Multi-Digit Multiplication
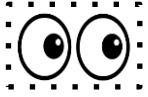
NOTE: Please study your multiplication basic facts so you will be successful with this goal!

Goal: I will learn to multiply one multi-digit number by another

There are three ways to multiply multi-digited numbers. Please use the method that feels most comfortable to you. You do not have to learn and use all three methods. Here is an example of each:

Method #1: The Traditional Approach:

EX #1:   2 7 4
X   5 6

1. Begin multiplying the one's digit
   in the bottom factor by each digit in
   the top factor, moving right to left:
   *6 x 4 = 24; record 4, regroup the 2
   *6 x 7 = 42 + 2 = 44; record 4, regroup 4
   *6 x 2 = 12 + 4 = 16; record the 16

         1 6 4 4
   +   1 3 7 0 **0 ← place saver**
   _____
       1 5,3 4 4

2. ENTER one "place saver" zero for each place value you have moved to the right. In this step, enter one zero at the right end of your second line of partial product. If you were to multiply by a hundreds number, enter 2 zeroes on the right of your line of partial product.

3. Begin multiplying the ten's digit in the bottom factor by each digit in the top factor, moving right to left:
*5 x 4 = 20; record 0, regroup the 2
*5 x 7 = 35 + 2 = 37; record 7, regroup 3
*5 x 2 = 10 + 3 = 13; record the 13

4. Add up your four lines of partial product for your final answer.

Method #2: The Partial Product or Decomposition Method:

1) Multiply each number according to its value, not just its digit.

2) Then you add up all the lines (which are partial products) to solve for your final product.

See below for a line by line demonstration:

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EX #2:      7  1  8
        X       4  5
                4  0      (5 x 8)
                5  0      (5 x 10)
            3  5  0  0    (5 x 700)
               3  2  0    (40 x 8)
               4  0  0    (40 x 10)
           2  8  0  0  0  (40 x 700)
Final Product:  3  2, 3  1  0
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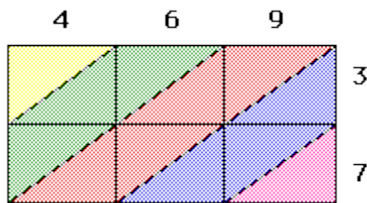
**Method #3: The Lattice Multiplication Method**

EX #3: This example was copied from "Dr. Math," at The Math Forum, an excellent website for math ideas.

First write the 469 across the top, and the 37 down the right side of **a 3x2 rectangle. (It's 3x2 because the factors have three and two digits respectively.)**

Now fill in the lattice by multiplying the two digits found at **the head of the column and to the right of the row. When the partial product is two digits, the first (10's) digit goes above the diagonal and the second (1's) digit goes on the lower right of the diagonal. If the partial product is only one digit, a zero is placed in the triangle above the diagonal in the square.**
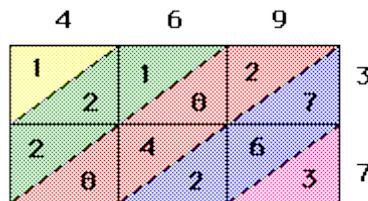
At this point, we have the multiplication done. **Now we add along the diagonals beginning in the lower right to get the final product. Any "carries" when adding are illustrated outside the rectangle.**
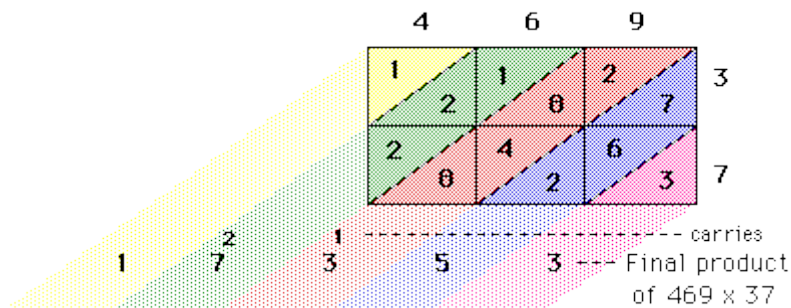
Solve each problem once. You may use any of the three methods shown, or any combination of the three. Have fun!

YOU GOT THIS!!

1.   2 1   2. 4 5 7   3. 6 8 9

  x   7 0   x   6 0 3   x 7 5 4

<u>Answers to "YOU GOT THIS" Problems:</u>

<u>1. 1,470</u>

<u>2. 275,571</u>

<u>3. 519,506</u>