**SUPPLEMENTAL INSTRUCTION ACTIVITY**

**TOPIC:** Addition and Subtractions of Decimals

**APPLICABLE COURSES:** All math courses and other courses in other divisions.

**LEARNING OUTCOME:** (What will students be able to do by the end of the workshop?)

-identify and name decimal place values

-round decimals to a given place value

-add decimals

-subtract decimals

**CONTENT:** (What do students need to know to accomplish the outcome?)

1. Identify the various place values of a decimal
2. Meaning of the various place values of a decimal
3. Rounding Decimals
   1. Rounding up the 5 method
   2. Differences between rounding decimals and rounding whole numbers
   3. Rounding money to the nearest cent
4. Adding Decimals.
   1. Line up the decimals and place values when adding
   2. Adding Correctly
   3. Carrying Correctly
   4. Adding Money
5. Subtracting Decimals.
   1. Line up the decimals and place values when subtracting
   2. Borrowing Correctly
   3. Subtracting Correctly
   4. Subtracting Money

**METHOD:** *(How will the instructor deliver content? Short lecture, handouts, Powerpoint, other audio-visual presentation)*

-The lesson is divided into segments composed of lecture and examples followed by student practice and sharing.

-First, the instructor distributes the exercise worksheet and any supporting handouts.

Part A (about 20 min): The instructor will present segments 1 and 2 with examples (place value and rounding). Students will then attempt the practice problems. After the students try the practice problems, the instructor posts the solutions/answers on the screen for students to check their work. Next, in pairs, students will discuss wrong answers with their partners and figure out why they got it wrong.

Part B (about 25 min): The instructor will present segments 3 and 4 with examples (adding and subtracting). Students will then attempt the practice problems. After the students try the practice problems, the instructor posts the solutions/answers on the screen for students to check their work. Next, in pairs, students will discuss wrong answers with their partners and figure out why they got it wrong.

Part C (about 10 min): Next students complete a short quiz where they are asked to round, add and subtract decimals and answer questions about place value. After completing the quiz, the instructor posts the solutions/answers on the screen. Students check their results.

Part D (about 5 min): Students complete the self-reflection activity. The instructor can also look over the quizzes while the students are completing the self-reflection activity to give feedback to students.

**ACTIVE LEARNING STRATEGIES:** (How will students apply their knowledge? Solve a problem, create a project, analyze a case, explain a process)

Students reflect on the exercises and teach each other by verbalizing the steps they took to reach their conclusions.

**ASSESSMENT METHOD:** (How will the instructor know that the students met the outcome? Check for understanding. )

(10 minutes.)

Students complete a quiz where they are asked to add, subtract and round decimals and answer questions about place value. After completing the quiz, the instructor posts the solutions/answers on the screen. Students check their results. The instructor can also look over the quizzes while the students are completing the self-reflection activity to give feedback to students. If students do not successfully complete the worksheet quiz, they may be referred to individual tutoring or a guided learning activity.

**SELF-REFLECTION ACTIVITY:** (What will the instructor do to get students to reflect on how they learned the content? What they learned, how they learned it, how they will apply it in their coursework)

(5 minutes.)

-If you were going to make a mistake on a decimal problem, what type of problem would it be? Why?

-What steps are you going to take so that you make fewer mistakes when you work with decimals?

|  |  |
| --- | --- |
| ***Adding & Subtracting Decimals***  **Handout KEY** | **Name: Date:** |

**Objective: Learn how to add and subtract Decimals**

**Segment 1**: **Knowing Place Value**

It is important to know the place values for decimal numbers. Let’s look at the example 72.6843195 and see if we can name the place value for each digit.

**7 2 . 6 8 4 3 1 9 5**

Tens Tenths Thousandths Hundred-Thousandths Ten-Millionths

Ones Hundredths Ten-Thousandths Millionths

It is vital to memorize the place values and their meaning. For example, a 6 in the tenth’s place means 6 out of 10 or  . An 8 in the hundredth’s place means 8 out of 100 or  . Etc.

**Example 1 Which digit is the hundredths place in the Decimal 57.3897421? 8**

**Example 2 Which digit is the ten-thousandths place in the Decimal 0.09763841? 6**

**Example 3 What is the place value for the “3” in the decimal 7.6435219 and what does the   
 “3” represent? Thousandths Place. 3/1000**

**Example 4 What is the place value for the “9” in the decimal 32.498713 and what does the   
 “9” represent? Hundredths Place, 9/100**

**Segment 2: Rounding Decimals**

To round a decimal, first identify the place value you wish to round to. Now look at the number to the right of the place value. If the number is 0,1,2,3 or 4 then leave the place value alone. This is called rounding down. If the number to the right is 5,6,7,8 or 9 then add one to the place value. This is called rounding up. The secret of rounding is to make the decimal a simpler number. If rounding to a place value to the right of the decimal (or to the ones place), cut off all digits after the rounded place value. Note: You will not need zero’s as place holders like we do with whole numbers.

