Unit 4 Multiplying and Dividing Whole Numbers

1. Multiplication

$$\begin{array}{r} 2 \\ 2 \\ +\,2 \\ \hline 6 \end{array} \quad \text{or} \quad \begin{array}{r} 2 \\ \times 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 333 \\ 333 \\ +333 \\ \hline 999 \end{array} \quad \text{or} \quad \begin{array}{r} 333 \\ \times\ 3 \\ \hline 999 \end{array}$$

Line up the units column. As with addition, going over nine requires carrying one or more tens one place to the left. Going over 99 requires carrying one or more hundreds one place to the left, etc. **Note: Parentheses** may be used to show multiplication. (2)(4) = 8

Carrying

$$\begin{array}{r} {\scriptstyle 1} \\ 37 \\ \times 12 \\ \hline 74 \\ 37 \\ \hline 444 \end{array} \qquad \begin{array}{r} {\scriptstyle 1} \\ 37 \\ \times 21 \\ \hline 37 \\ 74 \\ \hline 777 \end{array} \qquad \begin{array}{r} {\scriptstyle 1} \\ 37 \\ \times 201 \\ \hline 37 \\ 00 \\ 74 \\ \hline 7,437 \end{array}$$

Multiplying by a number with 2 or more places requires **indenting** a place to the left when placing all results after the first result. In these examples, each 74 was 10 larger than the preceding 74. Also note how 2 zeros were used as place-holders in the last example.

2. Division

A. **Begin** by choosing the largest number that will fit.
B. **Multiply** to make sure it fits.
C. **Subtract**
D. **Continue** until all digits of the original number have been used.
E. When the final result of subtraction is smaller than what is being divided by, the result is called the **remainder**.

$$\begin{array}{r} 3 \\ 2\overline{)6} \\ 6 \\ \hline 0 \end{array} \qquad \begin{array}{r} 20 \\ 3\overline{)60} \\ 6 \\ \hline 00 \\ 00 \\ \hline 0 \end{array} \qquad \begin{array}{r} 3 \\ 333\overline{)999} \\ 999 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 2\ \text{R}\ 1 \\ 4\overline{)9} \\ 8 \\ \hline 1 \end{array}$$

Note: ÷ and / are also used as division symbols.

$8 \div 4 = 2$

$10/5 = 2$

With division, take one part at a time.

$$\begin{array}{r} 12 \\ 37\overline{)444} \\ 37 \\ \hline 74 \\ 74 \\ \hline 0 \end{array} \qquad \begin{array}{r} 21 \\ 37\overline{)777} \\ 74 \\ \hline 37 \\ 37 \\ \hline 0 \end{array} \qquad \begin{array}{r} 201 \\ 37\overline{)7,437} \\ 74 \\ \hline 03 \\ 00 \\ \hline 37 \\ 37 \\ \hline 0 \end{array} \qquad \begin{array}{r} 23 \\ 340\overline{)7,820} \\ 680 \\ \hline 1\,020 \\ 1\,020 \\ \hline 0 \end{array} \qquad \begin{array}{r} 3,002 \\ 25\overline{)75,050} \\ 75 \\ \hline 00 \\ 00 \\ \hline 05 \\ 00 \\ \hline 50 \\ 50 \\ \hline 0 \end{array}$$

Note: The first three division problems are the opposites (inverses) of the three multiplication problems above.