

Lesson 1: Addition and Subtraction Review (2 Days)

☐ Getting Started

In this unit, you'll review, practice, and extend your work with whole numbers and decimal numbers. This lesson will help you brush up on your addition and subtraction skills.

Are you already pretty good at doing addition problems like these by hand?

$$\begin{array}{r} 57 \\ +19 \\ \hline \end{array}$$

$$\begin{array}{r} 428 \\ +356 \\ \hline \end{array}$$

$$\begin{array}{r} 2457 \\ +5319 \\ \hline \end{array}$$

If so, you'll be ready to do addition problems that involve decimal numbers because the algorithm used is very similar to what you already know. (Remember that an **algorithm** is just a step-by-step way of performing a particular task, often a calculation or problem-solving type of task.) The algorithm for adding two whole numbers might be stated like this:

1. First, write down the numbers, one on top of the other, being sure the place value digits are lined up (ones with ones, tens with tens, etc.).
2. Next, add the digits in the ones column. If the sum of those digits is a value greater than 9, write down the "ones" digit of this sum in the ones column under the two numbers, and write a "1" at the top of the tens column. Doing this regroups the 10 ones to the tens column as 1 ten. (Sometimes you'll hear this called "carry the 1.")
3. Next, add all the digits in the tens column, including the "1" that was regrouped from the addition of the digits in the ones column, and write down this sum in the tens column under the two numbers.
4. As needed, continue the same process with the hundreds column, the thousands column, and so on.

At this point in your math work, you may not consciously be thinking through the details of this algorithm every time you add two numbers together, but you're still following the steps. Go ahead and solve the three problems shown above and then share your answers with a parent.

Stuff You Need

- 3-hole drilled card stock (kit)
- colored pencils
- construction paper (kit)
- fine point dry-erase markers (kit)
- glue or glue stick
- Interactive Notebook
- laminated grid (kit)
- marker
- scissors

Ideas to Think About

- How are algorithms used in math?
- Why are the standard addition and subtraction algorithms useful?

Things to Know

- An **algorithm** is a step-by-step way of performing a particular task, often a calculation or problem-solving type of task.
- Adding and subtracting multi-digit decimal numbers is very similar to adding and subtracting multi-digit whole numbers.

Activities

☐ Activity 1: Adding Whole Numbers

Take a look at this video that uses base-10 blocks to explain why the 2-digit addition algorithm works, and notice in particular how the video explains what the regrouping step means.



Modeling Addition

www.beyondthepage.com/link/7279/

This link illustrates the process of addition with "regrouping".

Now, using either your laminated grid or the base-10 tool at the following web link, show your parent how to solve this addition problem: $65 + 27$. If you're using the laminated grid, you can outline a group of 10 squares for each rod or just draw a line 10 squares long; for a unit block, outline or fill in one square.

Be sure to explain to your parent how grouping 10 unit blocks into a 10-block rod and moving the 10-block rod to the tens column models the regrouping step in the addition algorithm.

**Base Ten Blocks**

www.beyondthepage.com/link/9670/

Click the question mark at the bottom left of the screen for information about using this tool. You will be most interested in learning to use the grouping option on the menu.

☐ **Activity 2: Adding Multi-Digit Decimal Numbers**

Adding decimal numbers works very much like adding whole numbers. In fact, it works *almost exactly* like adding whole numbers, as long as you remember how to write the numbers on your paper the correct way. And since you already know that in whole-number addition, you have to line up the ones in the ones column and the tens in the tens column, you can probably guess how to correctly line up decimal numbers.

That's right! You have to line up the tenths in the tenths column, the hundredths in the hundredths column, and so on. An easy way to do this is to just line up the decimal points. When you do this, all the digits to both the left and the right of the decimal will be lined up correctly by place value.

$$\begin{array}{r} 62.3 \\ + 4.75 \\ \hline \end{array}$$

Sometimes when you line up the decimal points, one or more of the place value columns at the end will have a missing digit. That missing digit won't change the sum, but adding a zero in the empty space can help you keep the numbers organized as you solve.

$$\begin{array}{r} 62.30 \\ + 4.75 \\ \hline \end{array}$$

To find the sum of two decimal numbers, you use the same addition algorithm that you use for whole numbers. The regrouping step works the same way as well, regardless of which place value digits you're adding.

$$\begin{array}{r} 1 \\ 62.30 \\ + 4.75 \\ \hline 67.05 \end{array}$$

There's just one more step to take. Bring the decimal point down into the answer. Remember that the decimal point always goes between the "ones" column and the "tenths" column, so be sure that your problem is written neatly so that the "brought down" decimal point goes in the correct place.

