:

- Divide by 100 and multiply by 28.
- Divide by 10 and then 10 again and multiply by 28.
- Multiply by 0.28.

Summary Discussion



Say to the class:

Sometimes you only need a rough idea of what percent an amount represents; however, other times it is not enough to say, "This is about 10%." Sometimes it is important to know an exact amount, for example, in the case of a 15% tip or a 35% deduction.

What are all the ways you can find 15% of a number such as $400?

Record methods, adding these if no one mentions them:

- Find 10% (divide by 10), then find half of that, and add the two together: $40 + $20 = $60.
- Find 10%, take half of that (5%), and then triple that amount.
- Find 1% (divide by 100), and multiply by 15: $4(15) = $60.
- Find 10% (divide by 10), and then divide by 10 again to find 1%. Add the 10% number and multiply the 1% number by five: $40 + $4(5) = $40 + $20 = $60.
- Change the percent to a decimal (15% = 0.15), and multiply $400 by 0.15 on a calculator.

Reiterate that although using a calculator often appears easy, knowing how to find a percent by using multiples of 10% and 1% is useful when you do not have a calculator handy.

Then ask:

In what ways have you thought about parts and wholes in this lesson?

Suggest students take a few minutes to write in *Reflections* (*Student Book*, pp. 211-212) about two ways to find a particular percent of a given amount and finish the *Equivalents Chart* (*Student Book*, p. 210), if they haven't already. Direct students to *Vocabulary* (*Student Book*, p. 204) and ask them for any terms they would like to add to the list.

Practice

Personal Payroll Deductions, p. 77
For practice finding tax percents deducted from a weekly income.

Which Is a Better Deal?, p. 79
For practice finding percents and fractions of amounts charged for sale items.

Increase, Decrease, p. 81
For practice determining percents and adding to or subtracting from an original amount to calculate the increased or decreased amount.

Visuals of Percents, p. 82
For practice representing the whole when given a part or percent of it.

Mental Math Comparisons, p. 84
For practice calculating percent amounts for multiples of 1%.

Extension

Markdowns, p. 85
Tells the story of how an item price changed due to percent reductions.

Test Practice

Test Practice, p. 86

Looking Closely

Observe whether students are able to

Use multiples of 1% to find single-digit percents

Do students recall how to find 1% of a number? If students struggle to find 1%, ask how they find 10% and how that might help them find 1%. Review the concept of multiples by asking, "If you know that \$10 is ⅒, or 10%, of \$100, how would you find 30%?"

Students can separate whole amounts into percent parts using play money, or they can use a grid to better visualize the problem. For instance, if a whole grid represents \$40, what is the value of each square on the grid? (40 cents) A 100-block grid also represents 100% of an amount, so each block represents what part/percent? (1%) How many must be counted to find 4%? (Four) How much money is that? (\$1.60).

Do students know they need to add sales tax and item cost together when comparing costs among states? The introduction of store sales slips can be used to demonstrate this idea.

Combine multiples of 10% and 1% to find two-digit percents

Do students know how to **decompose** numbers? Help students see that they can break 15% into two parts—a 10% part and a 5% part. You can use a 100-block grid to show this by shading 10% in one color and 5% in another and asking what the total percent shaded is. Suggest students take apart 28% as well. Some ways to break apart the number 28% follow:

- 10% + 10% + 8%
- 25% + 3%
- 20% + 8%

If students break apart numbers in ways that do not simplify the problem ("28% = 15% + 13%," for example), suggest that they concentrate on breaking apart numbers into 10's and 1's. Provide them with some practice so that breaking apart numbers this way becomes automatic.

Those who easily break apart numbers and who know how to find 10%, 1%, and their multiples can deepen their number sense by considering:

- How can a benchmark fraction/percent help in this case?
- Is there any way to use doubling or halving?
- If I round up (to 30%, for instance), how would I find 28%? (28% is 2% less than 30%, and I can find 30% and 2%.)

