Warm-Up Activity #2 Name _____

**Concept: Understanding Decimals
in the Real World**

? Price?

Directions: Decimals appear all around us on a daily basis. A day hardly goes by that skips encountering decimal notation. Select a partner, answer each question thoughtfully, and discover the decimal dilemma.

1. **Where is the most common place you encounter decimals on a daily basis?
    Provide an example.**

    _____

    _____

2. **What difference, if any, does it make if the decimal is placed before the zero, or
    after the zero?**

    _____

    _____

    _____

3. **Give at least three examples of jobs where employees encounter decimals on a
    daily basis.**

    a)_____   **b)**_____   **c)**_____

4. **Give at least three examples of where decimals appear in a newspaper.**

    a)_____   **b)**_____   **c)**_____

5. **Give at most three examples where you have witnessed errors with decimals.**

    a) _____

    b) _____

    c) _____

6. **What is the most common place the average person encounters decimals within
    the household?**

    _____

Warm-Up Activity #2 Name   **ANSWER KEY**

**Concept: Understanding Decimals
              in the Real World**

? Price?

Directions: Decimals appear all around us on a daily basis. A day hardly goes by that skips encountering decimal notation. Select a partner, answer each question thoughtfully, and discover the decimal dilemma.

1. Where is the most common place you encounter decimals on a daily basis? Provide an example.
Anywhere that involves the distribution or counting of money.
Examples: Purchasing breakfast or lunch; filling a vehicle with gas; calculating mileage.

2. What difference, if any, does it make if the decimal is placed before the zero, or after the zero?

One decimal place to the right of the decimal point is the "tenths" place, but one decimal place to the left of the decimal point is the "ones" place.

3. Give at least three examples of jobs where employees encounter decimals on a daily basis.

    a) Banking   **b)** Stock Broker   **c)** Cashier

4. Give at least three examples of where decimals appear in a newspaper.

    a) Stock Market -   **b)** Mortgage Rates   **c)** Sports
Dow Jones Industrial Averages   Inc/dec in % rates   Batting averages

5. Give at most three examples where you have witnessed errors with decimals.
Answers will vary. Some examples are:
a) Money notation. $199 instead of $1.99.   **d)** Not lining up decimals in addition

b) 0.5, when the meaning is .05.   **e)** Miscounting number of decimal places
c) Errors in rounding decimals.   **f)** Computer programming

6. What is the most common place the average person encounters decimals within the household?

Writing checks and balancing the checkbook!

SUPER DEAL MENU

BOSS'S PHAT CAFÉ

10 Items
ONLY .99¢ EACH
Real "Super Deal" From
The BOSS

Soup of the Day	Super Fries
Super Drink	Phat Salad
Freezee Dessert	Flaky Pastry

Midget Bacon Cheeseburger
Phat Cheeseburger D'lux
Super Phat Works Burger
Crispy Caesar Phat Salad

Senior Citizens Welcome! 20% Discount

Big Redd's Chicken Coup Coupon

One Dollar

Big Redd's Chicken Coup
Famous $5 Chicken Dinners

The Real Deal!
11 AM to 2 PM

~$100 OFF~
Any Meal

One Dollar

Big Redd's Chicken Coup Coupon

Letters to the Editor

The .2¢ Forum
What's it to you?
Put in your 2 cents worth!

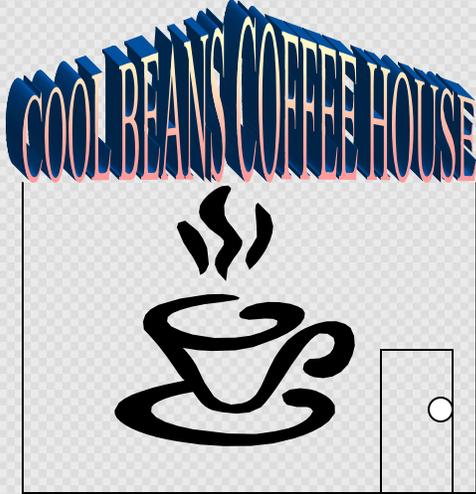- **POLICY:** Limit letters to one subject and include a daytime and   evening telephone number.

EXTRA! EXTRA!
READ ALL ABOUT IT!

BIG NEWS

INTEREST RATES DROP
HALF A PERCENT!

