# Arithmetics
# Multiplication base 10
# calculator-algebra.org

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## Example

Multiply the one-digit numbers.

$$3 \cdot 2 = 6$$
$$4 \cdot 3 = 12$$
$$0 \cdot 8 = 0$$
$$6 \cdot 7 = 42$$
$$7 \cdot 9 = 63$$

### Example

Multiply the one-digit numbers.

$$9 \cdot 1 = 9$$
$$8 \cdot 4 = 32$$
$$7 \cdot 7 = 49$$
$$6 \cdot 9 = 54$$

| · | 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 do one-digit multiplication quickly: make table with all possibilities.

## Example

Multiply the one-digit numbers.

$$
\begin{aligned}
2 \cdot 10 &= 20 \\
40 \cdot 4 &= 160 \\
70 \cdot 50 &= 3500 \\
30 \cdot 900 &= 27000
\end{aligned}
$$

## Observation

*To multiply numbers that end with zeroes:*

- *multiply the non-zero parts ignoring all zeroes at the end;*
- *copy all ending zeroes ignored in the previous step.*

## Example

Multiply 3 by 312.

$$3 \cdot 312$$
$$\overline{\phantom{3 \cdot }936}$$

## Example

Multiply 6 by 9127.

$$\frac{6 \cdot 9\,1\,2\,7}{5\,4\,7\,6\,2}$$

## Example

Multiply 11 by 12.

$$
\begin{array}{r}
11 \cdot 12 \\
\hline
12 \\
+ \quad 12 \phantom{0} \\
\hline
132
\end{array}
$$

## Example

Multiply 39 by 33.

$$
\begin{array}{r}
39 \cdot 33 \\
\hline
{\scriptstyle 1\ 1} \\
297 \\
+ \quad 99 \\
\hline
1287
\end{array}
$$

## Example

Multiply 30 by 88.

$$
\begin{array}{r}
30 \cdot 88 \\
\hline
0\,0 \\
+ \quad 264 \phantom{0} \\
\hline
2640 \\
\end{array}
$$

Multiply 3 by 88.

$$
\begin{array}{r}
3 \cdot 88 \\
\hline
264 \\
\end{array}
$$

## Example

Multiply 307 by 804.

$$
\begin{array}{r}
307 \cdot 804 \\
\hline
5628 \\
+ \quad 000 \phantom{0} \\
2412 \phantom{00} \\
\hline
246828
\end{array}
$$

## Example

Multiply 456 by 987.

$$
\begin{array}{r}
456 \cdot 987 \\
\hline
\scriptstyle 1\ 2\ 2 \\
5922 \\
+\quad 4935 \\
3948 \\
\hline
450072
\end{array}
$$