Rationale

Knowing how to combine 10%, 1%, and their multiples helps students determine less common percents, such as 28%. In situations in which an approximation is not good enough, knowing how to find a percent by using the benchmark percents 10% and 1% in combination with 25%, 50%, and 75% is useful.

Math Background

Finding a percent of an amount is only the first step toward determining the full cost of an item or the net take-home pay for an individual. The problems in this lesson are two-step problems; they require a first step, finding the amount of the percent(s), and a second step, adding or subtracting that amount from the whole to find the answer. Keeping track of steps in an organized way helps students solve the problems.

Deciding what operation to use when finding percents will vary. For example, 28% of 50 can be solved by multiplying: 0.28 x 50 = 14; or it can be solved by finding 30% of 50 (15) and subtracting 2% of 50 (1), so 15 – 1 = 14; or by finding 25% (¼) of 50 (12.5) and adding 3% of 50 (1.5), so 12.5 + 1.5 = 14. The preferred method depends on the individual. For those who know how to find multiples of 10% and 1%, for example, finding 30% and 2% and subtracting might be easiest; for those who like using the calculator, using the decimal for 28% and multiplying might work best.

Context

Tax charges commonly surface in daily life. This lesson provides a springboard to discuss taxation, earnings, and state tax rate differences, as well as processes for determining percents. Students can locate information to compare state and local taxes of any type by using an Internet search engine and typing in the type of tax (income, sales, excise, estate, etc.) and the level of government (state or federal) or the locations (cities and towns) they wish to examine.

Facilitation

Whether or not students accurately calculate a percent, you want them to consider how sensible their calculations are. Ask, "Is it supposed to be less than 10%? What would 10% be?" Or, "Is that close to 25%? What would one-quarter be?"

The decimal-equivalent discussion at the close of *Activity 2: Take-Home Pay* opens the door to further exploration. You might choose to explore decimal patterns to construct a general rule for changing percents to decimals. Encourage students to reexamine the percent, fraction, and decimal table on p. 210 in their *Reflections* section. They can add the decimal equivalents for 15% and 28% and then look at all decimals and percents to notice the decimal-point pattern (moving the percent's decimal point two places to the left). Once they see this pattern, you might follow up by including some single-digit percents and their decimal equivalents.

Making the Lesson Harder

Following Problem 4 in *Activity 1: Different States, Different Charges*, you might ask questions that provoke further generalizations, such as:

If the Michigan sales tax were 9%, would you expect the difference between the cost of an item there and of the same item in Alabama to be greater or smaller? Why?

If the Michigan sales tax were 9% and the Alabama sales tax were 6%, how would the difference affect a one-time purchase like a refrigerator? What about something you buy weekly or monthly like paper towels?

Base calculations on the $100 sound system price to make differences easily visible and comparable.

You might also ask students to consider the difference in tax paid on two items—sneakers and sound systems—in states with 4%, 5%, 6%, and 7% tax rates. They look for a pattern, explain it, and, if possible, write a rule for finding sales tax for any item. Chart the differences in taxes paid and post the numbers on the board:

Sales Tax Charged	Difference between Tax Paid on Sneakers and Tax Paid on Sound System
4%	$2.40
5%	$3.00
6%	$3.60
7%	$4.20

Then pose the question:

As we increase the sales tax by 1%, the difference between tax paid on the sneakers and tax paid on the sound system increases by the same amount each time. Why is the difference always the same?

The class will calculate the pattern of increase (60 cents for each percent increase), but may need to be prompted to consider what 60 cents represents (1% of the $60 difference in cost between a stereo and sneakers).

How might you write a rule that would let you predict the difference in tax paid on sneakers and sound systems between any two states?

LESSON 5 IN ACTION

Figuring out percents by using patterns is a powerful method; however, students often need multiple opportunities to do this and to generalize from what they have done to make this method their own.

Teacher: "To find 1% of a number you can . . ."