THAT'S RIGHT, .05%!

COOL BEANS COFFEE HOUSE

Hot or Cold! We fix it the way you like it!

Fresh Roasted   **Mocha Frosties**

$100 per cup   **$100 per mug**

FREE Refills

S A L E S A L E S A L E

Buy 1 Get 1 half price!

1st purchase $1.00
2nd purchase (same item) .50¢

SWISS AQUATIC DIVER'S WATCH

$139.99

Sale Price **$59.99**   SAVE **$80**

- Glow-in-the-dark hands & numerals
- Water resistant to **.50** m
- Swiss movement

Marc Mallow, PH.D.

R$_x$ Downtown Pharmacy 555-1243

123 Medicine Way   Dr. Marc Mallow
Wayside, FL   100 Doctor's Way
                           Wayside, FL

No. 12472-05330
Mary Jo Price

Take 2 tablets
twice a day.

Amoxicillin
25.0 mg

Discover the Decimal Dilemma Response Sheet

Name _____   Date _____

1. Boss's Phat Café

1. **According to the advertisement**, calculate the total cost, excluding tax, on 3 Super Phat Works Burgers and 2 orders of Super Fries.   _____

   Work Space:

2. Does the total cost seem reasonable? If not, why?   _____
   _____
   _____

3. What's the major math mistake in this advertisement?   _____

4. How much do you really pay for the items purchased in Question #1?
   _____

2. "Big Redd's" Chicken Coup Coupon

1. Is this a deal, or what?! What is the first inconsistency that you notice?
   _____

2. Explain the decimal dilemma. _____
   _____
   _____

3. Could a person get more for their money using the verbal notation or the money notation as advertised on the coupon? Explain.
   _____
   _____
   _____

4. What correction needs to be made on the coupon? _____
   Explain the actual savings. _____
   _____
   _____
   _____

Decimal Dilemma Response Sheet

3. The Two-Cent Forum

1. What does the expression "put in your 2 cents worth" mean?
   _____

   _____

2. If you were charged a fee of **.2¢** per letter you sent to the editor of a newspaper, at
   this rate how much would you be charged for 5 letters? _____
   (Be sure to express this amount as money value!)
   Work Space:

3. Does this seem reasonable? Why, or why not? _____
   _____
   _____

4. What correction needs to be made on the advertisement? _____
   What would be the actual cost of 5 letters sent to the editor if this fee were
   applied?   _____

   Work Space:

4. Extra! Extra! Read all about it!

1. What is meant by the term ***half***? _____
   Express half as a fraction in lowest terms.   _____

2. Does it make a difference whether the decimal point is before or after the zero?
   Explain and give an example. _____
   _____
   _____
   _____

3. Examine the advertisement. What is the value of .05 as a fraction? _____
   Is this the same as one half?   _____
   Explain.   _____
   _____
   _____

4. What correction needs to be made on the advertisement? _____

5. Cool Beans Coffee House

1. Coffee is the average person's wake up call. It takes at least 2 cups to 'jump start' most people. According to the advertisement, how much would you pay for 2 cups of coffee?   _____

2. What is the decimal dilemma in this advertisement? _____
   _____

3. Does the total cost seem reasonable? Why, or why not?? _____
   _____
   _____

4. What correction needs to be made on the advertisement? _____
   How much should you actually pay for the 2 cups of morning coffee? _____

6. Sale! Sale! Sale!

1. In this advertisement, there are representations of two decimal numbers. One of these is incorrect. Write the incorrect decimal as it appears in the advertisement.   _____

2. What is the **value** of the incorrect decimal as it appears in the advertisement?
   _____
   _____

3. Why does this value seem unreasonable?   _____
   _____
   _____

4. What correction needs to be made on the advertisement? _____
   How much should you actually pay for 4 drinks on sale?   _____

   Work Space:

7. Swiss Aquatic Diver's Watch

   1. Better look close in this advertisement or you will easily miss the error.
       (Hint: Does the decimal error always have to be in money notation?)
       Ah ha! Now you see it. What is the error? Identify and explain.
       _____
       _____
       _____

   2. What is the **value** of the incorrect decimal as it appears in the advertisement?
       _____
       _____

   3. Why does this value seem unreasonable?   _____
       _____
       _____

   4. What correction needs to be made on the advertisement? _____

8. R$_x$ Downtown Pharmacy

   1. Check the prescription for accuracy as filled by a local pharmacist. The
       pharmacist used the amount of dosage indicated on the prescription bottle to fill
       the prescription. What are the total milligrams of antibiotic the patient is taking
       daily?   _____

