Lesson: Subtraction of Decimal Numbers
Math Academy – Day 11
Student Notes

Goals:
- Draw base ten block representations of decimal numbers
- Demonstrate subtraction of decimals with base ten blocks
- Solve real world problems involving subtraction of decimals

Prerequisite Knowledge
- Definition of subtraction
- Familiar with base-ten block representation of decimal numbers

Activities:

1. Working with a partner,
    a. Using the same shape to represent the unit, draw the base-ten block representation for 1.2 and .9.

Unit Shape: **_____**

    b. Using the base-ten blocks, subtract $1.2 - .9$. Use the space provided below to draw your findings and the result. Highlight the trades, if applicable to this problem. Be prepared to share your findings with the class.

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2. Working with a partner,
   a. Using the same shape to represent the unit, draw the base-ten block representation for 1.09 and 0.312.

   Unit Shape: _____

   b. Using the base-ten blocks, subtract $1.09 - 0.312$. Use the space provided below to draw your findings. Highlight the trades, if applicable to this problem. Be prepared to share your findings with the class.

   c. Subtract $1.09 - 0.312$ using the paper-and-pencil method. Relate the result to the drawing in part b.

3. Whole Class Discussion: How do we subtract decimal numbers? How does subtraction of decimal numbers relate to addition of decimal numbers and why?

4. Using the paper-and-pencil method, subtract $1002 - 34.8$. Be prepared to share your results with the class. Be prepared to explain what is happening in the paper-and-pencil method with the class.

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5. With a partner, you will be given a piece of paper from your instructor. On the paper, create a story problem involving subtraction of decimal numbers. Do not write the result on the paper. Use the space provided below to write the result of your subtraction problem.

6. From our previous day's lesson, we discussed the following scenario:

Cristina is at the corner grocery store buying popsicles and ice cream sandwiches for friend's birthday party. The ice cream sandwiches cost $5.34 and the popsicles cost $3.97.

   a. Before tax, what is the total cost of the treats? (This was the same question from the last class).

   b. Cristina has a $20 bill. If Cristina pays with this $20 bill, what will her change be assuming that there is no tax on these food items?

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Instructor Notes

Goals:
- Draw base ten block representations of decimal numbers
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Prerequisite Knowledge
- Definition of subtraction
- Familiar with base-ten block representation of decimal numbers

Lesson Materials:
- Student Notes for Day 11
- Base-ten blocks, if students would like to use them. Prefer them to be drawing at this stage.

Lesson Breakdown:

Activity	Size of Group	Time in Activity Total Time: 55 minutes
1.2 - .9 Subtraction Problem	Partners	10 minutes (5 minutes for each part of the problem)
1.09 - .312 Subtraction Problem	Partners	15 minutes (5 minutes for each part of the problem)
Subtraction of Decimal Numbers	Whole Class Discussion	5 minutes
1002 – 34.8 Subtraction Problem	Partners	10 minutes
Story Problem Creation	Partners	10 minutes
Cristina Story Problem (if time permits)	Partners	5 minutes

Activities:

1. Working with a partner,
   a. Using the same shape to represent the unit, draw the base-ten block representation for 1.2 and .9.

Unit Shape: <u>There are</u> 3 possible way
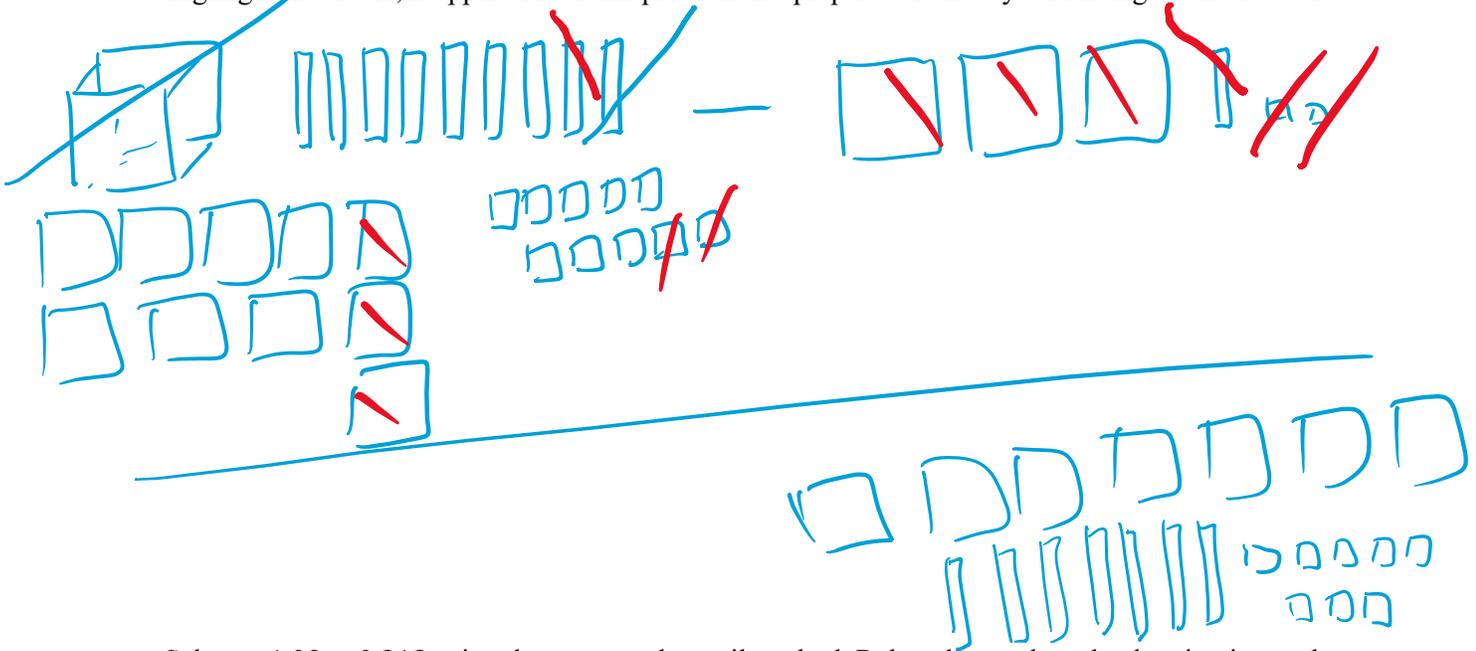
unit:

