GRE MATH REVIEW #3

Decimals

Decimal numbers are just another way of expressing fractions. Every fraction can be written as a decimal, and every decimal can be written as a fraction.

Sometimes it is necessary to **convert decimals** to fractions because the fractional form of the number may be easier to work with than the decimal form. For instance, it is easier to find the square root of 1/4 than 0.25. However, if the answer choices are in decimal form, work with the decimal form in your computations.

In a decimal number, such as 0.357, the first digit to the right of the decimal point, which is 3 in this example, is the tenths digit (i.e. 1/10), the 5 is the 100ths digit (1/100), the 7 is the 1000ths digit (1/1000), etc. To convert a decimal to a fraction, use the decimal number (without the decimal point) as the numerator, and put it over the appropriate denominator (How?). For example, 0.357 = 357/1000. Then reduce if possible.

To convert a fraction into its decimal equivalent, divide the numerator by the denominator. For example,

$$3/4 = 3 \div 4 = 4\overline{)3.00} = 0.75$$

```
    .75
  4)3.00
   28
    20
    20
     0
```

When **adding and subtracting decimals**, you must realize that all numbers can be written with a decimal point. For example, 12 can be written as 12.0. You must know where the decimal point should go in order to add and subtract decimal numbers. To add and subtract decimals, line up the decimal points in a column and add the digits as you would in any addition problem. If decimal points are missing, put them in at least mentally. You may even want to put zeros in the columns to the right of the decimal point to make the columns line up evenly. For example,

```
  34.5          34.500
  87            87.000
 123.456       123.456
+ 0.98        +  0.980
 245.936       245.936
```

When **multiplying decimals,** first multiply the numbers as you would integers. Next, count the total number of digits to the right of the decimal points in the two numbers you are multiplying. Finally, count that number of digits from right to left in your product and put the decimal point there. For example:

$$\begin{array}{r} 3.4517 \\ \times\ 80.9 \\ \hline 279.24253 \end{array}$$

Since 3.4517 has four decimal places and 80.9 has one, the product has five decimal places.

When **dividing decimals**, convert the divisor into a whole number by moving the decimal point to the right. Hence, you must move the decimal point in the dividend the same number of places to the right. After performing the division, the decimal point in the quotient goes directly above the decimal point in the dividend. In the division problem $24 \div 1.25$, 1.25 is the divisor and 24 is the dividend. Before dividing, change the problem to $2400 \div 125$:

$$24/1.25 = 2400/125 = 125\overline{)2400.0} \begin{array}{r} 19.2 \\ \hline \\ 125 \\ 1150 \\ 1125 \\ 250 \\ 250 \\ 0 \end{array} = 19.2$$

To determine which of two decimal numbers, such as 0.00099 and 0.001, **is larger or smaller**, (1) vertically align the decimal points, and (2) fill in the missing zeros. For example,

$$\begin{array}{l} 0.00099 = 0.00099 \\ 0.001 \quad = 0.00100 \end{array}$$

Now it is obvious that 100 is larger than 99, so 0.001 is larger than 0.00099.

It is often helpful on the GRE to remember that **money** is based on the decimal system. For example, \$.98 is 98/100 of a dollar. Hence, \$5.98 means 5 dollars plus 98/100 of a dollar. If you are stuck on a decimal problem, reminding yourself of this fact may help you.

EXERCISE 3

1. Add 101.054 to 5.12.
2. Subtract 10.31 from 125.823.
3. Multply 22.65 by 0.5.
4. Divide 22.65 by 0.5.
5. Reduce 5.76/.3.
6. Add four one-thousandths and three tenths.
7. Which is larger, .002 or .0015?
8. Convert 13/2 to a decimal.
9. Convert .125 to a fraction.
10. Approximate 2.00465/3.98136 without using your pencil.

EXERCISE 3 SOLUTIONS

1. 106.174
2. 115.513
3. 11.325
4. 45.3
5. 19.2
6. 0.304
7. .002
8. 6.5
9. 1/8
10. approximately 1/2

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Revised by Mosbah Dannaoui, 1992; Ziad Diab, 1993; John Everett, 1999
Reference:
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