There was total confusion, although students were well able to find 1% of 500, as well as 10%, 25%, 50%, 200%, and 300%. Students were confused about what they needed to do—multiply or divide.

The teacher wrote on the board: "50% of 500 = 250"

Teacher: "How did we get that?"

Students: "Took half."

Teacher: "Okay, that is the same as dividing by what?"

The students called out, "Two." Then they continued to work on the operation required by each percent. Students listed the equivalents—50% with 1/2, 25% with ¼, 10% with ⅒, and 1% with ⅟₁₀₀—and saw the relationship between each of those percents and division by 2, 4, 10, 1, and 100, respectively.

Having established the list, Carol asked, "How can we figure out what is 1% of 3,200?"

Students worked with percent patterns, starting with 100% = 3,200.

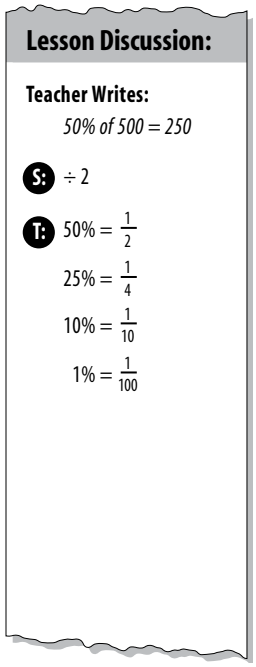
Student: "To get 1%, I knock off two zeroes. That gets me from 100% to 1%, so I knock off two zeroes and that gets me from 3,200 to 32."

Teacher: "What about 1% of 5,000?"

Kiki: "One percent of 5,000 is 4,950."

The teacher took a moment to ask Kiki how she got 4,950. In fact, she found 1% and subtracted. Because she confused 1% of 5,000 with 1% off, she came up with the wrong answer. The group did a few more examples, clarifying each time whether the 1% was *of* the whole or *off* the whole.

Carol Kolenik, observed by Myriam Steinback
Harvard Bridge to Learning and Literacy, Cambridge, MA



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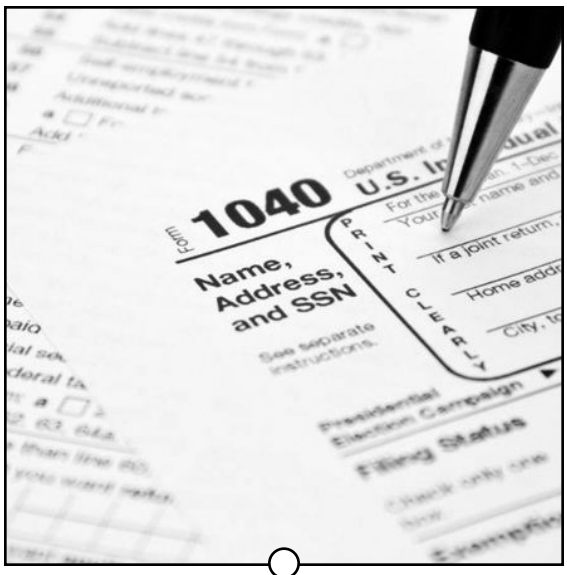
STUDENT BOOK

LESSON 5



Taxes, Taxes, Taxes

How is the tax determined?

An old saying goes, "Two things are certain in life: death and taxes." Taxes cost individuals and companies money, but paying taxes gives the government revenue to provide services. Understanding how to calculate taxes can help you keep track of where your money goes.

In this lesson, you will build on what you know about finding **multiples of 1%** and 10% to determine the sales tax for various items and to compare wages.

Activity 1: Different States, Different Charges

In 2020, only five states did not charge statewide sales tax. Forty-five states charged rates from a low of 2.9 percent in Colorado to 7.25 percent in California. (https://taxfoundation.org/2020-sales-taxes/)

- Round the item prices to the nearest dollar and write them on the lines in the sales tax table.
- Fill in the rest of the chart.
- Answer the questions that follow.

