When you multiply a number by 10, you must multiply the _value_ of _each_ digit by 10.

Why?—because of our number system's **distributive property**.

The distributive property tells us that multiplying the sum of a string of numbers by another number is the same as multiplying each of the numbers in the string by the other number and then summing up the products.

    Example: 2 x (3+5+1) = (2 x 3) + (2 x 5) + (2 x 1)

So, let's say you want to multiply 253 by 10. That's the same as multiplying the value of each digit by 10 and then summing up.

Let's see how it works:

    10 x 23 = 10 x (20 + 3)   WHY?

            = (10 x 20) + (10 x 3)

            =   200 + 30 = 230

Notice that there are _no_ ones in the answer. So, there's a zero in the one's place now.

In other words, when I multiplied by 10 each digit of 23 got moved one place to the left. This left the ones place empty, so I filled it will a zero.

You can always use this shortcut when multiplying by ten: Move each digit one place to the left and put a zero in the ones place.

1<u>0</u> x 23 = 23<u>0</u>

How about multiplying by 100?—This is the same as multiplying by 10 twice. Why?—because 100 = 10 x 10.

100 x 23 = (10 x 10) x (20 + 3)

The first time I multiply by 10, I move each digit one place to the left. The second time I multiply by 10, I move each digit another place to the left. In total, each digit has moved two places to the left, leaving _both_ the <u>ones</u> and the <u>tens</u> places empty. What do I do?—I put zeros in those two places.

1<u>00</u> x 23 = 2,3<u>00</u>

If I were multiplying by 1000, what would I do?— 100 = (10 x 10 x 10), so I would move each digit 3 places to the left. This would leave three empty places—the ones place, the tens place, and the hundreds place—so I would put zeros in each of those 3 places.

1,<u>000</u> x 23 = 23,<u>000</u> (23 thousand)

1. Write in expanded form:

   203 =

   420 =

   194 =

2. Write in standard form (as a single base-10 number):

   300 + 7 + 40 + 1000 =

   8 + 200 + 1000 =

   5 tens + 7 hundreds =

   1 thousand + 3 tens =

3. Fill in the blank:

   10 x 99 =_____   100 x 61 = _____   1000 x 11 = _____

   _____ x 24 = 240   100 x _____ = 1,200   10 x _____ = 1,000

   6 tens = 6 x _____   20 tens = _____ x 10   _____ tens = 50

   30 tens = _____   100 tens = _____   130 = _____ tens