

# Math Mania

**Grade Level:** Fifth Grade Math  
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**Length of Unit:** 12 lessons – Approximately 14-15 days long

## I. ABSTRACT

This unit is designed to help fifth grade students explore mathematical concepts such as fractions and decimals. This unit is a mixture of visualization and hands-on activities that will help students find a purpose for certain math concepts. We have incorporated adding, subtracting, multiplication and division as strategies that one deals with when teaching fractions and decimals.

## II. OVERVIEW

### A. Concept Objectives

1. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems. (Colorado State Math Standard #6.2)
2. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems. (Colorado State Math Standard # 1.3)

### B. Content from the *Core Knowledge Sequence*

1. Numbers and number sense
2. Fractions and decimals
3. Computation

### C. Skill Objectives

1. The students will be able to compute the product when given two common fractional numbers.
2. The student will be able to add, subtract, multiply, and divide fraction.
3. The student will be able to identify fractions in either written, picture or numerical forms.
4. The student will be able to identify numerators and denominators in fractions.
5. The student will be able to place numbers, including fractions and decimals, on a number line.
6. The student will be able to give the greatest common factor and least common multiple for numbers, including fractions.
7. The student will be able to convert improper fractions to mixed numbers and mixed numbers to improper fractions.
8. The student will be able to add and subtract mixed numbers.
9. The student will be able to use the proper terminology when referring to the decimals.
10. The student will be able to identify place values when dealing with decimals.
11. The student will be able to add, subtract, multiply and divide decimals.

12. The student will be able to put decimals in increasing and decreasing formats.
13. The student will be able to identify patterns when multiplying decimals by tens.

### III. BACKGROUND KNOWLEDGE

- A. For Teachers
  1. Hirsch, E.D. *What Your 5<sup>th</sup> Grader Needs To Know*. New York: Delta, 1993. 0-385-31464-7.
  2. Bolster, L.C. *Exploring Mathematics*. Illinois: Scott, Foresman and Company, 1991. 0-673-33115-6.
- B. For Students (*Core Knowledge Sequence 5<sup>th</sup> Grade*)
  1. Recognize fractions to one-twelfth.
  2. Write mixed numbers; change improper fractions to mixed numbers and vice versa.
  3. Recognize equivalent fractions.
  4. Put fractions in lowest terms.
  5. Add and subtract fractions with like denominators.
  6. Read and write decimals to the nearest thousandth.
  7. Write decimals in expanded form.
  8. Read and write decimals on a number line.

### IV. RESOURCES

- A. Pallott, J. and Bolster, R. *The Hershey's Milk Chocolate Fractions Book*. New York, New York, 1999 Scholastic. 0-439-13519-2.

### V. LESSONS

#### Lesson One: Introduction to Fractions

- A. *Daily Objectives*
  1. Concept Objective(s)
    - a. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
  2. Lesson Content
    - a. The student will be able to identify fractions in either written, picture or numerical forms.
  3. Skill Objective(s)
    - a. The student will be able to identify fractions in either written, picture or numerical forms.
    - b. The student will be able to identify numerators and denominators in fractions.
- B. *Materials*
  1. Dictionary
  2. Unifix Cubes

3. Fraction pictures
4. Overhead projector
5. Paper
6. Fraction Drawings worksheet (Appendix A-1 and A-2)
7. Fraction worksheet (Appendix B)

C. *Key Vocabulary*

1. Fraction - a number that is equal or greater than one
2. Numerator - the top number of a fraction
3. Denominator - the bottom number of a fraction
4. Fraction - a number that shows part of a whole unit
5. Equivalent fraction - fractions that name the same number or amount
6. Improper fraction - a fraction that is equal or greater than one
7. Proper fraction - a fraction that is less than one

D. *Procedures/Activities*

1. Begin the lesson by saying, “We are going to start our next unit on fractions.” We are going to begin by defining what a fraction is. Does anyone know what a fraction is? The teacher has one student look up the word fraction in the dictionary. While the teacher writes the definition on the board the students will write the definition of a fraction in their notebook. The students will have an ongoing math notebook that is used to record key vocabulary words and their definitions. A fraction is a number that shows part of a whole unit. This will then initiate a discussion on fractions. The discussion should also include the definitions for numerator, denominator, proper fraction and improper fraction. A numerator is the top number of a fraction. The denominator is the bottom number of a fraction. Example:  $\frac{1}{2}$  the denominator of this fraction is 2,  $\frac{2}{3}$  the denominator of this fraction is 4. A proper fraction is a fraction that is less than 1, Example:  $\frac{5}{16}$ ,  $\frac{2}{3}$ , and  $\frac{7}{8}$ . An improper fraction is a fraction that is equal or greater than 1. Examples:  $\frac{16}{4}$  and  $\frac{15}{6}$ .
2. Drawings of various fractions will be projected on the overhead to show visual understanding of a type of fraction (Appendices A-1 – A-2). Students will then be given colored cubes to use to help visualize why fractions may or may not be equal. The students can also use the unfix cubes to decipher between fractions. During this exercise students will be able to visualize how different fractions, like  $\frac{1}{2}$  and  $\frac{2}{4}$  are equal fractions, which are shown in a different format. Students will practice identifying drawings of fractions from the overhead (Appendices A-1 – A-2). Students will write their answers on a piece of paper and the teacher will move throughout the room to check for student understanding. The teacher will then introduce the definition lowest terms. Having a fraction in the lowest terms means to have a fraction where the numerator and denominator can be divided only by one. The teacher will then have students go back to the original examples given and reduce all the fractions that need to be reduced. For example, the students had a picture that was  $\frac{2}{4}$ . The students need to reduce the fraction to lowest terms, which is  $\frac{1}{2}$ .

