

Multiplying Whole Numbers

Multiplication is basically repeated additions.

$$3 \times 2 = 2 + 2 + 2 = 6$$

$$6 \times 8 = 8 + 8 + 8 + 8 + 8 + 8 + 8 + 8 = 48$$

The numbers that are multiplied are called factors (6 and 8) and the result is the product (48).

There are three basic ways to represent multiplication

$$a \times b$$

$a \cdot b$ all mean the same thing (a multiplied by b)

$$a(b)$$

As is addition the best way to learn multiplication is to memorize the basic facts.

Multiplication Table

\times	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

To use the table, place one finger on the top row on the first factor and place another finger on the second factor on the first column. Bring the finger together and you have the product.

Properties of Multiplication

There are several useful properties of multiplication that will help us in our computations

Multiplication Property of Zero

The product of any number and 0 is 0

$$0 \times 4 = 0$$

$$7 \times 0 = 0$$

Multiplication Property of One

The product of any number and one is the number

$$1 \times 5 = 5$$

$$6 \times 1 = 6$$

Commutative Property of Multiplication

Two numbers can be multiplied in either order and the product is unchanged.

$$4 \times 3 = 3 \times 4 = 12$$

Associative Property of Multiplication

Grouping the numbers in a multiplication problem in any order gives the same result

$$(4 \times 2) \times 3 = 8 \times 3 = 24$$

$$4 \times (2 \times 3) = 4 \times 6 = 24$$

Multiplying Larger Numbers

Multiplying large numbers involves the repeated usage of basic one-digit multiplication facts.

Multiply 37×4

$$\begin{array}{r} 37 \\ \times \underline{4} \\ \hline \end{array}$$

above the ten's column

$4 \times 7 = 28$ write the 8 in the one's column and carry the 8

$$\begin{array}{r} 2 \\ 37 \\ \times \underline{4} \\ \hline 8 \end{array}$$

$3 \times 4 = 12$, add the carry digit – $12 + 2 = 14$

$$\begin{array}{r} 37 \\ \times \underline{4} \\ \hline 148 \end{array}$$

Multiply 47×23

$$\begin{array}{r} 47 \\ \times \underline{23} \\ \hline \end{array}$$

$47 \times 3 = 141$

$$\begin{array}{r} 47 \\ \times \underline{23} \\ \hline 141 \end{array}$$

$20 \times 47 = 940$

$$\begin{array}{r} 47 \\ \times \underline{23} \\ \hline 141 \\ 940 \\ \hline 1081 \end{array}$$

$141 + 940 = 1081$

Multiply 439×206

$$\begin{array}{r} 439 \\ \times \underline{203} \\ \hline \end{array} \quad 3 \times 439 = 2634$$

$$\begin{array}{r} 439 \\ \times \underline{203} \\ \hline 2634 \end{array} \quad 0 \times 439 = 000$$

$$\begin{array}{r} 439 \\ \times \underline{203} \\ \hline 2634 \\ 0000 \end{array} \quad 200 \times 439 = 87800$$

$$\begin{array}{r} 439 \\ \times \underline{203} \\ \hline 2634 \\ 00000 \\ \underline{87800} \\ 90434 \end{array} \quad 2634 + 0000 + 87800 = 90434$$

When do we use multiplication?

There are key words that indicate the use of multiplication

Multiplication Key Word

Times	7 times 3	7×3
The product of	The product of 6 and 9	6×9
Multiplied by	8 multiplied by 2	8×2