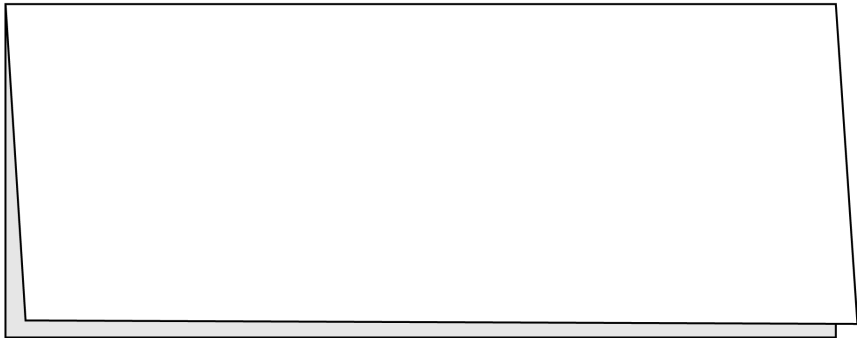
$$\begin{array}{r} 1 \\ 62.30 \\ + 4.75 \\ \hline 67.05 \end{array}$$

ones tenths

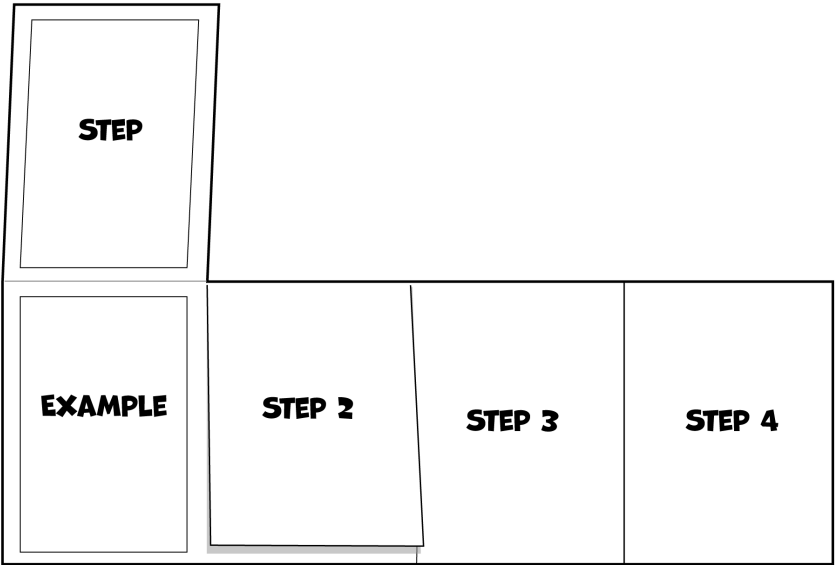
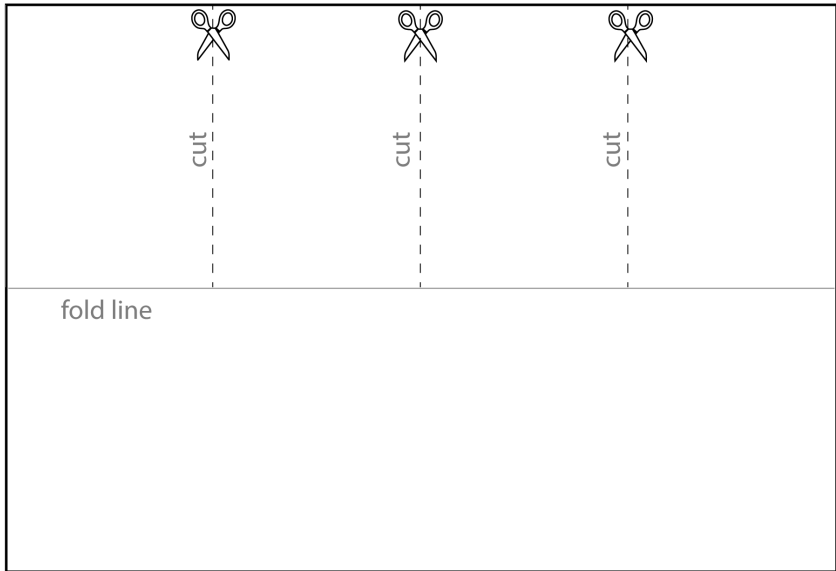
Now you're going to create a foldable that shows the algorithm for adding two or more multi-digit decimal numbers. Follow these steps to assemble your foldable:

1. Cut out the boxes from the "Addition Algorithm Foldable" sheet.
2. Put the algorithm steps in the correct order. Match the example problems with the correct step.
3. Once you've put the steps and matching examples in order, show them to a parent and explain each step in your own words.
4. Shade each step and its corresponding example in the same color, using a different colored pencil for each step.
5. Cut about 2 inches off the long end of a piece of construction paper so the page is about 9" × 10".
6. Fold the sheet of construction paper in half along the long edge. (Refer to the following image.)
7. Unfold the paper and cut the top half into 4 equal sections to create the flaps.
8. Use a marker to write "Step 1", "Step 2", "Step 3", and "Step 4" on the front of the flaps.
9. Lift the flaps and glue the steps and the examples in the correct order. The step should go on the back of the flap and the example should go below the step. (Refer to the following image.)

Fold in half on long side



Cut to fold line



When you are done, glue the back of the foldable to a piece of card stock paper and store it in your Interactive Notebook for future reference.

☐ **Activity 3: Practice Adding Multi-Digit Decimal Numbers**

Complete the "Practice Adding Multi-Digit Decimal Numbers" activity page.

Day 2☐ **Activity 4: Subtracting Whole Numbers**

You also use an algorithm when you subtract two whole numbers. This algorithm might be stated like this:

1. First, write down the numbers, one on top of the other, being sure the ones are lined up together in a "ones" column, the tens are lined up together in a "tens" column, etc.
2. Next, subtract the digits in the ones column, writing the difference in the ones column below the two digits. If the digit being subtracted is larger than the digit it's being subtracted from, "borrow" a ten from the tens digit of the top number, and add ten to the ones digit of the top number. Also subtract one from the tens digit you just borrowed from, and write the new tens digit above the old tens digit.
3. Next, subtract the digits in the tens column, writing the difference in the tens column below the two digits.
4. As needed, continue the same process with the hundreds column, the thousands column, and so on.

Take a look at this video that uses base-10 blocks to explain how the 2-digit subtraction algorithm works, and notice in particular how the video explains what the "borrowing" (or "perform an exchange") step means:

**Modeling Subtraction**

www.beyondthepage.com/link/7286/

This link illustrates the process of subtraction with "borrowing".

Now use your laminated grid and dry-erase markers or the tool at the following web link to model for your parent how to perform this subtraction problem: $65 - 27$. Remember that on the grid you can outline a group of 10 squares for each rod or just draw a line 10 squares long; for a unit block, outline or fill in one square.

Be sure to explain to your parent how moving a 10-block to the ones column models the "borrowing" step in your subtraction algorithm.

**Base Ten Blocks**
www.beyondthepage.com/link/9671/
☐ **Activity 5: Subtracting Multi-Digit Decimal Numbers**

Just as you saw with addition, subtracting decimal numbers uses the same algorithm as subtracting whole numbers. Of course, it's important to write the numbers on your paper the correct way. Just like with addition, if you line up the decimal points, then all of the ones digits will be in a "ones" column, all of the tenths digits will be in a "tenths" column, and so on.

$$\begin{array}{r} 38.42 \\ - 12.5 \\ \hline \end{array}$$

$$\begin{array}{r} 38.42 \\ - 12.5 \\ \hline \end{array}$$

Don't forget to put zeros in any place value columns that have an empty spot, especially if the missing digit is in the top number. This step helps make sure your problem stays organized as you solve it.

$$\begin{array}{r} 38.42 \\ - 12.50 \\ \hline \end{array}$$

Once you've done this, you'll use the same subtraction algorithm you're already familiar with. And again, the "borrowing" step works exactly the way it worked before, regardless of which particular column of digits you're subtracting.

$$\begin{array}{r} 7 \\ 38.42 \\ - 12.50 \\ \hline 25.92 \end{array}$$

Do you remember the last step? Bring the decimal point down into the answer. The decimal point, as you know, always goes between the "ones" column and the "tenths" column, so be sure that your problem is written neatly so that the "brought down" decimal point goes in the correct place.