3. Next, the teacher will write out a fraction on the board using words. For example, the teacher can write one-fifth on the board. Have the students tell the teacher what is on the board. The students, as a whole class, need to come to the conclusion that one-fifth is the same as  $1/5$ .
  4. Then the teacher needs to write  $2/10$  on the board. As an end result students should have the understanding that this also means two-tenths. The teacher needs to reinforce that the two formats mean the exact same thing.
  5. Students will then be given a worksheet on writing fractions (Appendix B) where they will identify the numerator and denominators in fractions. Students will be able to tell, by using the drawings, if the fractions are equal or not equal; and convert basic word written fractions to numbers and visa versa. Students need to be able to say and write that  $3/4$  is three-fourth and that two-thirds is equal to  $2/3$ .
- E. *Assessment/Evaluation*
1. Students will be given a worksheet on writing fraction (Appendix B) to complete to show understanding of the concepts they learned (points possible: 33).
  2. The teacher will be watching students for understanding and periodically talking with students individually to check for understanding.

## **Lesson Two: Greatest Common Factor and Lowest Common Multiple**

### A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
  - a. Number and number sense
  - b. Fractions and decimals
3. Skill Objective(s)
  - a. The student will be able to place numbers, including fractions and decimals, on a number line.
  - b. The student will be able to give the greatest common factor and least common multiple for numbers, including fractions.

### B. *Materials*

1. Overhead projector
2. Fraction number line (Appendix C)
3. Markers

### C. *Key Vocabulary*

1. Greatest common factor - the greatest factor that two or more numbers have in common
2. Lowest common multiple - the least common multiple of two or more denominators

D. *Procedures/Activities*

1. The teacher begins lesson by saying, "Today we are going to talk more about fractions. We will be expanding on the lesson from yesterday, beginning by reviewing yesterday's concept." The teacher will then put up  $\frac{3}{10}$  and sixty-hundredths on the overhead as the students write it on their own paper. The students will need to answer the problems by converting them to either a word fraction or a number fraction. The teacher will walk around the room to check for understanding.
2. The teacher will begin the new lesson by giving the students two new key words. Students will be writing the words in their math vocabulary notebook. The first vocabulary word is greatest common factor (GCF), which is the greatest factor that two or more numbers have in common. The teacher will then expand with an example on the overhead. The teacher will explain that in the numbers 18 and 30, the GCF is 6. To come to this conclusion, the teacher needs to write the factors of each number of the overhead like this: 18 (1, 2, 3, 6, 9, 18) and 30 (1, 2, 3, 5, 6, 10, 15, 30). A hint to do this is to multiply the numbers to get to 18 ( $1 \times 18=18$ ,  $2 \times 9=18$ ,  $3 \times 6=18$ ). Each number has 1, 2, 3 and 6 in common, but the greatest common factor is 6. Have the students' practice on their own. Give the students the number 12 and 20 and have them write down the factors for each number then find the GCF. The students should have something similar to the following: 12 (1, 2, 3, 4, 6, 12) 20 (1, 2, 4, 5, 10, 20).
3. Next introduce the word least common denominator (LCD). Have the students write the definition for the LCD in their notebooks. The LCD is the least common multiple of two or more denominators. To find the LCD students need to find the multiple of two numbers. Have the students find the multiples of the two numbers 2 and 3. They should come up with this: 2 (2, 4, 6, 8, 10...) and 3 (3, 6, 9, 12, 15...). Now they just have to find the lowest number that the two have in common. The LCD of 2 and 3 is 6. After students see this, relate it to fraction. The LCD of  $\frac{1}{2}$  and  $\frac{1}{3}$  is  $\frac{1}{6}$ .
4. The next thing the teacher will introduce is a fraction number line (appendix 3). This is to help the students visualize the order of fractions and visualize which fractions are larger or smaller than other fractions. The teacher will put up a number line, on the overhead, like this:  
$$\underline{\hspace{10em} 0 \hspace{10em} 1 \hspace{10em} 2}$$
5. Have the students fill in the following fractions:  $\frac{6}{6}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $\frac{5}{8}$ ,  $\frac{1}{7}$ . This will help students better understand the size of some fractions, and where they are in regards to other numbers and other fractions.
6. Students will be given the following number pairs: 2 and 3, 10 and 100, 20 and 5, 9 and 18, 4 and 6, 90 and 9, 17 and 18, 54 and 38, 26 and 32, and 45 and 9. Students need to find both the LCM and GCF for each number. They need to do this on their own paper.

E. *Assessment/Evaluation*

1. Students will need to complete the ten problems given at the end of the lesson (points possible: 30).

2. Students will be orally and individually questioned to check for understanding.

**Lesson Three: Apple Fractions**

**A. Daily Objectives**

1. Concept Objective(s)
  - a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
  - a. Numbers and number sense
  - b. Fractions and decimals
3. Skill Objective(s)
  - a. The student will be able to add and subtract fractions.
  - b. The student will be able to identify fractions in either written, picture or numerical forms.
  - c. The student will be able to identify numerators and denominators in fractions.
  - d. The student will be able to give the greatest common factor and least common multiple for numbers, including fractions.

**B. Materials**

1. Overhead projector
2. Apple
3. Orange
4. Unifix Cubes
5. Markers
6. Adding and Subtracting worksheet (Appendix D)
7. Number Line worksheet (Appendix C)

**C. Key Vocabulary**

1. Greater than  $>$
2. Equal to  $=$
3. Less than  $<$
4. Numerator (review)
5. Denominator (review)

**D. Procedures/Activities**

1. The teacher will begin by saying, "How many of you have ever eaten an orange or an apple." Let the students respond. The teacher will then tell the students that they have eaten a fraction. If you cut an apple into four slices and eat only one slice, what part of a fraction have you eaten? Let the students come to the conclusion that you have eaten  $\frac{1}{4}$  of an apple. The teacher will show the students the example by actually cutting up apples and oranges. This will help with visualization. What if you cut the apple into 8 slices (which the teacher will do) and eat 3, what part of a fraction have you eaten? Let the students respond with  $\frac{3}{8}$ . Then the teacher will ask which fraction is bigger,  $\frac{1}{4}$  or  $\frac{3}{8}$ ? The teacher will tell

the students that by the end of the lesson they will be able to answer this question.