Sales Tax Table

Sales Tax Rate*	Sound System $_____	Sneakers $_____	Washing Machine $_____
	Tax Paid on Items		
4% AL, GA, HI, NY, WY			
5% ND, WI			
6% FL, ID, IA, KY, MD, MI, PA, SC, VT, WV			
7% IN, MS, RI, TN			

*States charging this percent sales tax in 2020

1. What are *two* ways you can calculate the amount charged when there is a 5% sales tax on an item?

2. What is the final cost of the sound system in Florida (FL), including sales tax? How do you know?

3. How much more does a sound system cost in Michigan (MI) than in Alabama (AL), including the sales tax? How do you know?

4. With sales tax, what is the difference in price for a washing machine between states listed with the lowest sale tax and those with the highest sales tax?

Activity 2: Take-Home Pay

1. Mara lives in Oregon and earns four times as much as her brother who lives in Louisiana. Mara thinks that her **net** or take-home pay will be four times as much as her brother's take-home pay. Do you agree with Mara? Why or why not?

Gross Weekly Pay	Federal* Tax	State Tax	Social Security	Medicare	Net Pay
Mara's: $1,600	28%	11% (OR)	6%	1%	
Her brother's: $400	15%	6% (LA)	6%	1%	

*All tax figures are based on 2015 tax rates and are rounded to whole numbers.

Based on the tax figures, Mara compared their take-home, or net, pay. What did she discover?

2. Mara's take-home pay:

3. Her brother's take-home pay:

4. When Mara compared them, she found that …

Practice: Personal Payroll Deductions

A paycheck stub lists the gross pay (the total amount before any costs) and the take-home, or net, pay after taxes and deductions for benefits.

Use the following information to determine what the take-home amount is after all deductions.

Show your work.

1. Fill in your own weekly gross pay or make up an amount.

   Gross weekly pay (hours worked x hourly wage): _____

2. The percent withheld for Federal income tax: _____
   (Choose the category that applies to you.)

Weekly Withholding for Federal Income Tax

Tax Rate*	Single	Married Filing Jointly	Married Filing Separately	Head of Household
10%	$0– $222	$0–$520	$0–$134.62	$0–$192.31
15%	$222.01–$764	$520.01–$1,906	$134.63–$546.15	$192.32–$731.73
25%	$764.01–$1,1789	$1,906.01–$3,073	$546.16–$1,679.81	$731.74–$1,889.42

*All tax rates are based on 2015 figures.

Check **http://www.taxadmin.org** or call the reference librarian at your local library for the state income tax rates in your state.

3. The amount withheld for Federal income tax per week from your gross pay: _____

   Explain your reasoning.

4. The percent withheld for state income tax in your state: _____

   Explain your reasoning.

5. The amount withheld for state income tax per week from your gross pay: _____

   Explain your reasoning.

Other Deductions

Social Security tax rate for employees: 6% (approximate)

Medicare tax rate for employees: 1% (approximate)

6. The percent withheld for other deductions per week from your gross pay: _____
7. The amount withheld for other deductions: _____
8. Net weekly pay: _____

Practice: Which Is a Better Deal?

Two stores at the mall sell a lot of the same things, but they tend to offer good deals on different items.

Both stores are having big sales. Circle the better deal for each item.

1. Jacket

At Barkers:

At Elsa's:

2. Set of Kitchen Knives

At Barkers:

At Elsa's:

Show how you know with pictures, words or numbers.

3. Media Streaming Device

At Barkers:

At Elsa's:

4. Running Shoes

At Barkers:

At Elsa's:

5. Dollhouse

At Barkers:

At Elsa's:

Show how you know with pictures, words or numbers.

For Problem 6, choose your own "___ %-off" sale for each stapler and show how you know the final cost with pictures, words or numbers.

6. Stapler

At Barkers:

At Elsa's:

Practice: Increase, Decrease

Write the matching amount for each description on the line provided.