$$\begin{array}{r} 7 \\ 38.42 \\ - 12.50 \\ \hline 25.92 \end{array}$$

ones tenths

Now you're going to create a foldable that shows the algorithm for subtracting two multi-digit decimal numbers. Follow these steps to assemble your foldable and refer to the image in Activity 2 as needed for guidance on folding and assembly:

1. Cut out the boxes from the "Subtraction Algorithm Foldable" sheet.
2. Put the algorithm steps in the correct order, and match the example problems that go with each step.
3. Once you've put the steps and matching examples in order, show them to a parent, and explain each step in your own words.
4. Shade each step and its corresponding example in the same color, using a different colored pencil for each step.
5. Cut about 2 inches off the long end of a piece of construction paper so the page is about 9" × 10".
6. Fold the construction paper in half along the long edge.
7. Unfold the paper and cut the top half into 4 equal sections to create the flaps.
8. Use a marker to write "Step 1", "Step 2", "Step 3", and "Step 4" onto the front of the flaps.
9. Lift the flaps and glue the steps and the examples in the correct order. The step should go on the back of the flap and the example should go below the step.

When you are finished, glue the back of your foldable to a piece of card stock paper and store it in your Interactive Notebook for future reference.

☐ Activity 6: Practice Subtracting Multi-Digit Decimal Numbers

Complete the "Practice Subtracting Multi-Digit Decimal Numbers" activity page.

Wrapping Up

In this lesson, you reviewed how to add and subtract multi-digit whole and decimal numbers and explored why the algorithms for these operations work. You'll review multiplying whole and decimal numbers in the next lesson.

Learning Gates

Take the [Learning Gates quiz](#) for this lesson.

Addition Algorithm Foldable

Add zero(s) to the right of any decimal number, if needed.	$\begin{array}{r} 403.78 \\ + 36.5 \\ \hline \end{array}$
Bring the decimal point straight down.	$\begin{array}{r} 403.78 \\ + 36.50 \\ \hline 440.28 \end{array}$
Line up the decimal points vertically; draw an addition line under the numbers to be added.	$\begin{array}{r} 403.78 \\ + 36.50 \\ \hline 028 \end{array}$
Add individual columns of digits, going from right to left; write the sum of each column of digits in the same column underneath the addition line. If any column of digits adds to more than 9, "regroup" the 1 to the next column.	$\begin{array}{r} 403.78 \\ + 36.50 \\ \hline \end{array}$

Practice Adding Multi-Digit Decimal Numbers

Directions: Use the standard addition algorithm to do the following addition problems.

Example: $9.087 + 15.31$

$$\begin{array}{r} 9.087 \\ + 15.310 \\ \hline 24.397 \end{array}$$

1) $17.55 + 4.29$

2) $38.6 + 12.51$

3) $276 + 15.8$

4) $543.87 + 17.4$

5) $6.964 + 118.5$

6) $948.47 + 2.743$

7) Demond bought a shirt for \$48 and a sport jacket for \$127.43. How much did he spend for both items?

8) An iron bar was heated to a temperature of 1037 degrees Kelvin. It was then heated an additional 14.28 degrees. What was the final temperature of the iron bar?

9) A scientist was measuring the masses of chemical residue. After one experiment, the amount remaining was 6.308 grams. After another, the amount remaining was 9.914 grams. What was the total amount of chemical residue?

10) Erin and her brother weighed themselves on a digital scale. She weighs 88.26 pounds and her brother weighs 103.8 pounds. What is their combined weight?

Subtraction Algorithm Foldable

Subtract individual columns of digits, going from right to left; write the difference of each column of digits in the same column underneath the subtraction line. If needed, "borrow" from the column to the left before subtracting.

Add zero(s) to the right of any decimal number, if needed.

Bring the decimal point straight down.

Line up the decimal points vertically; draw a subtraction line under the numbers to be subtracted.

$$\begin{array}{r} 614.70 \rightarrow \\ - 53.44 \\ \hline \end{array}$$

$$\begin{array}{r} 614.7 \\ - 53.44 \\ \hline \end{array}$$

$$\begin{array}{r} 614.70 \\ - 53.44 \\ \hline 126 \end{array}$$

$$\begin{array}{r} 51\cancel{6}1\cancel{6}1 \\ - 53.44 \\ \hline 561.26 \end{array}$$

PRACTICE SUBTRACTING MULTI-DIGIT DECIMAL NUMBERS

Directions: Use the standard subtraction algorithm to perform the following subtraction problems.

