For Topic 3, the students should know:

When multiplying by a number with a lot of zeros, just multiply the basic facts and add the amount of zeros to the answer. This is the **associative property of multiplication**. It states that you can change the grouping of factors, and the product stays the same.

3 X 12,000 = 3 X (12 X 1,000)

3 X 12 is the basic fact. The answer is 36. Then multiply 36 X 1,000, or simply pop three zeros onto the answer.

The tricky part is when the basic fact ends in a zero. 5 X 4,000. The basic fact is 20. Do not count the zero in the 20 as one of the three you need to add to the answer. The answer is 20,000.

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:

2,987 X 3 = (2,000 X 3) + (900 X 3) + (80 X 3) + (7 X 3)

 6,000 + 2,700 + 240 + 21 = 8,961

This can also be written vertically:

 2,987

 X 3

 21 (3 X 7)

 240 (3 X 80)

 2,700 (3 X 900)

 + 6,000 (3 X 2,000)

 8,961

You can also use models to solve problems like this:

|  |  |  |  |
| --- | --- | --- | --- |
|  2,000  |  900  |  80 | 7 |

|  |  |  |  |
| --- | --- | --- | --- |
|  2,000  |  900  |  80 | 7 |

|  |  |  |  |
| --- | --- | --- | --- |
|  2,000  |  900  |  80 | 7 |

And of course, you can use the “old fashioned” algorithm, where we multiply and carry over numbers:

 2 2 2

 2,987

 X 3

 8,961