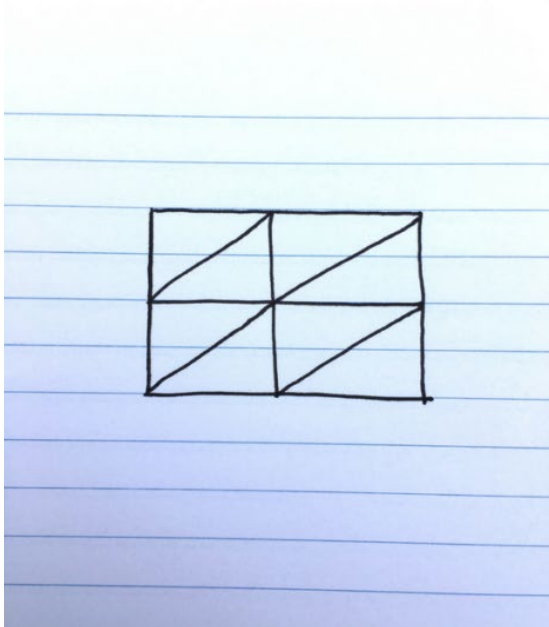


Long Multiplication

Lattice Method

Step 1: Draw a grid. The number of rows and columns will depend on the number of digits in the factors. For example, if you are multiplying a 2-digit by 2-digit number, your grid will have two rows and two columns.



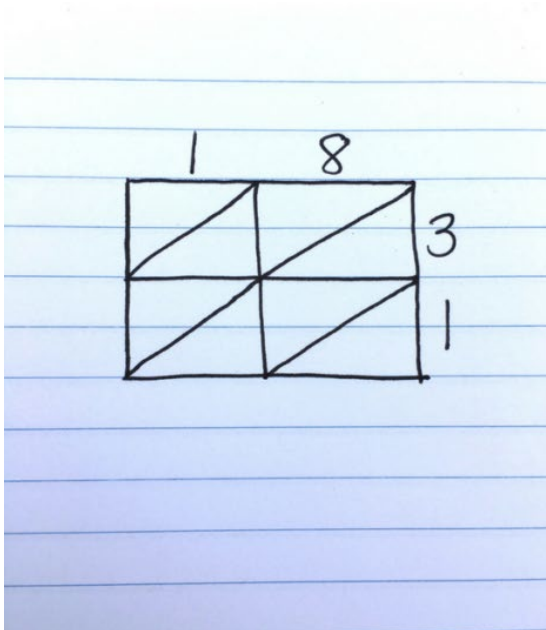
Step One

Draw a grid and divide each box with a diagonal line.

The number of rows and columns will depend on the number of digits in the factors.

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Step 2: Arrange the factors along the top and right side of the grid, as shown below.

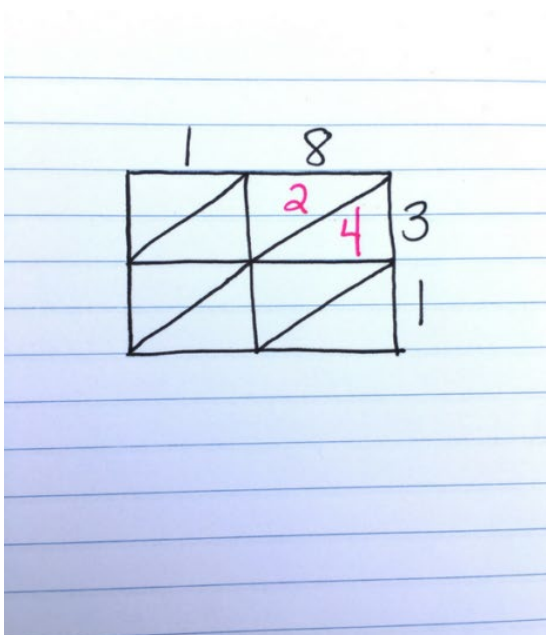


Step Two

Arrange the factors along the top and right side of the grid.

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Step 3: Now it's time to multiply. Multiply the numbers that meet in each space on the grid. For example, in the top right corner, we are multiplying 8×3 to make 24. The tens and ones are split on either side of the diagonal line.