2. The teacher will then write these signs on the overhead projector:  $>$ ,  $<$ , and  $=$ . Have the students tell the teacher what these signs mean. The students should be familiar with the signs and be able to tell you that they mean, greater than, less than and equal to.
3. The students will be asked to take out the number line (Appendix C) that they completed in the previous lesson. Students will be able to use their number line to help them with the problems they will be given. The teacher will tell the students that they may want to add to their number line today and in the future. The teacher will put a few examples on the overhead to do as a whole class first. The teacher will put these fraction up on the overhead for the students to put in order of greatest to least:  $1/2$ ,  $9/9$ ,  $3/4$ ,  $5/7$ ,  $2/3$ ,  $1/4$ ,  $8/9$ , and  $5/8$ . After the students have done this individually, the teacher will review and go over the correct order with the students. The correct order is  $1/4$ ,  $1/3$ ,  $5/8$ ,  $2/3$ ,  $5/7$ ,  $3/4$ ,  $8/9$ ,  $9/9$ .
4. Next, the students will review getting a common denominator for fractions. This is reviewing and expanding on the previous lesson concepts. This concept will prepare students for adding and subtracting fractions. The teacher will ask the students how to get a common denominator for the following two fractions.  $1/5$  and  $1/10$ . Students should come to the conclusion that you need to get the LCM of both numbers, which is 10. Next you need to change the denominators both to 10, which means multiplying the 5 by 2. So if you multiply the denominator by 2, you must also multiply the numerator by 2. So you should get the two fractions to look like this,  $2/10$  and  $1/10$ . They now have the same denominator. The teacher will need to reinforce that you must do the same thing to the numerator as you do to the denominator. The teacher may want to tell the students that they need to get the denominators the same so they can add and subtract them. If students need more understanding, the teacher can say that you cannot compare apples and oranges, but that you can compare apples to apples and oranges to oranges (this was shown earlier).
5. After the students have grasped the concept of getting a common denominator, the students will be ready to add and subtract fractions. The teacher will do a few examples with the students.
6. Have the teacher reinforce that one can use the LCM to help get a common denominator. The teacher will do a few examples with the students. The teacher writes  $1 + 1 =$  on the board. The students will say that the answer is 2. Then the teacher will write on the overhead,  $2 + 3 =$ . The students will answer 5. So  $1/2 + 1/3 = 2/5$ . Let the students analyze the problem for a little while. The teacher will give the students two problems to do as a class, one student will be doing the problem at the board to show a better example if some students are having trouble. The problems are  $2/3$  plus  $1/3$  equals, and  $2/3$  plus  $4/5$  equals. Let the students work through the problems together. After the students have done a few

together on the overhead, give them a worksheet to practice adding and subtracting (Appendix D). Tell students that they can use the colored cubes if they need help visualizing the adding and subtracting of the fractions.

- E. *Assessment/Evaluation*
1. Students will need to complete the worksheet (Appendix D) and hand it into the teacher to check for understanding. Students will also be observed while doing the cutting and manipulating of the apples and oranges (points possible: 22).
  2. The teacher will periodically review problems with the students to help ongoing understanding.

#### **Lesson Four: Mixed Numbers**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
  2. Lesson Content
    - a. Numbers and number sense
  3. Skill Objective(s)
    - a. The student will be able to identify fractions in either written, picture or numerical forms.
    - b. The student will be able to convert mixed numbers to improper fractions.
- B. *Materials*
1. Overhead projector
  2. Markers
  3. Mixed Number and Improper Fractions (Appendix E)
- C. *Key Vocabulary*
1. Mixed number - a number that is made up of a whole number and a fraction.
  2. Improper fraction - a fraction that is equal to or greater than one.
- D. *Procedures/Activities*
1. The teacher will begin by saying, "What is a mixed number?" Let the students guess and use the word "mixed" to find out what the definition for mixed number is. The teacher will write possible answers for the definition on the overhead. The teacher will then give the students the correct definition for mixed number. A mixed number is a number that is made up of a whole number and a fraction. The students will write the word and definition in their math vocabulary notebooks for future reference.
  2. The teacher will then show the students an example of a mixed number on the overhead. The teacher will write  $1\frac{1}{2}$  on the overhead projector. The

teacher will ask the students what this means. The students need to come to the conclusion that this means, for example, one whole apple and another part ( $\frac{1}{2}$ ) of an apple. The teacher will then have a student come up and draw a picture to represent  $3\frac{5}{6}$ .

3. Next, the teacher will introduce how to add and subtract mixed numbers. The teacher will explain to the students that this process is very similar to adding and subtracting whole numbers, but with a fraction to the side. The teacher will first give the students mixed numbers to add, but the denominators will be the same. For example, as a class, they will have the following problems:  $2\frac{1}{2} + 4\frac{1}{2} =$  and  $8\frac{1}{4} + 3\frac{3}{4}$ . This will get the students familiar with mixed numbers, without having to deal much with the fractions yet. The teacher will, first, do a few problems together with the class, then have the class do some individually for practice. The teacher needs to explain to the students that you need to go from right to left, like always, which means working the fraction first. You may need to get a common denominator before adding or subtracting. You may also need to take the whole number and make it into a fraction before adding and subtracting.
4. After doing problems together as a class, the teacher will give the students a fraction worksheet (Appendix E) to reinforce concepts learned in the lesson.

E. *Assessment/Evaluation*

1. Students will be completing a fraction worksheet (Appendix E) to reinforce math concepts taught (points possible: 20).
2. The teacher will observe classroom participation.

**Lesson Five: Multiplying Fractions**

A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
  - a. The student will be able to add and subtract fractions.
  - b. The student will be able to identify fractions in either written, picture or numerical forms.
3. Skill Objective(s)
  - a. The student will be able to multiply and divide fractions.
  - b. The student will be able to convert mixed numbers to improper fractions.
  - c. The student will be able to add and subtract mixed numbers.