Descriptions	Amounts
1. Population: 3,000 increased by 35% _____	9,520
2. Manufacturing jobs: 1,200 decreased by 8% _____	731.5
3. Fundraising target: $8,500 increased by 12% _____	1,160
4. Registered voters: 800 increased by 45% _____	8,610
5. Technology costs: $10,500 decreased by 18% _____	4,050
6. Carpet coverage: 950 sq. ft.; decreased by 23% _____	1,104

7. Cassie thinks the total for Problem 5 is $8,190, *not* $8,610. Check her math. What method did she use to solve the problem?

a. Explain what each number is.

b. Circle and explain the error(s).

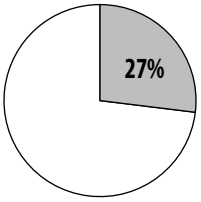
Cassie started with $10,500.

Step 1	Step 2	Step 3
$1,050	$2,100	$10,500
$1,050	+ 210	− 2,310
$ 105	$2,310	$ 8,190
$ 105		

Practice: Visuals of Percents

Each of the following diagrams represents a percent of a whole diagram. Draw or describe in words what 100% of each diagram would look like.

1. Twenty-seven percent of the circle is shaded.



a. Shade the rest.

b. How do you know 100% of the circle is now shaded?

c. What percent did you shade? _____

2. This is 15% of a line of dots. How many dots represent 100% of the line? How do you know?

3. Calculate 15% of

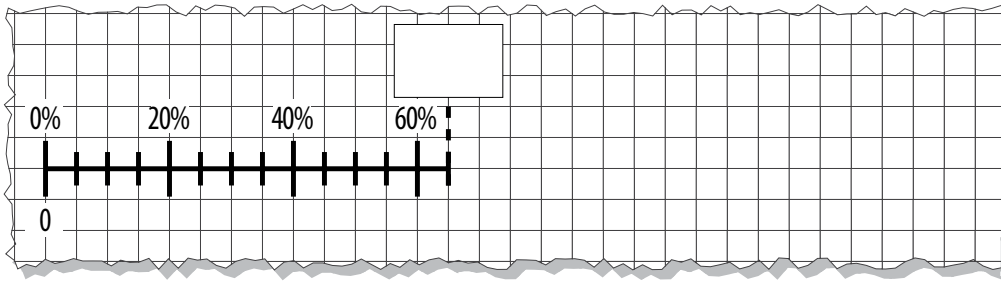
a. 1,000

b. 1,200

c. 1 million

d. What is the pattern that you see?

4. a. What percent of the line below is drawn? _____

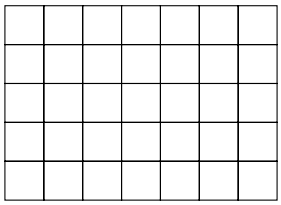


b. Draw the line out to 100% of its length.

c. What percent of the line did you draw? _____

d. How do you know your line equals 100% of the length?

5. This grid represents 25% of a whole.



a. Show a shape that would represent 100% of a whole.

b. How do you know your shape equals 100% of a whole?

Practice: Mental Math Comparisons

Compare each pair of amounts. Predict the answer, then solve the problems in your head. Use the benchmarks 10% and 1%.Then use the symbols for less than, greater than and equals to show the comparisons.

		Predict	Solve
1.	20% of \$500 ___ 2% of \$3,000	_____	_____
	20% of \$500 =	_____	_____
	2% of \$3,000 =	_____	_____
2.	40% of \$800 ___ 4% of \$9,000	_____	_____
	40% of \$800 =	_____	_____
	4% of \$9,000 =	_____	_____
3.	30% of \$1,500 ___ 3% of \$10,000	_____	_____
	30% of \$1,500 =	_____	_____
	3% of \$10,000 =	_____	_____
4.	60% of \$200 ___ 6% of \$2,000	_____	_____
	60% of \$200 =	_____	_____
	6% of \$2,000 =	_____	_____
5.	50% of \$900 ___ 5% of \$10,000	_____	_____
	50% of \$900 =	_____	_____
	5% of \$10,000 =	_____	_____
6.	70% of \$1,200 ___ 7% of \$12,000	_____	_____
	70% of \$1,200 =	_____	_____
	7% of \$12,000 =	_____	_____

Extension: Markdowns

Discounter's Warehouse always has the lowest prices in town.