   2. Dr. Marc Mallow prescribed the Amoxicillin for his patient, Mary Jo Price, to
       treat an infection. The dosage prescribed was for 1000 mg per day.   Is she
       receiving more or less than the proper dosage to clear up the infection?
                                                                   _____

   3. If the number of capsules to be taken two times a day is correct, where did the
       error occur?
       _____
       _____

   4. How can the pharmacist correct the error to insure the patient is treated properly?
       _____
       _____
       _____

Discover the Decimal Dilemma Response Sheet
ANSWER KEY

1. Boss's Phat Café

   1. **<u>According to the advertisement</u>**, calculate the total cost, excluding tax, on 3
Super Phat Works Burgers and 2 orders of Super Fries. <u>$0.0495</u>

   Work Space: .99¢ = .0099 as a decimal
For 5 items purchased, multiply .0099 x 5.

   2. Does the total cost seem reasonable? If not, why not? <u>NO!</u>
<u>The value calculated is less than a nickel!</u>

   3. What's the major math mistake in this advertisement?
<u>99 cents as a decimal is 99¢ without the decimal point, or $0.99 with the decimal
point. Do not use the decimal with the cent sign.</u>

   4. How much do you really pay for the items purchased in Question #1?
<u>For 5 items purchased, multiply .99 x 5.</u>
<u>Total cost = $4.95 which is a nickel less than five dollars, not a nickel for all 5
items!</u>

2. "Big Redd's" Chicken Coup Coupon

   1. Is this a deal, or what?! What is the first inconsistency that you notice?
<u>The value of the coupon in words and in symbols is not the same.</u>

   2. Explain the decimal dilemma. <u>$100 in numerals is read as one hundred dollars,
whereas the coupon reads one dollar on the sides. The dilemma is that they are
not equivalent values.</u>

   3. Could a person get more for their money using the verbal notation or the money
notation as advertised on the coupon? Explain. <u>Obviously you get more for your
money with the numeral notation. At a savings of $100, the number notation
allow for several FREE meals!</u>

   4. What correction needs to be made on the coupon? <u>$100 should be $1.00</u>
Explain the actual savings. <u>The money notation would allow a savings of $1.00
and any meal would cost $4.00 instead of $5.</u>

3. The Two-Cent Forum

    1. What does put in your 2 cents worth mean? <u>This is a slang expression that stands for a person's opinion on a certain matter.</u>

    2. If you were charged a fee of **.2¢** per letter you sent to the editor of a newspaper, at this rate how much would you be charged for 5 letters? <u>$0.01, which is one cent!</u>

       Work Space: .2¢ = 0.002 in decimal notation
                    Multiply 5 times 0.002 for total fee charged of 0.01.

       Does this seem reasonable? Why, or why not? <u>NO! The fee would be only one cent for every 5 letters.</u>

    3. What correction needs to be made on the advertisement? <u>**.**2¢ should be $0.02 or just 2¢ without the decimal.</u>

       What would be the actual cost of 5 letters sent to the editor if this fee were applied?   <u>$0.10, which is 10 cents</u>

       Work Space: 2¢ = 0.02 in decimal notation
                    Multiply 5 times 0.02 for a total fee charged of 0.10.

4. Extra! Extra! Read all about it!

    1. What is meant by the term ***half***?   <u>To divide by 2</u>
       Express half as a fraction in lowest terms.   <u>1/2</u>

    2. Does it make a difference whether the decimal point is before or after the zero? Explain and give an example. <u>Yes. The zero before the decimal represents the whole number. The zero behind the decimal represents the tenths place that is a value less than a whole.</u>

    3. Examine the advertisement. What is the value of .05 as a fraction? <u>5/100 = 1/20</u>
       Is this the same as one half?   <u>NO!</u>
       <u>Explain.</u>   <u>1/2 is read as one half and represents 1 out of 2 or 1 divided by 2, whereas 1/20 is read as one twentieth and represents 1 out of 20 or 1 divided by 20. 1/20 does not reduce to 1/2 .</u>

    4. What correction needs to be made on the advertisement? <u>.05% should be 0.5%</u>

5. Cool Beans Coffee House

1. Coffee is the average person's wake up call. It takes at least 2 cups to 'jump start' most people. According to the advertisement, how much would you pay for 2 cups of coffee? $200

2. What is the decimal dilemma in this advertisement? Without the decimal point, the numerical value is too easily read as one hundred dollars. The addition of the decimal point adds clarity to the actual meaning of the price.