B. *Materials*

1. Overhead projector
2. Markers

3. Multiplying Fractions worksheet (Appendix F)
- C. *Key Vocabulary*
1. “of” means to multiply
  2. Quotient x divisor = dividend (reinforce the use of mathematical terms)
- D. *Procedures/Activities*
1. The teacher begins by saying, “Today we are going to learn to multiply fractions. You have learned to add and subtract fractions, which is more complicated than multiplying fractions.” However, to do this we need to add one more concept on to what you learned yesterday. We are going to learn how to take a mixed number (i.e.  $2\frac{3}{4}$ ) and turn it into an improper fraction ( $\frac{11}{4}$ ). The teacher will explain that to get to this answer you need to “go in a circle.” First you multiply, then you add. You will always keep the same denominator. What this means is that if you have a problem, like  $1\frac{2}{3}$ , you need to start with the 3 and multiply it by 1, which gives you 3, then add 2, which gives you  $\frac{5}{3}$ . You can check yourself by dividing 3 into 5; you should get  $1\frac{2}{3}$ . The teacher will have the students practice together as a whole class, then do a few individually.
  2. Next, the teacher will have the students start to multiply fractions. Tell the students that all you have to do is multiply straight across. The teacher will work through a problem for the students. The teacher will put the example  $\frac{3}{4} \times \frac{4}{5}$  on the overhead projector. The teacher will then multiply  $3 \times 4 = 12$  and put 12 on the overhead, then the teacher will multiply  $4 \times 5 = 20$  and put that under 12, making the answer  $\frac{12}{20}$ . The teacher will then ask the students what they need to do to the answer. Hopefully, the students will recognize that it needs to be reduced. So it is easier for the students to follow, the teacher will write the following steps on the overhead, for them to use in the future:
    1. Set up the problem so that you can multiply straight across
    2. Next, multiply the numerators together
    3. Then multiply the denominators together
    4. Put your # together as a fraction
    5. Just multiply straight across and be sure to reduce
  3. The teacher will then have the students practice problems on the board. Have a few students come up to the board at a time and answer the problems. Have each student do at least one problem on the board while the other students do the problems on scratch paper or in their notebooks.
  4. Students will be given a multiplying fraction worksheet (Appendix F) with extra problems on it to complete.
- E. *Assessment/Evaluation*
1. The students will be given a multiplying fraction (Appendix F) assignment to reinforce concepts being taught (points possible: 10).
  2. The teacher will continuously be walking around to see what progress the student’s are making.

## **Lesson Six: Dividing Fractions**

### **A. Daily Objectives**

1. Concept Objective(s)
  - a. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
  - a. Fractions and decimals
  - b. Computation
3. Skill Objective(s)
  - a. The student will be able to multiply and divide fractions.

### **B. Materials**

1. Overhead projector
2. Markers
3. Dividing Fractions worksheet (Appendix G)

### **C. Key Vocabulary**

1. Reciprocal- the opposite number

### **D. Procedures/Activities**

1. The teacher will begin by asking students “how many 5’s are in 20?” Let the students respond and say “4”. Ask how they knew that. How did they know if they needed to multiply or divide? Students should say that they knew to divide by the wording in the problem. Ask the students how many 10’s are in 100. Let them reply with 10. Now ask the students how many halves are in 10. The students should be able to reply with 20. If the teacher needs to, he/she can draw 10 squares and cut them in half and have the students count the halves. Discuss that you use different operations for different problems (review). Tell the students that they are going to divide fractions today, but we will be using the operation of multiplying.
2. The teacher will write  $\frac{3}{4}$  and  $\frac{5}{8}$  on the overhead projector. Ask students what the opposite operation of division is. They should reply multiplication. Ask students if they think it is less complicated to divide or multiply. Most will probably say multiply. Tell the students that that’s what we will do then. So we are doing the opposite operation to dividing, then should we change something with the problem? Yes, we need to put one fraction in its opposite (or reciprocal) form. So we need to change the problem to  $\frac{3}{4} \times \frac{8}{5}$ . Then all you do is multiply straight across. When you have a division problem that is fractions, all you need to do is flip one of the fractions and multiply straight across. You can do this because you are using the opposite operation and using a fraction reciprocal.
3. The teacher will have the students practice this, including rewriting from a division problem to a multiplication problem, on a worksheet (Appendix G).

- E. *Assessment/Evaluation*
1. Students will be given a dividing fractions worksheet (Appendix G) to complete and hand in to the teacher (points possible: 10).
  2. The teacher will observe classroom participation.

**Lesson Seven: Basic Decimals**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
  2. Lesson Content
    - a. Numbers and number sense
    - b. Fractions and decimals
  3. Skill Objective(s)
    - a. The student will be able to use the proper terminology when referring to the decimals.
    - b. The student will be able to identify place values when dealing with decimals.
- B. *Materials*
1. Overhead projector
  2. Markers
- C. *Key Vocabulary*
1. Decimal- a number that uses place value and a decimal point to show values less than one
  2. Decimal point- a point that separates the whole number places from the decimal places in decimal numbers
- D. *Procedures/Activities*
1. The teacher begins by asking the students “What is a decimal?” Ask one of your students to show you an example of a decimal on the overhead projector. Discuss with the students that a decimal is a number with a decimal point (like a period) in it. For example, 1.3 has a decimal in it. Ask the students how to say 1.3. They should say one point three or one and three tenths. Tell the students that 1.3 can also be written like  $1\frac{3}{10}$ . Have volunteer come up to the overhead and draw a picture to represent the number. The student should have a whole object and another object with ten sections and three colored in. They should see that they recognize this from their fraction unit.
  2. Next, write the place value chart on the overhead transparency (Appendix C). Have the students copy it down in their math notebooks because they will need to refer to it throughout the next few lessons. Have the students use the example above, 1.3, and place it in the chart in the correct value places. Tell the student that it is read as one and three tenths. They should then place the 1 in the ones column and the 3 in the tenths column. Go over the other columns with the students. Give them more examples to place in the correct columns. For example, you could use the following:

0.1, 1.2, 8.6, 9.45, 6.831, 19.7781. Have the students' practice saying the numbers correctly and reinforcing the correct word usage. You may want students to say the place values with you like this: for 310.1 they can say three hundreds, one tens, zero ones and one tenths. This will help them remember and organize place values.

