

Decimal Subtraction Problems

Math Focus Points

- Using representations to subtract tenths and hundredths
- Subtracting decimals to the hundredths through reasoning about place value, equivalents, and representations

Today's Plan	Materials
1 <small>ACTIVITY</small> Introducing Subtracting Decimals	 20 MIN  CLASS • T68 
2 <small>ACTIVITY</small> Subtracting Decimals	 25 MIN  INDIVIDUALS • <i>Student Activity Book</i> , p. 57A or C67, Subtraction Problems with Decimals Make copies. (as needed) • M21, Hundredths Grid for Fill Two
3 <small>DISCUSSION</small> Subtraction Problems with Decimals	 15 MIN  CLASS • <i>Student Activity Book</i> , p. 57A or C67 (completed) • T68 
4 <small>SESSION FOLLOW-UP</small> Daily Practice	• <i>Student Activity Book</i> , p. 57B or C68, Decimal Subtraction Problems Make copies. (as needed) • <i>Student Math Handbook</i> , p. 57

Ten-Minute Math

Practicing Place Value Write 99,005 on the board and have students practice saying it.

Have students write the number in expanded form using exponents. $9 \times 10^4 + 9 \times 10^3 + 5$ Ask students:

- What is 5,000 less than 99,005? What is 1,000 more? What is 20,000 more?

Ask students how to write the new numbers and record them on the board. Then have them compare each sum or difference with 99,005. Ask students:

- Which places have the same digits?
- Which do not? Why?

If time remains, pose additional similar problems with the numbers 8,045 and 65,903.



1

ACTIVITY

Introducing Subtracting Decimals

Write the following problem on the board:

Mercedes had 1.86 grams of gold. She used 0.73 gram of it in a piece of jewelry. How much gold does she have left?

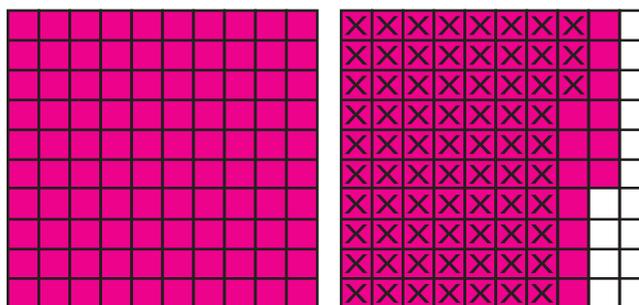
Display the transparency of Hundredths Grid for *Fill Two* (T68).

How could you use these grids to show what is happening in the problem?

Students might say:



“You could color in one whole grid and 86 hundredths on another grid to show the gold she had at first, and then cross off 73 hundredths of what is colored in to show how much she used.”



How much does she have left? (1.13)

What is another way to solve this problem without using the grids?

Students might say:



“You could subtract in parts – subtract the 7 tenths first and then the 3 hundredths.”



“You could add up from 73 hundredths to 1 and then from 1 to 1 and 86 hundredths.”

Connect students' suggestions for strategies to drawings on the grids. For example, if a student suggests subtracting in parts, use grids shaded in like the ones above and point out the 7 tenths and the 3 hundredths that were subtracted. If a student suggests adding up, use one color to shade 0.73 on a grid, and then use another color to shade in the amount needed to get to 1.86. (0.27 on the first grid, and 0.86 on the second)

2 ACTIVITY

Subtracting Decimals



Today you will solve subtraction problems with decimals. You can use the hundredths grids to help you solve the problems, and use what you know about solving subtraction problems with whole numbers to help you.

Distribute additional copies of Hundredths Grid for *Fill Two* (M21) and have students complete *Student Activity Book* page 57A or C67.

ONGOING ASSESSMENT: Observing Students at Work

Students subtract numbers with tenths and hundredths.

- **Do students pay attention to the place value of each digit as they subtract?**
- **What strategies do students use to solve the problems?** Do they use the grids? Do they use strategies similar to those used for subtracting whole numbers, such as subtracting in parts or adding up?
- **Can students create equivalent decimals when they need them?** For example, can they change 0.6 to 0.60 to subtract 0.48?

DIFFERENTIATION: Supporting the Range of Learners

Students solve subtraction problems involving decimals.

Intervention Some students may find it challenging to keep track of the place value of the digits when they subtract. Ask these students to solve the problem using the hundredths grids. As they solve a problem ask them: **How many tenths are we starting with? How many hundredths? How many tenths are there now? How many hundredths?**

Name _____ Date _____

Decimals on Grids and Number Lines

Subtraction Problems with Decimals

Average Monthly Precipitation in Inches (1971-2000)

City	Jan.	Feb.	Mar.
San Diego, California	2.28	2.04	2.26
Macon, Georgia	5	4.55	4.9
Evansville, Indiana	2.91	3.1	4.29
Sioux City, Iowa	0.59	0.62	2

Solve the following problems using the precipitation information above. Show how you solved each problem.

1. In March, how much more precipitation on average was there in Evansville than in San Diego?
2. In January, how much more precipitation on average was there in Evansville than in Sioux City?
3. In February, how much more precipitation on average was there in Evansville than in San Diego?
4. In March, how much more precipitation on average was there in Macon than in San Diego?
5. How much more precipitation on average was there in Macon in January than in February?