3. Does the total cost seem reasonable? Why, or why not??   Definitely not! The average person could not afford one coffee bean at this price!

4. What correction needs to be made on the advertisement? $100 should be $1.00 How much should you actually pay for the 2 cups of morning coffee? $2.00

6. Sale! Sale! Sale!

1. In this advertisement, there are representations of two decimal numbers. One of these is incorrect. Write the incorrect decimal as it appears in the advertisement.   .50¢

    What is the **value** of the incorrect decimal as it appears in the advertisement? .50¢ is 50/100 of one cent or 1/2 a penny!

2. Why does this value seem unreasonable? Money is not calculated on the basis of half cents. The advertisement as is indicates the second bottle would be only 1/2 of one penny.

3. What correction needs to be made on the advertisement? .50¢ should be $.50 or 50¢ without the decimal. How much should you actually pay for 4 drinks on sale? $3.00

    Work Space: 2 drinks at regular price of $1.00 each = $2.00
                    2 drinks at half price of 50¢ each = $1.00

7.   Swiss Aquatic Diver's Watch

1.   Better look close in this advertisement or you will easily miss the error.
      (Hint: Does the decimal error always have to be in money notation?)
      Ah ha! Now you see it. What is the error? Identify and explain.
      .50 m ~ The error is in the measurement of the depth for water resistancy.

2.   What is the **value** of the incorrect decimal as it appears in the advertisement?   Be
      specific.
      .50 m is actually only half of one meter, which is equivalent to approximately
      19½ inches. That's only 1 foot and 6.5 inches!

3. What correction needs to be made on the advertisement?
       .50 m should be 50 m without the decimal point.

3.   What is the **value** of the actual measurement and why does it really make a
      difference?
      50 m is actually 50 meters which is more reasonable for diving. That is
      equivalent to approximately 162.5 feet.

8.   R$_x$ Downtown Pharmacy

1.   Check the prescription for accuracy as filled by a local pharmacist. The
      pharmacist used the amount of dosage indicated on the prescription bottle to fill
      the prescription. What are the total milligrams of antibiotic the patient is taking
      daily? 100 mg

2.   Dr. Marc Mallow prescribed the Amoxicillin for his patient, Mary Jo Price, to
      treat an infection. The dosage prescribed was for 1000 mg per day.   Is she
      receiving more or less than the proper dosage to clear up the infection? Less than

3.   If the number of capsules to be taken two times a day is correct, where did the
      error occur?
      The error occurred in the placement of the decimal point, thereby causing the
      pharmacist to give the patient the wrong strength in the medication.

4.   How can the pharmacist correct the error to insure the patient is treated properly?
      The number of milligrams per capsule should be 250 mg not 25.0 mg.

Look at the sales receipt below. What is the decimal dilemma?

Acme Building Supplies
324 Forest Lane
Timberline, MA

Sales Receipt

Item Purchased	Quantity	Unit Price	Total Price
Lumber 2' x 4'	6	5.79	34.74
Lumber 2' x 6'	12	7.46	89.52
Nails	2 lbs	.99/lb	1.98
Nail Apron	1	12.49	12.49
Battery Powered Saw	1	129.33	129.33
SubTotal			2680.60
Tax		7 ½%	201.00
TOTAL			2881.60

Does the total amount charged seem reasonable?

Now look at the sales receipt again.

Acme Building Supplies
324 Forest Lane
Timberline, MA

Sales Receipt

Item Purchased	Quantity	Unit Price	Total Price
Lumber 2' x 4'	6	5.79	34.74
Lumber 2' x 6'	12	7.46	89.52
Nails	2 lbs	.99/lb	1.98
Nail Apron	1	12.49	12.49
Battery Powered Saw	1	129.33	129.33
SubTotal			268.06
Tax		7 ½%	20.10
TOTAL			288.16

Does the total amount charged seem reasonable?
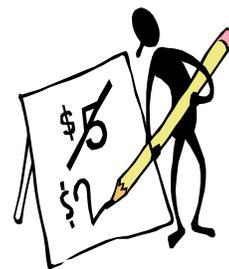
The Decimal Dilemma
"When are we ever going to USE this Math?"