- E. *Assessment/Evaluation*
1. Check for understanding while reviewing and doing problems as a whole class and individually.
  2. Students will also be assessed on participation and orally practicing correct word usage.

### **Lesson Eight: Learning the Number Line**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
  2. Lesson Content
    - a. Numbers and number sense
    - b. Fractions and decimals
  3. Skill Objective(s)
    - a. The student will be able to identify place values when dealing with decimals.
    - b. The student will be able to put decimals in increasing and decreasing formats.
- B. *Materials*
1. Number line
  2. Overhead projector
  3. Place values chart
  4. Markers
- C. *Key Vocabulary*
1. Place values-the placement of numbers before and after the decimal points
- D. *Procedures/Activities*
1. The teacher will begin by having the students put these numbers, 0, 1, .25, .27, .89, 2, .67, .251, on their number line (Appendix C). Once the students have done this, the student's will check them together in class.
  2. Next, have the students pick some numbers to put on the number line. Plot them on the overhead as a class and individually on their own paper. Give the students plenty of time to look at the number line to see which numbers go where and that one number is bigger than another number. Let the students analyze the number line. Explain that .003 is larger than .0003 because  $\frac{3}{1000}$  is larger than  $\frac{3}{100,000}$ . While doing all of this, review how to properly say decimals to how to properly name place values.

3. The next thing you want to do is to have the students' compare two or three numbers. Have 0.123, 0.129, and 0.202 written on the overhead. Ask which number is the largest and which number is the smallest. Have the students put the numbers in order from largest to smallest. The correct order is 0.202, 0.129 and 0.123. Have the students orally discuss what conclusions they came to and why. You can add numbers to put in order from largest to smallest if you want.
- E. *Assessment/Evaluation*
1. Have the students make up their own number line. Tell the students that they need to plot at least ten numbers, with at least three numbers being to the left of the zero (points possible: 10).

### **Lesson Nine: Whole Numbers**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
  2. Lesson Content
    - a. Fractions and decimals
    - b. Computation
  3. Skill Objective(s)
    - a. The student will be able to add and subtract decimals.
- B. *Materials*
1. Overhead projector
  2. Markers
  3. Adding and Subtracting Decimals worksheet (Appendix H)
  4. Rounding Numbers worksheet (Appendix I)
- C. *Key Vocabulary*
1. Review vocabulary words as needed
- D. *Procedures/Activities*
1. The teacher begins by saying, "We all know how to add and subtract whole numbers, right?" Let the students answer. Well, then just think of whole numbers when adding and subtracting decimals. You just add and subtract like you would with whole numbers, but put a decimal point in the answer.
  2. The first thing we are going to do is learn how to set up problems with decimal points in them. The one thing you have to do is remember to line up the decimal points to start your problem off in the correct format. The teacher will give the students a few problems to set up on the overhead. They will be as follows:  
 $21 - 3.128 =$ ,  $56 + 21.980 =$ ,  $89 - 9.02 =$ , and  $56 + 87.3 =$ . Have the students set up the problems vertically, making sure to line up the decimals. If the students need to, they can put zeros in to fill blank spaces to make lining the numbers up easier. Then have the students solve all the problems.

3. Next, practice estimating with the students. Have the teacher write 14 on the overhead projector. Ask the students to round the number to the nearest tens. They should answer “10.” Ask the students to round 14.8 to the nearest whole number. They should answer “15.” How would you round 15.46 to the nearest tenths place. Tell the students that is the tenths place, not the tens place. Reminding them that they have to really watch the wordings. They have to round it by looking at the place value to the right of the tenths spot. If it is greater than 5, you would make the number 15.5, if the number in the hundredths spot is less than five, you make the number 15.4. Since students have already done estimations before, this should be a review. The teacher must check understanding and comprehension levels to see if further instruction is needed.
  4. The teacher will have the students complete the Adding and Subtracting worksheet (Appendix H) and the Rounding Numbers worksheet (Appendix I).
- E. *Assessment/Evaluation*
1. The teacher will observe classroom participation.
  2. The teacher will grade the two worksheet assigned Adding and Subtracting (Appendix H) and Rounding Numbers (Appendix I) (points possible 32).

### **Lesson Ten: Multiplying Decimals**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
  2. Lesson Content
    - a. Fractions and decimals
    - b. Computation
  3. Skill Objective(s)
    - a. The student will be able to multiply and divide decimals.
- B. *Materials*
1. Overhead projector
  2. Place value chart
  3. Markers
  4. Multiplying Decimals (Appendix J)
- C. *Key Vocabulary*
1. Review from previous lessons
- D. *Procedures/Activities*
1. The teacher will begin by saying, “Today we are going to talk about how to multiply decimals. However, we are going to start off by reviewing the previous lesson concepts.” The teacher will then need to go over and review the place value chart to get students thinking about the place values

for decimal. The teacher will have students tell the teacher what place value (2.013). The 2 is in and then the 3, and so on to review.

2. The next thing the teacher needs to have the students do is to think of the numbers with decimal points in it as money. Have the teacher put 2.12 up on the overhead projector and say this is two and twelve hundredths. Then put \$2.12 on the overhead. Ask the students if the two mean the same things or if they are different. Ask the students to explain. The students should say that they are the same amount, however, one is just a number and the other means money. Then ask the students what \$2.12 plus \$2.12 equals. You may want to put the problem up on the overhead, also. The students should say \$4.24. Then ask the students if  $\$2.12 \times 2$  is the same as  $\$2.12 + \$2.12$ . They should come up with the conclusion that the two are the same or are equal.
3. Next, have the students do a few problems as a class helping them put the decimal points in the correct place. Tell students that they just have to count over as many place values as are in the problem and put that in the answer.
4. The students will be given problems to practice the concepts that have been taught through a Multiplying Decimals worksheet (Appendix J).

E. *Assessment/Evaluation*

1. The students will be completing a worksheet on Multiplying Decimals (points possible: 10).
2. The teacher will continuously be walking around to see what progress the students are making and if they understand the materials.

