

Multiplying in Columns, Standard Way

Here we learn the standard algorithm of multiplication. It is based on the same principle of multiplying in parts: you simply multiply ones and tens separately, and add. In the standard algorithm the *adding* is done at the same time as multiplying. The calculation looks more compact and takes less space.

$$\begin{array}{r} \\ 63 \\ \times 4 \\ \hline \end{array}$$

Multiply the ones first.

$$4 \times 3 = 12$$

Place 2 under the line at the ones place, but the tens digit (1) is written above the tens column as a little memory note. This is called *carrying to tens*.

$$\begin{array}{r} \\ 63 \\ \times 4 \\ \hline 252 \end{array}$$

Then multiply the tens, and *add* the 1 ten that was carried over.

$$4 \times 6 + 1 = 25$$

Total of 25 tens, which actually signifies 250. Write the 25 in front of the ones digit (2).

$$\begin{array}{r} 63 \\ \times 4 \\ \hline 12 \\ + 240 \\ \hline 252 \end{array}$$

Compare to the "multiplying in parts" method you have learned previously, where the adding is done without "carrying".

In the calculation $4 \times 6 + 1 = 25$, the 6 and the 1 are actually tens. So in reality we calculate $4 \times 60 + 10 = 250$.

Look at other examples. In each case, some tens are carried as a result of multiplying the ones.

$$\begin{array}{r} \\ 27 \\ \times 4 \\ \hline 8 \end{array} \quad \begin{array}{r} \\ 27 \\ \times 4 \\ \hline 8 \end{array}$$

$$4 \times 7 = 28$$

$$4 \times 2 + 2 = 10$$

$$\begin{array}{r} \\ 69 \\ \times 7 \\ \hline 3 \end{array} \quad \begin{array}{r} \\ 69 \\ \times 7 \\ \hline 3 \end{array}$$

$$7 \times 9 = 63$$

$$7 \times 6 + 6 = 48$$

$$\begin{array}{r} \\ 54 \\ \times 6 \\ \hline 4 \end{array} \quad \begin{array}{r} \\ 54 \\ \times 6 \\ \hline 4 \end{array}$$

$$6 \times 4 = 24$$

$$5 \times 6 + 2 = 32$$

$$\begin{array}{r} \\ 83 \\ \times 9 \\ \hline \end{array} \quad \begin{array}{r} \\ 83 \\ \times 9 \\ \hline \end{array}$$

$$9 \times 3 =$$

$$9 \times 8 + 2 =$$

$$\begin{array}{r} \\ 77 \\ \times 7 \\ \hline \end{array} \quad \begin{array}{r} \\ 77 \\ \times 7 \\ \hline \end{array}$$

$$7 \times 7 =$$

$$\begin{array}{r} \\ 38 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} \\ 38 \\ \times 5 \\ \hline \end{array}$$

Compare the earlier method with the one in this lesson:

$\begin{array}{r} 75 \\ \times 8 \\ \hline 40 \\ + 560 \\ \hline 600 \end{array}$	OR	$\begin{array}{r} 4 \\ 75 \\ \times 8 \\ \hline 0 \end{array}$ <p>$5 \times 8 = 40,$ 4 is carried.</p>	$\begin{array}{r} 4 \\ 75 \\ \times 8 \\ \hline 600 \end{array}$ <p>$7 \times 8 + 4 =$ $56 + 4 = 60$</p>
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You can choose which one you use. Discuss it with your teacher.

1. Multiply. Be careful with the carrying.

a.
$$\begin{array}{r} 53 \\ \times 8 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 51 \\ \times 6 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 88 \\ \times 3 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 79 \\ \times 3 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 62 \\ \times 2 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 46 \\ \times 7 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 18 \\ \times 5 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 19 \\ \times 3 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 66 \\ \times 6 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 39 \\ \times 9 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 87 \\ \times 3 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 67 \\ \times 2 \\ \hline \end{array}$$

m.
$$\begin{array}{r} 20 \\ \times 9 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 54 \\ \times 8 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 34 \\ \times 6 \\ \hline \end{array}$$

p.
$$\begin{array}{r} 46 \\ \times 2 \\ \hline \end{array}$$

q.
$$\begin{array}{r} 17 \\ \times 9 \\ \hline \end{array}$$

r.
$$\begin{array}{r} 43 \\ \times 4 \\ \hline \end{array}$$

s.
$$\begin{array}{r} 76 \\ \times 8 \\ \hline \end{array}$$

t.
$$\begin{array}{r} 35 \\ \times 9 \\ \hline \end{array}$$