Directions: The following problems relate to mathematics set in a real-world context. Always show justifications and explanations for your answers. Answers only do **not** justify reasoning ability! Refer to the General Approach to Problem Solving handout as a guide.

1. Mr. Johnson hired a contractor to build a small deck on the back of his house. The cost of materials alone added to $678.12.   When he received the final bill, the **total** amount charged was $1206.12.   Labor amounted to 16.5 hours at $32 **per** hour.   Verify the accuracy of the bill.

2. A doctor orders 0.2 gram of nicotinic acid* for a patient.   This medication is only available in 0.05-gram and 0.5-gram tablets. The nurse gave the patient 4 tablets of the 0.5-gram tablets.   Did the patient receive the correct amount?   If not, describe the amount received and the possible outcomes of this error.

3. A child died when a nurse administered an overdose of morphine. This was the result of a misplaced decimal point. Doctors had intended two 0.5-milligram doses to suppress postoperative pain. Instead, the child got 10 times the intended amount. What amount of morphine was administered to the child that resulted in her death?

4. One of the most common places of decimal error is in calculations with money. One critical area is computing the amount of withholding tax to deduct from an employee's paycheck. An employee makes $475.50 per week before taxes. He must pay $4450.68 withholding tax over the course of the year. How much withholding tax must be paid per week?

5. Speedy Serve advertises colas on sale for **.**89¢ each. If the store manager honors this ad, how many colas can you buy for a dollar?

*Nicotinic acid or niacin, the water-soluble B vitamin, improves all lipoproteins when given in doses well above the vitamin requirement. Nicotinic acid lowers total cholesterol, LDL-cholesterol and trygylceride levels, while raising HDL-cholesterol (the "good" cholesterol) level.

The Decimal Dilemma
"When are we ever going to USE this Math?"

Directions: The following problems relate to mathematics set in a real world context. Always show justifications and explanations for your answers. Answers only do **not** justify reasoning ability! Refer to the General Approach to Problem Solving handout as a guide.

1. Mr. Johnson hired a contractor to build a small deck on the back of his house. The cost of materials alone added to $678.12.   When he received the final bill from the contractor, the total amount charged was $1206.12. Verify the accuracy of this bill if labor amounted to 16.5 hours at $32 **per** hour.

Cost of labor: 32 x 16.5 = $528.00
Cost of materials: 678.12
TOTAL COST: $1206 .12   The bill was calculated correctly.

2. A doctor orders 0.2 gram of nicotinic acid* for a patient.   This medication is only available in 0.05-gram and 0.5-gram tablets. The nurse administering the medication saw no difference in the two numbers and gave the patient 4 tablets of the 0.5-gram tablets.   Did the patient receive the prescribed amount to sufficiently meet the doctor's orders? If not, describe the amount received and the possible outcomes of this error.   No. Four of the 0.05-gram tables is equivalent to the doctor's orders of 0.2 gram of the medication. Since the nurse administered the 0.5-gram tablets in error, this means the patient received 2 grams of medication! This means the patient received an overdose which could result in many possible reactions.

3. A child died after a misplaced decimal point caused a nurse to administer an overdose of morphine. Doctors had intended two 0.5-milligram doses to suppress postoperative pain. Instead, the child got 10 times the intended amount. What amount of morphine was administered to the child that resulted in her death?   two 5-milligram doses

4. One of the most common places of decimal error is in calculations with money. One critical area is computing the amount of withholding tax to deduct from an employee's paycheck. An employee makes $475.50 per week before taxes. He must pay $4450.68 withholding tax over the course of the year. How much withholding tax must be paid per week?
There are 52 weeks in one year. Therefore, $4450.68 ÷ 52 = $85.59 per week.

5. Speedy Serve advertises colas on sale for **.**89¢ each. If the store manager honors this ad, how many colas can you buy for a dollar? What is wrong with the advertisement?
.89¢ = .00089 as a decimal   1.00 ÷ .0089 ≈ 112.36 ≈ 112 bottles!   WOW!
A misplaced decimal is the culprit here! 89 cents is written as 89¢ or $0.89.