

2-Digit by 2-Digit Multiplication: How It Works

Multiply by the ones, write a zero, multiply by the tens, then add.

1. Break the problem into two easier ones

	36
20	$36 \times 20 = 720$
4	$36 \times 4 = 144$

36×24 means 24 groups of 36. Split the 24 into **20** and **4**, and there are two easier problems: $36 \times 4 = 144$ and $36 \times 20 = 720$. Add the parts: $144 + 720 = 864$. The written method does the same thing, with one line for each part.

2. The written method, one step at a time

1. Ones digit

$$\begin{array}{r} 2 \\ 36 \\ \times 24 \\ \hline 144 \end{array}$$

Multiply by the 4. $4 \times 6 = 24$: write 4, carry 2. Then $4 \times 3 = 12$, and 2 more is 14.

2. Zero

$$\begin{array}{r} 2 \\ 36 \\ \times 24 \\ \hline 144 \\ + 0 \end{array}$$

Next comes the 2 in 24. It means 20, so write a 0 in the ones place first.

3. Tens digit

$$\begin{array}{r} 1 \\ 2 \\ 36 \\ \times 24 \\ \hline 144 \\ + 720 \end{array}$$

Multiply by the 2. $2 \times 6 = 12$: write 2, carry 1. Then $2 \times 3 = 6$, and 1 more is 7.

4. Add

$$\begin{array}{r} 1 \\ 2 \\ 36 \\ \times 24 \\ \hline 144 \\ + 720 \\ \hline 864 \end{array}$$

Add the two lines. $144 + 720 = 864$.

Every problem goes the same way: **ones, zero, tens, add**.

3. Check it, then go bigger

Check with an estimate

Round each number to the nearest ten and multiply. Your answer should be near the estimate.

$$40 \times 20 = 800$$

864 is close to 800



Bigger numbers work the same way

A 3-digit number on top means one more multiplication in each line. The steps do not change: ones, zero, tens, add.

$$\begin{array}{r} 215 \\ \times 32 \\ \hline 430 \\ + 6450 \\ \hline 6880 \end{array}$$

Watch out

Do not forget the zero. You are multiplying by 20, not by 2. Without the zero the second line reads 72, and the answer comes out as 216.

Cross out the carried digits from the first line before you start the second.

$$\begin{array}{r} 36 \\ \times 24 \\ \hline 144 \\ + 720 \\ \hline 864 \end{array}$$