**Lesson Eleven: Multiplying Decimals**

A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
1. Lesson Content
  - a. Fractions and decimals
  - b. Computation
3. Skill Objective(s)
  - a. The student will be able to multiply and divide decimals.
  - b. The student will be able to identify patterns when multiplying decimals by tens.

B. *Materials*

1. Overhead projector
2. Markers
3. Multiplying by Tens worksheet (Appendix K)

C. *Key Vocabulary*

Review from previous lessons

- D. *Procedures/Activities*
1. The teacher will begin by saying “What happens when you multiply .006 by 10, 100, 1000?” Write these numbers, in a problem that is vertical, on the overhead projector. Ask the students if they see a pattern once the problems are solved. Ask the students what is happening as you multiply by a greater number (10 to 100 to 1000 etc). The students need to come to the conclusion that the decimal point in the original number moves to the right one place value for each zero in the number it is multiplied by.
  2. The teacher will put this up on the overhead:
 
$$10 \times 6.25 = 62.50$$

$$100 \times 6.25 = 625.00$$

$$1000 \times 6.25 = 6250.00$$
 Have the students look at what happens when you multiply by 10’s and what happens to the decimal point in the answer.
  3. Next, have the students use some mental math to figure out the following problems.  $10 \times 0.8$ ,  $100 \times 6.75$ ,  $100 \times 4.50$ ,  $1000 \times 5.6$ . The teacher can say or write problems and have the students answer the problems orally.
  4. Students will be given a short assignment to practice these concepts worksheet (Appendix K). Students will be encouraged to use mental math to figure out the problems.
- E. *Assessment/Evaluation*
1. Students will be given an assignment to complete dealing with multiplying by Tens. Students will be encouraged to use mental math and pay close attention to patterns and decimal point placement (points possible: 20).

**Lesson Twelve: Bank Fun!!**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.
  2. Lesson Content
    - a. Fractions and decimals
    - b. Computation
  3. Skill Objective(s)
    - a. The student will be able to multiply and divide decimals.
- B. *Materials*
1. Fake money
  2. Overhead projector
  3. Markers
- C. *Key Vocabulary*
- Review from previous lessons

- D. *Procedures/Activities*
1. The teacher will begin by saying “suppose I have 42 pennies and want to share them between myself, Shari and Joe. How do I do this, what do I do?” The point of this problem is to have the students come to the conclusion that you need to divide the coins up equally among the three people. The teacher will then inform the students that today they will be doing division with decimals.
  2. The teacher will explain that once again, pretending that the decimals are actually money may help students understand. The teacher will then ask if money uses a decimal point. The answer should be “yes”.
  3. The teacher will then take out some fake money and distribute it to the students. Have them practice doing basic multiplication problems using the money. This will help the students see that multiplying is adding numerous times. Students have dealt with money a lot so far in their lives so thinking of decimals as money, is often easier for them. Have the student pretend they are a bank. Assign jobs to numerous students. For example, you will need a president, a vice president, a head teller, numerous tellers, and numerous customers. Have the students make deposits into numerous accounts so that each account has equal deposits, etc. Have the students make up problems or give the students a sheet with problems to work out.
- E. *Assessment/Evaluation*
1. The students will be assessed on how they perform their specified function in the bank activity. The teacher will be observing and answering questions when needed. The teacher will also be asking questions and giving problems individually to check for comprehension.

## VI. HANDOUTS/WORKSHEETS

- |    |               |  |
|----|---------------|--|
| A. | Appendix A-1: | Fraction Drawings                      |
| B. | Appendix A-2: | Fraction Drawings                      |
| C. | Appendix B:   | Worksheet                              |
| D. | Appendix C:   | Number Line                            |
| E. | Appendix D:   | Worksheet                              |
| F. | Appendix E:   | Mixed and Improper Fractions Worksheet |
| G. | Appendix F:   | Multiplying Decimals Worksheet         |
| H. | Appendix G:   | Divide the Fractions                   |
| I. | Appendix H:   | Adding and Subtracting Decimals        |
| J. | Appendix I:   | Rounding Numbers Worksheet             |
| K. | Appendix J:   | Multiplying Fractions Worksheet        |
| L. | Appendix K:   | Multiplying By Tens Worksheet          |

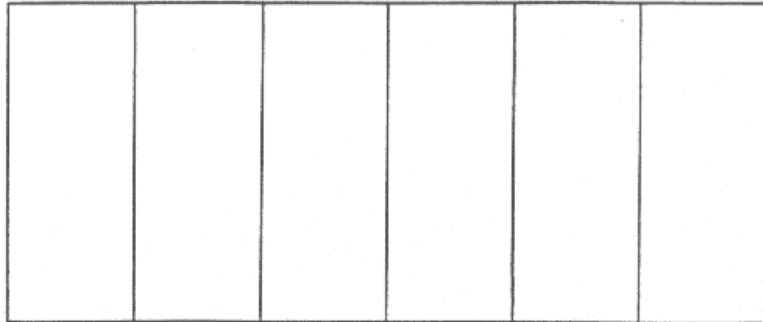
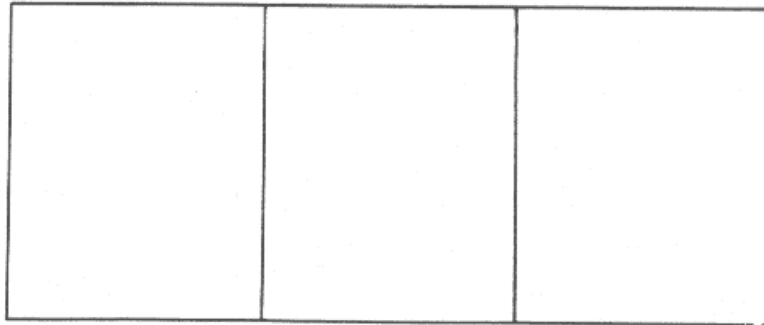
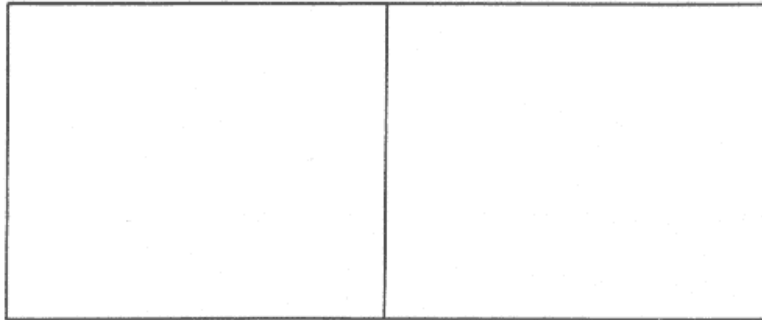
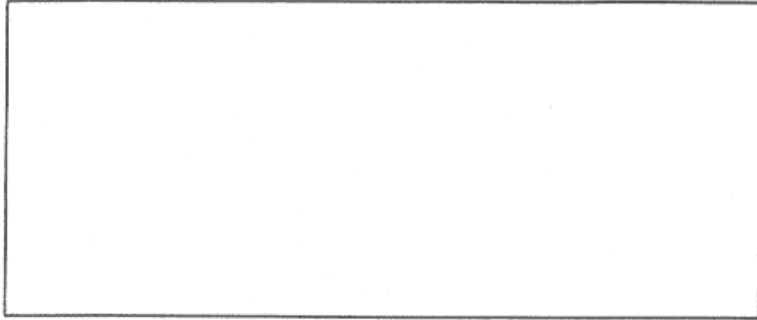
## VII. BIBLIOGRAPHY