This is how they price their items:

- Immediate discount of 4%
- After six months on the shelf, deep discount of 35% off the *last* price
- After 12 months on the shelf, a deeper discount of 12% off the *last* price

1. Fill in the markdown history of the items in the following chart. You may want to use a calculator. Round your answers to the nearest cent.

Discounter's Warehouse Markdown Schedule

Initial Price	Immediate Discount		Deep Discount (after 6 months)		Deeper Discount (after 12 months)	
	4% Discount	Price	35% Discount	Price	12% Discount	Price
Jacket $125.00						
Lamp $44.00						

2. Is a 51% markdown off the original price a better deal than the markdown schedule? Explain.

Test Practice

1. The American Heart Association recommends that saturated fat intake be limited to 300g each day. Four ounces of dark-meat chicken with skin contains 15 grams of saturated fat, which is

(**a**) 1% of the recommended daily saturated fat intake.

(**b**) 5% of the recommended daily saturated fat intake.

(**c**) 10% of the recommended daily saturated fat intake.

(**d**) 15% of the recommended daily saturated fat intake.

(**e**) 20% of the recommended daily saturated fat intake.

2. Based on past sales, chocolate ice cream accounts for 19% of all ice cream sales. Which calculation DOES NOT show how much chocolate ice cream a supermarket should order?

(**a**) Find 10%, 5%, and 4% of your ice cream order.

(**b**) Find $\frac{19}{100}$ of your ice cream order.

(**c**) Find $\frac{1}{5}$ of your order and subtract 1%.

(**d**) Find one-quarter of your order and add 1%.

(**e**) Find 20% of your order and subtract 1%.

3. A supermarket orders 300 gallons of ice cream each month. Chocolate ice cream accounts for 19% of the order. How many gallons of chocolate ice cream will the market order?

(**a**) 63 gallons

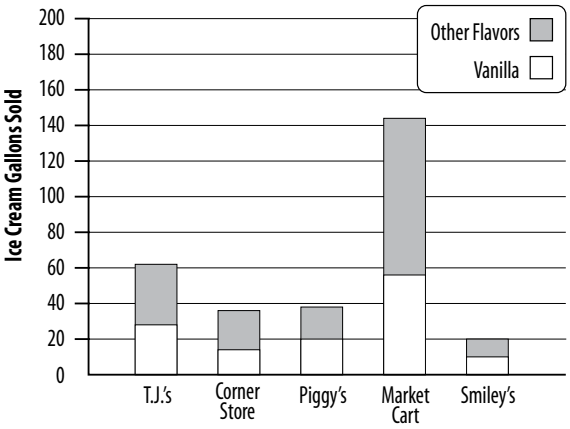
(**b**) 60 gallons

(**c**) 57 gallons

(**d**) 27 gallons

(**e**) 18 gallons

4. According to the graph, at which stores were ice cream sales at least 45% vanilla ice cream?



(**a**) Market Cart and T.J.'s

(**b**) Corner Store and Smiley's

(**c**) Corner Store and Piggy's

(**d**) Corner Store and Market Cart

(**e**) Piggy's, Smiley's, and T.J.'s

5. The percent of workers who get paid for sick days dropped from 67% in 2009 to 60% in 2014. A company had 1,000 workers in both 2009 and 2014. How many *fewer* workers were likely paid for sick days in 2014?

(**a**) 60

(**b**) 70

(**c**) 330

(**d**) 600

(**e**) 670

6. In 2013, 48% of people who passed the GED® tests in Massachusetts were teens. How many teens received a GED® certificate if 9,700 certificates were given?