1.2

.9

unit:

1.2

~9

unit:

1.2

.9

   b. Using the base-ten blocks, subtract $1.2 - .9$. Use the space provided below to draw your findings and the result. Highlight the trades, if applicable to this problem. Be prepared to share your findings with the class.

This is for unit ▯

Trade

=

or

.3

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2. Working with a partner,
   a. Using the same shape to represent the unit, draw the base-ten block representation for 1.09 and 0.312.

only one choice

Unit Shape: _____

1.09

0.312
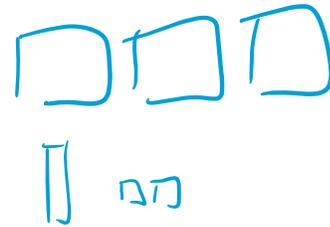
   b. Using the base-ten blocks, subtract $1.09 - 0.312$. Use the space provided below to draw your findings. Highlight the trades, if applicable to this problem. Be prepared to share your findings with the class.

   c. Subtract $1.09 - 0.312$ using the paper-and-pencil method. Relate the result to the drawing in part b.

   0.312

   as seen

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.778

3. Whole Class Discussion: How do we subtract decimal numbers? How does subtraction of decimal numbers relate to addition of decimal numbers and why?

   Remember: We are not telling the answers to the students. We want students to being telling us how to subtract decimal numbers.

   Line up the decimal point and place values.
   Same set up as addition because like shapes must be eliminated.

4. Using the paper-and-pencil method, subtract $1002 - 34.8$. Be prepared to share your results with the class. Be prepared to explain what is happening in the paper-and-pencil method with the class.

   $$\begin{array}{r} \cancel{1}\cancel{0}\cancel{0}2.0 \\ -\ 34.8 \\ \hline 967.2 \end{array}$$

   Explanation we are looking for from students: The algorithm requires us to re-write 1002 so that we can easily take 3 tens, 4 ones, and 8 tenths away from it. 1002 can be re-written as 1001 and 10 tenths; however, writing it in this manner allows 8 tenths to be taken away easily, but it does not allow for 4 ones and 3 tens to be taken away easily (because you can't take 4 from 1 nor can you take 3 from 0). Therefore, we must break the thousands down into 10 hundreds, then break 1 of the hundreds into ten ones, and finally break 1 of the ten into 10 ones. Thus, if we think of 1002 as 0 thousands, 9 hundreds, 9 tens, 11 ones, and 10 tenths (which equates to 1002 when grouped into the least number of blocks), it makes it easy to take 3 tens, 4 ones, and 8 tenths away from it.

5. With a partner, you will be given a piece of paper from your instructor. On the paper, create a story problem involving subtraction of decimal numbers. Do not write the result on the paper. Use the space provided below to write the result of your subtraction problem.

Read the story problems s/
Verify subtraction

6. From our previous day's lesson, we discussed the following scenario:

Cristina is at the corner grocery store buying popsicles and ice cream sandwiches for friend's birthday party. The ice cream sandwiches cost $5.34 and the popsicles cost $3.97.

a. Before tax, what is the total cost of the treats? (This was the same question from the last class).

$$\begin{array}{r} \$\ 5.34 \\ \$\ 3.97 \\ \hline \$\ 9.31 \end{array}$$

b. Cristina has a $20 bill. If Cristina pays with this $20 bill, what will her change be assuming that there is no tax on these food items?

$$\begin{array}{r} \$20.00 \\ 9.31 \\ \hline \$10.69 \end{array}$$