For Topic 4, the students should know:

When multiplying by a double digit number with a lot of zeros, just multiply the basic facts and add the all of the zeros to the answer.
For Example:
300 X 120 =
3 X 12 = 36
Then we add on ALL of the zeros. There are 3 zeros in the problem, so the answer is 36,000.
It gets tricky if the answer to the basic fact problem has a zero. Don't count that one.
For Example:
400 X 500 =
4 X 5 = 20
Then we add all the zeros. There are four zeros in the problem. We don't count the zero in the 20. So, our answer is 200,000

The **distributive property of multiplication** states that you can break a number into its expanded form, and multiply each by the same number. This is called using **partial products** to solve a multiplication problem. Then you can add the partial products to get the answer. This is also called the **break apart method** for multiplication.
Example:
36 X 24 = (30 +6) X (20 +4)
(30 X 20) + (30 X 4) + (6 X 20) + (6 X 4) =
600 + 120 + 120 + 24 = 864

We could also do this as two separate problems and add the answers together:

$$\begin{array}{r} 36 \\ \underline{\times\ 20} \\ 720 \end{array} \quad + \quad \begin{array}{r} 36 \\ \underline{\times\ 4} \\ 144 \end{array} \quad = 864$$

We can use the array method:

X	30 +	6
20 +	600	120
4	120	24

and then add the products 600 + 120 + 120 + 24 = 864

We can use partial products by doing each multiplication step beneath the other:

```
  36
X 24
  24   (4 X 6)
 120   (4 X 30)
 120   (20 X 6)
+600   (20 X 30)
 864
```

And of course, we can use the “old fashioned” algorithm where we multiply the ones on the bottom by the top number, and then multiply the tens on the bottom by the top number (don’t forget the zero, because it’s in then tens place!), and then add the answers:

```
   1
   ~~2~~
   36
 X 24
  144
+720
  864
```