

Grade 4 - Multiplying Multi-Digit Numbers - Lesson

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To multiply multi-digit numbers, break a factor into place-value parts, multiply each part, and add the partial products. An area model draws this as a rectangle: 36×24 is $600 + 120 + 120 + 24 = 864$. The distributive property allows the split. For multiples of 10, multiply the basic facts and attach the zeros.

Grade 4 · Common Core State Standards: **4.NBT.B.5**

Key facts

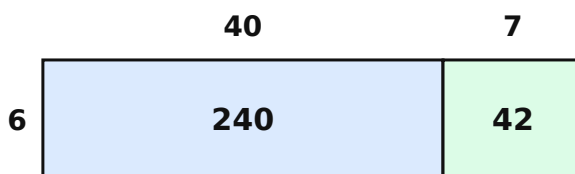
- Partial products are the answers to each smaller multiplication; add them for the final product.
- Distributive property: $6 \times 47 = 6 \times 40 + 6 \times 7$.
- A 2-digit by 2-digit problem has four partial products in an area model.
- For multiples of 10, multiply the basic facts and attach all the zeros: $30 \times 40 = 1,200$.
- Estimate first by rounding to check that the product makes sense.

What is a partial product?

To multiply big numbers, break one number into place-value parts. Multiply each part, then add. Each answer you get along the way is a **partial product**.

Distributive property

The **distributive property** says you can split a factor and multiply each part: $6 \times 47 = 6 \times 40 + 6 \times 7$. An **area model** draws this as a rectangle cut into parts.



47×6 splits into $40 \times 6 = 240$ and $7 \times 6 = 42$. Add: $240 + 42 = 282$.

The rectangle is 6 units tall and 47 units wide. The two parts have areas 240 and 42, and they add to 282.

How do you multiply two 2-digit numbers?

Split both numbers. A 2-digit by 2-digit problem makes four partial products.

	30	6
20	600	120
4	120	24

36×24 has four partial products: 600, 120, 120, and 24. Their sum is 864.

1. Split each factor into tens and ones: $36 = 30 + 6$ and $24 = 20 + 4$.
2. Multiply every part by every other part: $30 \times 20 = 600$, $6 \times 20 = 120$, $30 \times 4 = 120$, $6 \times 4 = 24$.
3. Add the four partial products: $600 + 120 + 120 + 24 = 864$.

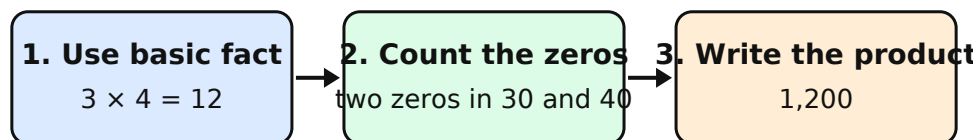
How do you multiply a 4-digit number by a 1-digit number?

Use the same idea. Split the big number by place value, multiply each part by the 1-digit number, then add.

	2,000	400	30	8
4	8,000	1,600	120	32

$$2,438 \times 4 = 8,000 + 1,600 + 120 + 32 = 9,752.$$

How can you multiply multiples of 10 in your head?



To multiply 30×40 , multiply 3×4 and then attach the zeros.

Think of 30×40 as 3 tens times 4 tens. The basic fact $3 \times 4 = 12$ gives 12 hundreds, which is 1,200. Count the zeros in both factors and attach them all.

Which properties make multiplying easier?

- **Commutative:** $7 \times 12 = 12 \times 7$.
- **Associative:** $4 \times 17 \times 25 = (4 \times 25) \times 17 = 100 \times 17 = 1,700$.

Look for pairs that make friendly numbers, such as 4×25 or 5×20 .

Questions about multiplying multi-digit numbers

What is an area model for multiplication?

It is a rectangle cut into parts by place value. Each part shows one partial product, and the sum of the parts is the answer. For 47×6 , the parts are 240 and 42, so the product is 282.

What are partial products?

Partial products are the products of each part of one factor with each part of the other. Add all of them to get the final product.

How do you multiply 30×40 in your head?

Multiply the basic fact $3 \times 4 = 12$, then attach the two zeros from the factors. The product is 1,200.

How many partial products does 36×24 have?

It has four: 30×20 , 6×20 , 30×4 , and 6×4 . They equal 600, 120, 120, and 24, and they add to 864.

How can I check a multiplication answer?

Estimate by rounding each factor. For 48×31 , think $50 \times 30 = 1,500$. The exact product, 1,488, is close, so it makes sense.