MA 130 SECTION 7.1 DECIMALS: PLACE VALUE, ESTIMATION, AND MENTAL COMPUTATION **HOMEWORK: 1 – 55 odd**

OBJECTIVES:

- Employ pictorial models to represent decimals and decimal arithmetic
- Develop and explain procedures for decimal arithmetic
- Employ procedures for mental computation and estimation with decimal numbers

1. All rational numbers can be written as fractions or as decimals. To recognize a rational number in decimal form you look for one of two traits:

   A. A decimal number with a terminating decimal sequence.

   E.g. ½ = 0.5 ¼ = 0.25 1/10 = 0.1

   B. A decimal number with a repeating decimal sequence

   E.g. = $\frac{1}{3} = 0.\overline{3333}$ $1\frac{1}{7} = \frac{8}{7} = 1.\overline{142857}$

2. All numbers are not rational, decimal numbers include all real numbers – rational and irrational.

3. PLACE VALUE:

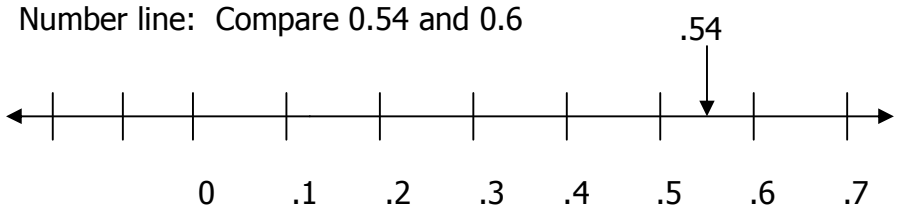
   A. How is place value affected by multiplying a number by 10?

   B. How is place value affected by dividing a number by 10?

4. COMPARE & ORDER DECIMALS

   A. Decimal-Square pictures. See figure 7 – 1.

B. Number line: Compare 0.54 and 0.6



C. Place-Value Columns

Ones		tenths	hundredths
0	.	5	4
0	.	6	0

5. TYPES OF ROUNDING: Use all three types of rounding to round the price $5.435.

A. ROUNDING TO THE NEAREST

B. ROUNDING DOWN

C. ROUNDING UP

6. METHODS OF ESTIMATION

A. Use the front-end strategy to estimate $8.63 + $7.55

8.63 ➔ front-end sum ➔
\+ 7.55 ➔ adjustment ➔

_____ _____

Note: The front end strategy is most useful for addition, subtraction, & multiplication.

B. Use the compatible-numbers strategy to estimate $58.20 ÷ 6.8.

Note: The compatible-numbers strategy is most useful for division.

7. EXPONENTS

The powers of 10 have a pattern in decimal place value

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. . 10^3	10^2	10^1	10^0		10^{-1}	10^{-2} . . .

Multiplying a decimal number by 10^n (n = 1, 2, 3, . . .) is the same as moving the decimal point n places to the right.

Dividing a decimal number by 10^n (n = 1, 2, 3, . . .) is the same as moving the decimal point n places to the left.

Compute:

A. 8.759 x 10 = _____ 8.759 ÷10 = _____

B. 8.759 x 100 = _____ 8.759 ÷ 100 = _____

C. 8.759 x 1000 = _____ 8.759 ÷ 1000 = _____

D. 8.759 x 10000 = _____ 8.759 ÷10000 = _____

8. SCIENTIFIC NOTATION – a method of writing very large and very small numbers.

Any positive decimal number can be written in scientific notion, n x 10^p, in which $1 \leq n < 10$ and p is an integer.

A. Write 6,400,000,000,000,000 using scientific notation

B. Write .0000000000345 using scientific notation