Example: $9.005 - 3.6$

$$\begin{array}{r} 8\text{ }10 \\ 9.005 \\ - 3.600 \\ \hline 5.405 \end{array}$$



1) $17.29 - 4.55$

2) $34.5 - 17.61$

3) $274 - 15.8$

4) $543.27 - 17.4$

5) $118.5 - 6.964$

6) $948.47 - 2.743$

7) $127.43 - 48.5$

8) $1037 - 18.28$

9) A scientist started an experiment with 19.414 grams of a chemical. After heating it, there were 6.7 grams remaining. How much of the chemical was lost due to the heating process?

10) Jake weighs 103.2 pounds and his little brother weighs 88.46 pounds. How much more does Jake weigh than his brother?

Lesson 1: Addition and Subtraction Review (2 Days)

Getting Started

✿ Ideas to Think About

- How are algorithms used in math?
- Why are the standard addition and subtraction algorithms useful?

Things to Know

- An **algorithm** is a step-by-step way of performing a particular task, often a calculation or problem-solving type of task.
- Adding and subtracting multi-digit decimal numbers is very similar to adding and subtracting multi-digit whole numbers.

⦿ Skills

- Compute fluently with multi-digit numbers
- Fluently add and subtract multi-digit decimals using the standard algorithm for each operation
- Solve real-world and mathematical problems involving the four operations with rational numbers

Introducing the Lesson

Unit 1 will allow your child to review, practice, and extend his work with whole and decimal numbers. In this lesson, he will apply the standard multi-digit addition and subtraction algorithm he learned in previous math courses to adding and subtracting multi-digit decimal numbers. In addition to having mastered his basic addition and subtraction facts, your child should also be familiar with the following:

- Adding and subtracting numbers to the thousands, including addition problems that involve regrouping and subtraction problems that involve borrowing.
- Decimal numbers and the place value system; specifically the meaning of digits in the different "columns" (e.g., the tenths column, the hundredths column, etc.)

Your child should begin by solving the three addition problems in this section:

- $57 + 19 = 76$
- $428 + 356 = 784$
- $2,457 + 5,319 = 7,776$

Activities

Activity 1: Adding Whole Numbers

In this activity, your child will watch a video that models how 2-digit addition works and will then use an online tool or his laminated grid to model for you how to add $65 + 27$. Note that the video refers to "exchanging" ten unit blocks for one 10-block rod. This is also referred to as "regrouping" or "carrying the one." Your child should be able to correctly use one or more of these phrases when modeling the addition of $65 + 27$ to find the sum of 92.

Activity 2: Adding Multi-Digit Decimal Numbers

In this activity, your child will review how to add decimal numbers and will create an addition algorithm foldable for his Interactive Notebook. The instructions for creating the foldable should be clear to your child, but be ready to help if needed. Once you've checked the steps, he will glue them into the foldable. The steps are as follows:

- Step 1: Line up the decimal points vertically; draw an addition line under the numbers to be added. (Pairs with the image of the decimal points circled.)
- Step 2: Add zero(s) to the right of any decimal number, if needed. (Pairs with image showing an arrow by a grayed 0.)
- Step 3: Add individual columns of digits, going from right to left; write the sum of each column of digits in the same column underneath the addition line. If any column of digits adds to more than 9, regroup the 1 to the next column. (Pairs with the image showing a dotted-line arrow.)
- Step 4: Bring the decimal point straight down. (Pairs with the completed problem with the decimal circled in the sum.)

Addition with decimals is a concept that has been taught in earlier math levels, but if your child would benefit from extra instruction on the topic, allow him to watch the video lesson at the following web link.

**Addition and Subtraction with Decimals**

www.beyondthepage.com/link/9887/

Watch the video to the 3:13 mark to review addition with decimals.

Activity 3: Practice Adding Multi-Digit Decimal Numbers

Your child will complete a page of decimal addition problems.

