

Grade 4 · Multi-Digit Multiplication · Lesson

Common Core 4.NBT.B.5 · mathovore.fr

Multi-digit multiplication finds a product by splitting factors into place-value parts, multiplying each part, and adding the partial products. An area model shows each partial product as a smaller rectangle. For example, $24 \times 36 = 600 + 120 + 120 + 24 = 864$. Estimate first to check that an answer is reasonable.

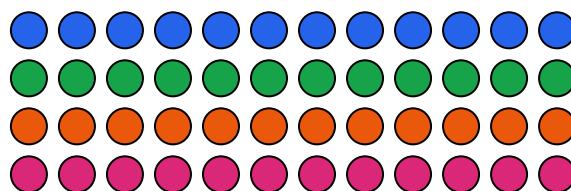
Grade 4 Common Core: 4.NBT.B.5

Key facts:

- Split each factor by place value: $24 = 20 + 4$.
- Multiply every part by every part to get partial products.
- Add all partial products to find the total.
- An area model shows each partial product as a rectangle.
- Estimate with rounded factors to check the answer.

What does multi-digit multiplication mean?

Multiplying finds the total in equal groups or the area of a rectangle. A rectangular array shows this clearly: 4 rows with 12 dots in each row is $4 \times 12 = 48$.



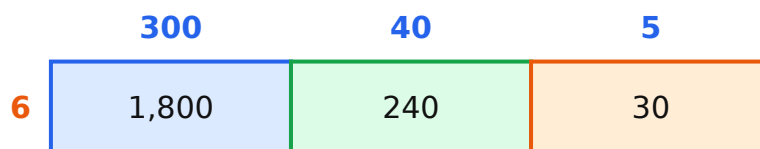
4 rows of 12 dots: 48 dots in all.

Partial products

A **partial product** is the product of one part of a factor and another. Because of the **distributive property**, we can split a number by place value, multiply each part, and add the results.

How do you multiply by a one-digit number?

Split the larger factor into hundreds, tens, and ones. Multiply each part by the one-digit factor, then add. For 6×345 , think $345 = 300 + 40 + 5$.

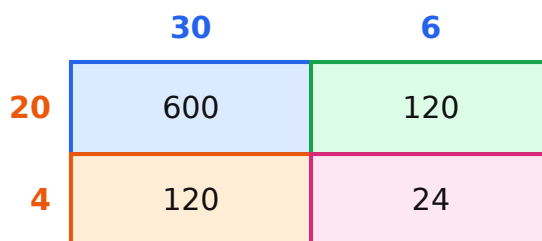


6×345 : the three partial areas are 1,800, 240, and 30.

Add the partial products: $1,800 + 240 + 30 = 2,070$. So $6 \times 345 = 2,070$.

How do you multiply two two-digit numbers?

Split both factors by place value. This gives four partial products: tens times tens, tens times ones, ones times tens, and ones times ones.

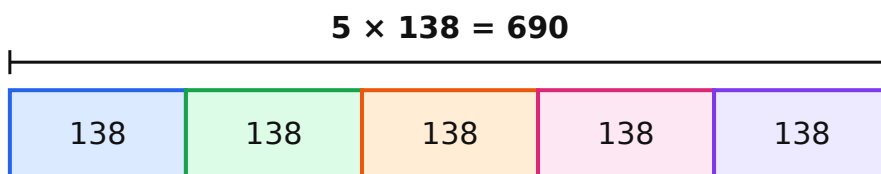


24×36 : the four partial areas are 600, 120, 120, and 24.

1. Write each factor as tens plus ones: $24 = 20 + 4$ and $36 = 30 + 6$.
2. Multiply every part by every part: 600, 120, 120, 24.
3. Add: $600 + 120 + 120 + 24 = 864$.

Which properties make multiplying easier?

The **commutative property** lets you swap factors, and the **associative property** lets you regroup them. For example, 5×138 can be seen as five equal parts of 138.



Five equal parts of 138 make 690.

Why does splitting work? A number such as 345 is really $300 + 40 + 5$, so multiplying each piece and adding keeps the total the same. This is the distributive property, and it works for any size of factor. Each partial product tells you how much of the rectangle each piece covers, which helps you notice a missing piece right away.

Always estimate first. Since 24×36 is close to $20 \times 40 = 800$, the answer 864 is reasonable.

Multi-Digit Multiplication: frequently asked questions

What is a partial product?

It is the product of one place-value part of a number and another number or part. Adding all partial products gives the full product.

How does an area model help with multiplication?

It draws a rectangle whose sides are the place-value parts of the factors. Each smaller rectangle is one partial product, and the total area is the answer.

How many partial products are there for 2-digit by 2-digit numbers?

Usually four: tens times tens, tens times ones, ones times tens, and ones times ones. Zeros in a number reduce the count.

How can I check a multiplication answer?

Estimate by rounding each factor, or redo the problem by swapping the factors. If the answer is far from the estimate, look for a missing partial product.

Why does multiplying by 10 add a zero?

Each digit moves one place to the left and becomes worth ten times as much, so a zero is needed in the ones place to hold the places.