- A. Pallott, J. and Bolster, R. *The Hershey's Milk Chocolate Fractions Book*. New York, New York, 1999 Scholastic.

**Appendix A-1-Math Mania**

**FRACTION DRAWINGS**

**Name:** \_\_\_\_\_



**Appendix A-2-Math Mania**

**FRACTION DRAWINGS**

**Name:** \_\_\_\_\_

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--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



## Appendix B-Math Mania

NAME: \_\_\_\_\_

Write the fraction number:

Example: Seven sixteenths 7/16

One half \_\_\_\_\_

Two thirds \_\_\_\_\_

One fourth \_\_\_\_\_

Three fourths \_\_\_\_\_

One eighth \_\_\_\_\_

Five eighths \_\_\_\_\_

One tenth \_\_\_\_\_

Two halves \_\_\_\_\_

One twelfth \_\_\_\_\_

Three tenths \_\_\_\_\_

Convert the number fraction into a word written fraction.

Example:  $1/3$  one third

$5/19$  \_\_\_\_\_

$1/12$  \_\_\_\_\_

$7/20$  \_\_\_\_\_

$1/5$  \_\_\_\_\_

$1/11$  \_\_\_\_\_

$4/6$  \_\_\_\_\_

$2/7$  \_\_\_\_\_

$7/8$  \_\_\_\_\_

$3/10$  \_\_\_\_\_

$7/12$  \_\_\_\_\_

Circle the denominators.

Circle the numerators.

$3/4$

$6/7$

$2/3$

$0/3$

$5/8$

$4/9$

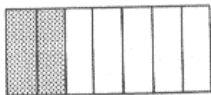
$7/10$

$1/14$

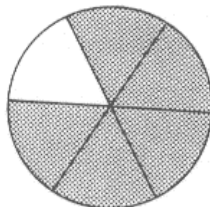
$4/5$

$9/45$

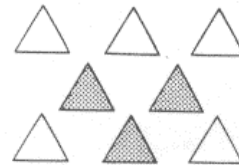
Are the fractions equal?



$2/7$



$5/6$

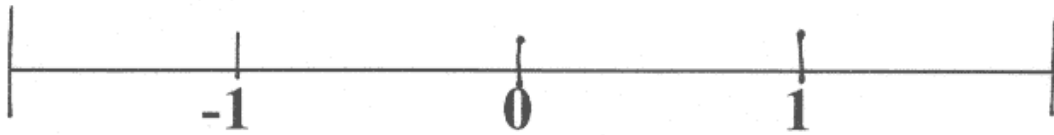


$5/10$

## Appendix C-Math Mania

### NUMBER LINE

Name: \_\_\_\_\_



## Appendix D-Math Mania

Name \_\_\_\_\_

### ADDING AND SUBTRACTING FRACTIONS

Put the fractions in order from greatest to least.

$\frac{3}{15}$ ,  $\frac{1}{4}$ ,  $\frac{8}{11}$ ,  $\frac{10}{10}$ ,  $\frac{8}{9}$

---

Put the fraction in order from least to greatest.

$\frac{1}{2}$ ,  $\frac{7}{11}$ ,  $\frac{5}{9}$ ,  $\frac{2}{7}$ ,  $\frac{3}{4}$

Add or Subtract the fractions.

$$\frac{2}{12} + \frac{1}{12} = \underline{\hspace{2cm}}$$

$$\frac{5}{12} + \frac{4}{8} = \underline{\hspace{2cm}}$$

$$\frac{7}{10} + \frac{4}{10} = \underline{\hspace{2cm}}$$

$$\frac{3}{4} - \frac{2}{5} = \underline{\hspace{2cm}}$$

$$\frac{2}{8} + \frac{3}{8} = \underline{\hspace{2cm}}$$

$$\frac{5}{12} - \frac{1}{3} = \underline{\hspace{2cm}}$$

$$\frac{3}{9} - \frac{1}{9} = \underline{\hspace{2cm}}$$

$$\frac{8}{15} - \frac{1}{13} = \underline{\hspace{2cm}}$$

$$\frac{4}{9} - \frac{4}{9} = \underline{\hspace{2cm}}$$

$$\frac{7}{12} + \frac{1}{6} = \underline{\hspace{2cm}}$$

$$\frac{6}{7} - \frac{7}{7} = \underline{\hspace{2cm}}$$

$$\frac{9}{12} + \frac{1}{6} = \underline{\hspace{2cm}}$$

## Appendix E-Math Mania

Name \_\_\_\_\_

### MIXED AND IMPROPER FRACTIONS

Change the mixed numbers to improper fractions.