Answer Key:

1. $17.55 + 4.29 = 21.84$
2. $38.6 + 12.51 = 51.11$
3. $276 + 15.8 = 291.8$
4. $543.87 + 17.4 = 561.27$
5. $6.964 + 118.5 = 125.464$
6. $948.47 + 2.743 = 951.213$
7. Demond bought a shirt for \$48 and a sport jacket for \$127.43. How much did he spend for both items? (\$175.43)
 $\$48 + \$127.43 = \$175.43$
8. An iron bar was heated to a temperature of 1,037 degrees Kelvin. It was then heated an additional 14.28 degrees. What was the final temperature of the iron bar? (1,051.28 degrees Kelvin) $1,037 + 14.28 = 1,051.28$
9. A scientist was measuring the masses of chemical residue. After one experiment, the amount remaining was 6.308 grams. After another, the amount remaining was 9.914 grams. What was the total amount of chemical residue? (16.222 grams)
 $6.308 + 9.914 = 16.222$
10. Erin and her brother weighed themselves on a digital scale. She weighs 88.26 pounds and her brother weighs 103.8 pounds. What is their combined weight? (192.06 pounds) $88.26 + 103.8 = 192.06$

Day 2**Activity 4: Subtracting Whole Numbers**

In this activity, your child will watch a video that models how 2-digit subtraction works and will then use his laminated grid or an online base-10 tool to model for you how to perform the subtraction problem $65 - 27$. Note that the video refers to "exchanging" a single 10-block for ten 1-blocks. This is often referred to as "borrowing." Your child should be able to correctly use one or both of these phrases when modeling the subtraction $65 - 27$ to find a difference of 38.

Activity 5: Subtracting Multi-Digit Decimal Numbers

In this activity, your child will review how to subtract decimal numbers and will create a subtraction algorithm foldable for his Interactive Notebook. The instructions for creating the foldable are the same as for the previous foldable. Listen to your child review the algorithm steps with you before he glues them into the foldable. The steps are as follows:

- Step 1: Line up the decimal points vertically; draw a subtraction line under the numbers to be subtracted. (Pairs with the image of the decimal points circled.)
- Step 2: Add zero(s) to the right of any decimal number, if needed. (Pairs with image showing an arrow by a gray 0.)
- Step 3: Subtract individual columns of digits, going from right to left; write the difference of each column of digits in the same column underneath the subtraction line. If needed, "borrow" from the column to the left before subtracting. (Pairs with the image showing a dotted-line arrow.)
- Step 4: Bring the decimal point straight down. (Pairs with the completed problem with the decimal circled in the answer.)

Subtraction with decimals is a concept that has been taught in earlier math levels, but if your child would benefit from extra instruction on the topic, allow him to watch the video lesson at the following web link.

**Addition and Subtraction with Decimals**

www.beyondthepage.com/link/9888/

Begin watching at the 3:13 mark to review subtraction with decimals.

Activity 6: Practice Subtracting Multi-Digit Decimal Numbers

Your child will complete an activity page of decimal subtraction problems.

Answer Key:

1. $17.29 - 4.55 = 12.74$
2. $34.5 - 17.61 = 16.89$
3. $274 - 15.8 = 258.2$
4. $543.27 - 17.4 = 525.87$
5. $118.5 - 6.964 = 111.536$
6. $948.47 - 2.743 = 945.727$
7. $127.43 - 48.5 = 78.93$
8. $1,037 - 18.28 = 1,018.72$

9. A scientist started an experiment with 19.414 grams of a chemical. After heating it, there were 6.7 grams remaining. How much of the chemical was lost due to the heating process? (12.714 grams)
 $19.414 - 6.7 = 12.714$
10. Jake weighs 103.2 pounds and his little brother weighs 88.46 pounds. How much more does Jake weigh than his brother? (14.74 pounds) $103.2 - 88.46 = 14.74$

Wrapping Up

Questions to Discuss

- Explain what it means to "regroup" in the standard addition algorithm. (*Answers will vary, but encourage your child to explain in as much detail as possible.* In the standard addition algorithm, regrouping (or "carrying") is the process of transferring a digit from one place value column of digits to the next higher place value column. This transfer represents ten units of the smaller place value (such as 10 "ones") moving to the next place value as one group (such as 1 "ten").
- Explain what "borrowing" is in the standard subtraction algorithm. (*Answers will vary, but encourage your child to explain in as much detail as possible.* In the standard subtraction algorithm, borrowing is done whenever the number to be subtracted is larger than the number it is to be subtracted from. A digit is "borrowed" from the next higher place value column, and added to the original column. Since the "1" digit is borrowed from the next higher column, it represents "10" digits in the original column, and has the effect of increasing that number by 10.)

Things to Review

- Review the definition of an algorithm
- Review the algorithm for adding multi-digit decimal numbers
- Review the algorithm for subtracting multi-digit decimal numbers