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Session 2.5A

Unit 6 57A

▲ **Student Activity Book, Unit 6, p. 57A; Resource Masters, C67**

ELL

Story problems are especially difficult for English Language Learners. Read through the problems with students and discuss unfamiliar words (e.g., *precipitation*). Then rephrase the problems to eliminate extra information.

Extension

If students easily solve the problems, ask them to try a different method for solving some of the problems.

3**DISCUSSION**

15 MIN



CLASS

Subtraction Problems with Decimals

Math Focus Points for Discussion

- ◆ Subtracting decimals to the hundredths through reasoning about place value, equivalents, and representations

Have students look at Problem 3 on *Student Activity Book* page 57A or C67.

Write the following solution on the board:

$$3.1 - 2.04 =$$

$$3.1 - 2 = 1.1$$

$$1.1 - 0.04 = 0.7$$

$$3.1 - 2.04 = 0.7 \text{ inch}$$

Here is a solution I've seen that shows subtracting in parts. What do you think about this solution?

Students might say:



"It was a good idea to subtract in parts. But there's a mistake. This person thought 0.04 was 4 tenths, and then 1.1 minus 0.4 would be 0.7. But really you need to subtract 0.04, which is much smaller."



"This person didn't subtract 0.04 correctly. Maybe it would have helped to think of 1 and 1 tenth as 1 and 10 hundredths. Then you subtract $1.10 - 0.04$."

Display the transparency of Hundredths Grid for *Fill Two* (T68). Ask volunteers to show 0.04 and 0.4 on the grids to highlight the difference between these decimals.

Subtracting 0.4 from a number is quite different from subtracting 0.04. Let's return to the original problem. In this problem you were subtracting 2.04 from 3.1. We are subtracting a number with hundredths in it from a number with only tenths in it. Can someone tell us how you did it?

Students might say:

“I just changed the 3.1 to 3.10 because they are equal. Then both numbers have hundredths and it is easier to subtract.”

Does everyone agree that 3.10 is equivalent to 3.1? So one strategy we can use if one number in the problem has only tenths and the other has hundredths is to change one of the numbers to an equivalent number.

Suppose you could talk to the person who made the error I showed you. What advice would you give about solving subtraction problems with decimals?

Students might say:

“We really have to pay attention to the place value!”

Next, have students look at Problem 4. Write the subtraction equation for the problem on the board:

$$4.9 - 2.26 =$$

Have several students write their solutions on the board and explain how they found the answer. Make sure a variety of solutions are shared. Solutions may include the following:

$$4.9 - 2 = 2.9$$

$$2.9 - 0.2 = 2.7$$

$$2.7 = 2.70$$

$$2.70 - 0.06 = 2.64$$

$$2.26 + 0.74 = 3$$

$$3 + 1.9 = 4.9$$

$$0.74 + 1.9 = 2.64$$

$$5.26 - 2.26 = 3$$

I changed 4.9 to 5.26, so the answer is 0.36 too big.

$$3 - 0.36 = 2.64$$

Name _____ Date _____

Decimals on Gifts and Number Lines Daily Practice

Decimal Subtraction Problems

Solve the following problems. Show your work.

- Renaldo has \$5.00. He spent \$3.89 on a toy. How much money does he have left?
- Zachary bought 1.49 pounds of cheese. He used 0.5 pound of the cheese in the dinner he made. How much cheese does he have left?
- Georgia is running in a 3.5-kilometer race. She runs 2.25 kilometers and then stops to tie her shoe. How much farther does she need to run to complete the race?
- $0.46 - 0.23 =$
- $8.26 - 6.1 =$
- $7.2 - 4.89 =$

NOTE: Students subtract decimals to the hundredths.

57B Unit 6 Session 2.5A

▲ Student Activity Book, Unit 6, p. 57B; Resource Masters, C68

Most of the strategies you used to solve this decimal problem are the same ones you used for subtracting with whole numbers: subtracting in parts, adding up, subtracting back, changing the numbers. How is subtracting with decimal numbers the same or different?

Students might say:



“It’s really the same, I’m just not used to subtracting decimals, so I have to think more about what I am doing.”



“You have to pay attention to the place value of each digit and make sure you are subtracting the correct thing—like $0.5 - 0.02$ isn’t 0.3 or 0.03 .”

4 SESSION FOLLOW-UP Daily Practice



Daily Practice: For reinforcement of this unit’s content, have students complete *Student Activity Book* page 57B or C68.



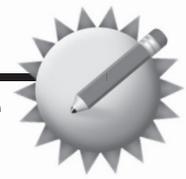
Student Math Handbook: Students and families may use *Student Math Handbook* page 57 for reference and review. See page 148 in the back of Unit 6.

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- 4.** In March, how much more precipitation on average was there in Macon than in San Diego?
- 5.** How much more precipitation on average was there in Macon in January than in February?



Decimal Subtraction Problems

NOTE Students subtract decimals to the hundredths.

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