Rounding decimals are used all the time with Money. When we round money to the “nearest cent” we are rounding to the hundredths place. This is very common in business applications.

**Example 5 Round the Decimal 8.51276 to the Tenths place. 8.5**

**Example 6 Round the Decimal 8.51276 to the Thousandths place. 8.513**

**Example 7 Round the Decimal 32.599876 to the Ones place. 33**

**Example 8 Round $32.599876 to the nearest cent. $32.60**

***Now it is time for you to practice. Work on the following problems using the rules discussed above. The instructor will post the answers on the board for you to check. Break up into pairs and discuss wrong answers with your partner.***

**Practice 1** **Which digit is the ones place in the Decimal 8.49271? 8**

**Practice 2** **Which digit is the ten-thousandths place in the Decimal 8.49271? 7**

**Practice 3** **Which digit is the tenths place in the Decimal 8.49271? 4**

**Practice 4 What is the place value for the “3” in the decimal 26.83714 and what does the   
 “3” represent? Hundredths Place, 3/100**

**Practice 5 What is the place value for the “7” in the decimal 26.83714 and what does the   
 “7” represent? Thousandths Place, 7/1000**

**Practice 6 What is the place value for the “1” in the decimal 26.83714 and what does the   
 “1” represent? Ten-Thousandths Place, 1/10000**

**Practice 7 Round the Decimal 41.586317 to the Hundredths place. 41.59**

**Practice 8 Round the Decimal 41.586317 to the Thousandths place. 41.586**

**Practice 9 Round the Decimal 41.586317 to the Tens place. 40**

**Practice 10 Round the amount of money $274.583192 to the nearest cent. $274.58**

**Practice 11 Round the amount of money $79.99648 to the nearest cent. $80.00**

**Segment 3: Adding Decimals**

Adding Zeros to the end of a decimal does not change the value of the decimal. For example   To add Decimals it is vital that we add each place value to the same corresponding place value in the second number. We must line up the decimal points and all of the place values. If one number has more digits than another, we simply add zeros to the place values until both numbers have the same number of digits and the same place values.

For Example, to add 7.3 to 5.192 we would first write the 7.3 as 7.300 so that both numbers now end in the thousandths place. Now we can line up the decimal points and place values and add like whole numbers. (Don’t forget to carry.)

**Example 9  $442.81**

**Example 10  13.4712**

**Example 11**  58.00684

**Example 12**  20.8945

**Segment 4: Subtracting Decimals**

Subtracting Decimals is very similar to adding. First rewrite the decimals by adding zeros so that both numbers end in the same place value. Now line up the decimal point and all the place values and subtract as if they are whole numbers. (Don’t forget to borrow correctly!)

**Example 13  13.092**

**Example 14**  10.779

**Example 15**  2.7307

***Now it is time for you to practice again. Work on the following problems using the rules discussed above. The instructor will post the answers on the board for you to check. Break up into pairs and discuss wrong answers with your partner.***

**Practice 12 Add the following: $32.89 + $45.67 + $71.35 $149.91**

**Practice 13 Add the following: 2.8 + 0.31974 + 26 29.11974**

**Practice 14 Subtract the following: $90.23 - $34.87 $55.36**

**Practice 15 Subtract the following: 8.4 – 0.03798 8.36202**

**Quiz:** Let’s check to see how much you have learned. Take the quiz. Then check your answers.

When you are done, answer the following self-reflection questions.

**SELF-REFLECTION**

-If you were going to make a mistake on a decimal problem, what type of problem would it be? Why?

-What steps are you going to take so that you make fewer mistakes when you work with decimals?

|  |  |
| --- | --- |
| ***Adding&Subtracting Decimals***  **Quiz** | **Name: Date:** |

1. Which digit is the thousandths place in the Decimal 38.692174? 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does the “6” mean in the decimal 0.0241673? 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Round the Decimal 37.96129 to the Tenths place. 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Round $572.93518 to the nearest cent. 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5.  5.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. **** 6**.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |
| --- | --- |
| ***Adding&Subtracting Decimals***  **Quiz KEY** | **Name: Date:** |

1. Which digit is the thousandths place in the Decimal 38.692174? 1. \_\_\_\_\_\_\_2\_\_\_\_\_\_\_\_\_\_
2. What does the “6” mean in the decimal 0.0241673? 2. \_\_6 out of 100,000\_\_\_
3. Round the Decimal 37.96129 to the Tenths place. 3. \_\_\_\_38.0\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Round $572.93518 to the nearest cent. 4. \_\_\_$572.94\_\_\_\_\_\_\_\_\_\_\_\_
5.  5.\_\_\_9.5172\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. **** 6**.\_\_**11.96244**\_\_\_\_\_\_\_\_\_\_\_\_\_**