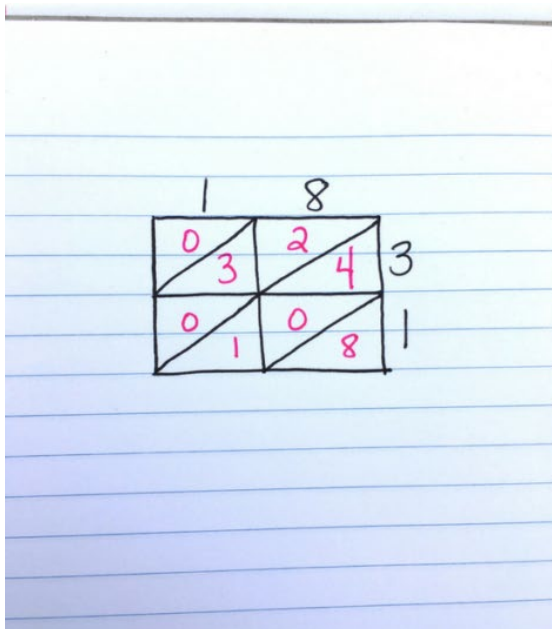


Step Three

Multiply the numbers that meet in each space on the grid. The tens and ones are split by the diagonal line in each space.

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Step 4: Continue multiplying for each space on the grid.

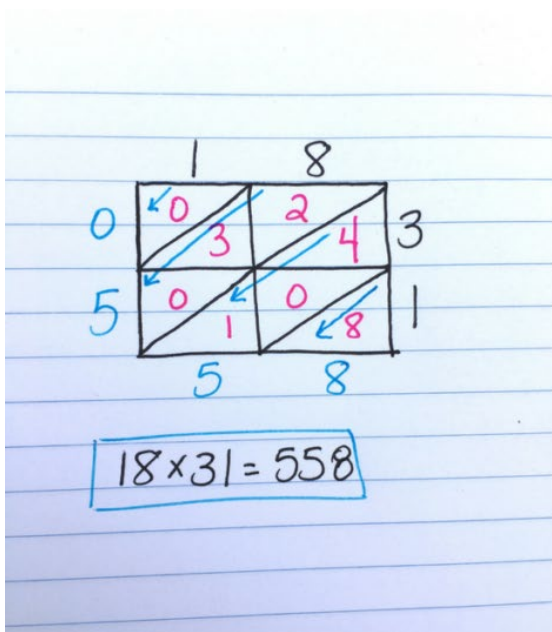


Step Four

Continue to multiply until all of the spaces on the grid have been filled.

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Step 5: Lastly, add! We add using diagonal rows and write the sum of each diagonal row along the left side and bottom of the grid. So, in this example, the final product is 558.



Step Five

Add the numbers in each diagonal row. Write the sums along the left side and bottom.

These numbers become the final product.

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Carry the tens digit to the next diagonal row. In the example below, we have done all of our multiplying on the grid. Now when we add, let's see what happens.

A handwritten grid on lined paper showing the multiplication of 25 by 38. The grid is 2 rows by 2 columns. The top row has digits 2 and 5 above the columns. The left column has digits 0 and 9 to the left of the rows. The right column has digits 3 and 8 to the right of the rows. The grid is divided into four quadrants by a diagonal line from the top-left to the bottom-right. The top-left quadrant contains 0 and 6. The top-right quadrant contains 10 and 5. The bottom-left quadrant contains 16 and 5. The bottom-right quadrant contains 40 and 0. A circled '1' is written above the '6' in the bottom-left quadrant, indicating a carry. Below the grid, the equation $25 \times 38 = 950$ is written and boxed.

When you need to regroup, simply carry the tens digit to the next diagonal row.

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First, we add the diagonal row in the bottom right, to make 0. (see example above). Now we add the next diagonal row. The sum is 15, so here we write the ones digit (5) and carry the tens (1) to the next diagonal row (I've circled that carried digit in this example so that it stands out). Now, when we add that diagonal row, we simply add that carried digit in there as well.

What if we have more digits in the factors?

Easy!

We simply increase the numbers of rows or columns based on the number of digits in the factors. The example below shows a 2-digit by 3-digit equation, so there are 2 rows and 3 columns.

A handwritten grid on lined paper showing the multiplication of 258 by 34. The grid is 2 rows by 3 columns. The top row has digits 2, 5, and 8 above the columns. The left column has digits 0 and 8 to the left of the rows. The right column has digits 3 and 4 to the right of the rows. The grid is divided into six quadrants by two diagonal lines from the top-left to the bottom-right. The top-left quadrant contains 0 and 6. The top-middle quadrant contains 15 and 5. The top-right quadrant contains 24 and 4. The bottom-left quadrant contains 08 and 7. The bottom-middle quadrant contains 20 and 7. The bottom-right quadrant contains 32 and 2. A circled '1' is written above the '5' in the top-middle quadrant, indicating a carry. Below the grid, the equation $258 \times 34 = 8772$ is written and boxed.

More digits in your factors? No problem! Just use additional rows and columns on your grid.

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