1.  $3 \frac{1}{6} =$

2.  $4 \frac{4}{5} =$

3.  $1 \frac{2}{3} =$

4.  $7 \frac{4}{8} =$

5.  $2 \frac{7}{9} =$

Change the improper fractions to mixed numbers.

6.  $\frac{11}{5} =$

7.  $\frac{17}{10} =$

8.  $\frac{10}{3} =$

9.  $\frac{40}{5} =$

10.  $\frac{100}{10} =$

Multiply the fractions.

11.  $\frac{1}{2} \times \frac{1}{2} =$

12.  $\frac{4}{6} \times \frac{3}{4} =$

13.  $\frac{1}{10} \times \frac{1}{4} =$

14.  $\frac{2}{3} \times \frac{1}{5} =$

15.  $\frac{7}{12} \times \frac{1}{8} =$

16.  $\frac{8}{9} \times \frac{2}{13} =$

17.  $\frac{5}{12} \times \frac{9}{10} =$

18.  $\frac{6}{7} \times \frac{1}{7} =$

19.  $\frac{11}{12} \times \frac{6}{9} =$

20.  $\frac{2}{4} \times \frac{3}{7} =$

## Appendix F-Math Mania

NAME \_\_\_\_\_

### MULTIPLYING DECIMALS

Find solutions to the following equations.

1.  $6.98 \times 4 =$

2.  $7.3 \times 2 =$

3.  $5.78 \times 1 =$

4.  $29.76 \times 8 =$

5.  $7.34 \times 3 =$

6.  $1.4234 \times 5 =$

7.  $9875.97 \times 2 =$

8.  $7.01 \times 4.9 =$

9.  $13.06 \times 2.1 =$

10.  $9.0 \times 6.7 =$

## Appendix G-Math Mania

### DIVIDE THE FRACTIONS

Name: \_\_\_\_\_

1.  $3 \div \frac{1}{3} = \underline{\quad}$     2.  $2 \div \frac{1}{2} = \underline{\quad}$     3.  $4 \div \frac{1}{4} = \underline{\quad}$

4.  $\frac{1}{3} \div \frac{4}{6} = \underline{\quad}$     5.  $\frac{7}{8} \div \frac{2}{9} = \underline{\quad}$     6.  $\frac{1}{4} \div \frac{1}{4} = \underline{\quad}$

7.  $\frac{2}{3} \div \frac{1}{6} = \underline{\quad}$     8.  $\frac{3}{5} \div \frac{1}{5} = \underline{\quad}$     9.  $\frac{1}{10} \div \frac{3}{9} = \underline{\quad}$

10. How many  $\frac{1}{2}$ 's are in 4?  
 $4 \div \frac{1}{2} = \underline{\quad}$

Appendix H-Math Mania

NAME \_\_\_\_\_

**ADDING AND SUBTRACTING DECIMALS**

**Find pairs of numbers whose sum is equal to 14.2**

7.1	8.2	5	6.3
8.1	2.8	9.6	11.8
0.2	1.5	0.8	7.8
6.7	7.1	6	6.4
8	8.8	7.9	10.3

Subtract the following decimal equations.

1. 
$$\begin{array}{r} 4.7 \\ - 5.2 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 8.2 \\ - 5.1 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 7.8 \\ - 3.3 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 6 \\ - 1.99 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 9.62 \\ - 2.86 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 23.89 \\ - 21.06 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 187.84 \\ - 105.86 \\ \hline \end{array}$$

8. 
$$\begin{array}{r} 15,089 \\ - 7.8649 \\ \hline \end{array}$$

## Appendix I-Math Mania

NAME \_\_\_\_\_

### ROUNDING NUMBERS

Round to the nearest  
whole number.

1.  $1.8 =$

2.  $5.06 =$

3.  $0.876 =$

4.  $93.21 =$

5.  $4.356 =$

Round to the nearest  
Tenth.

6.  $8.03 =$

7.  $7.25 =$

8.  $54.81 =$

9.  $93.21 =$

10.  $0.43 =$

Round to the nearest hundredth.

11.  $45.809 =$

12.  $4.123 =$

13.  $9.04 =$

14.  $0.388 =$

15.  $2.344 =$

16.  $0.909 =$

17.  $21.017 =$

18.  $8.409 =$

19.  $0.677 =$

20.  $1.11 =$

## Appendix J-Math Mania

NAME \_\_\_\_\_

### MULTIPLYING FRACTIONS

Find solutions to the following equations.

1.  $6.98 \times 4 =$

2.  $7.3 \times 2 =$

3.  $5.78 \times 1 =$

4.  $29.76 \times 8 =$

5.  $7.34 \times 3 =$

6.  $1.4234 \times 5 =$

7.  $9875.97 \times 2 =$

8.  $7.01 \times 4.9 =$

9.  $13.06 \times 2.1 =$

10.  $9.0 \times 6.7 =$

## Appendix K-Math Mania

NAME \_\_\_\_\_

### MULTIPLYING BY TENS

Solve the following equations. Be sure to keep in mind the patterns of multiplying by tens.

$6.72 \times 10 =$

$6.72 \times 100 =$

$6.72 \times 1,000 =$

$6.72 \times 10,000 =$

$6.72 \times 100,000 =$

$89.34 \times 10 =$

$89.34 \times 100 =$

$89.34 \times 1,000 =$

$89.34 \times 10,000 =$

$89.34 \times 100,000 =$

1.  $.4867 \times 10 =$

2.  $45.76 \times 100 =$

3.  $5.98 \times 10 =$

4.  $9.087 \times 1,000 =$

5.  $324.012 \times 100 =$

6.  $987.3 \times 10 =$

7.  $100 \times 2.034 =$

8.  $10,000 \times 13.59 =$

9.  $1,000 \times 78.857 =$

10.  $10 \times 768.9348 =$