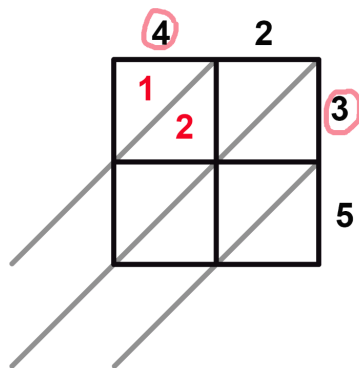


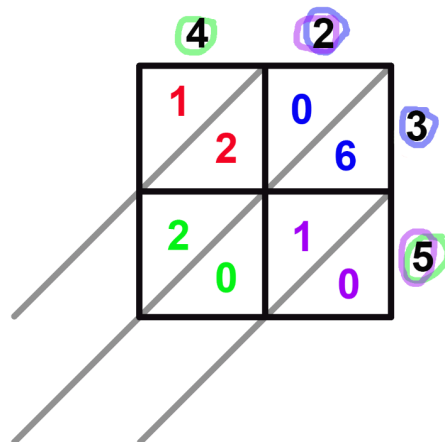
Lattice Method!

There's an interesting method for multiplying numbers I wanted to show you, in case you're asked to do it at your school. It's kinda crazy-looking and feels a lot like magic... Here we go!

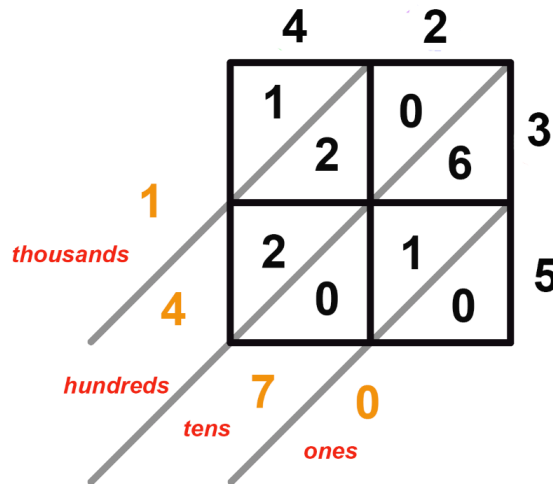
Let's do: $42 \times 35 = ?$ For the Lattice Method, first we draw our box like we learned on p.187, but then we draw diagonal lines through all the corners, extending down to the left way past the box. Then, we write just the digits (*not* the expanded form!), along the top and right side. In this case, 4 & 2, and then 3 & 5.



Now we start multiplying the numbers into their boxes, always writing the tens digits on TOP of the diagonal lines, and the ones digits BELOW the diagonal lines. So for $4 \times 3 = 12$, we write the 1 on top, and the 2 on the bottom of the "12" box. See what I mean? Then we fill in the rest of the little half-boxes by doing the rest of the multiplication problems ($2 \times 3 = 6$, $4 \times 5 = 20$, $2 \times 5 = 10$). (Notice that for $2 \times 3 = 6$, there is nothing in the tens place of that answer, so we just put a "0" in that spot.)



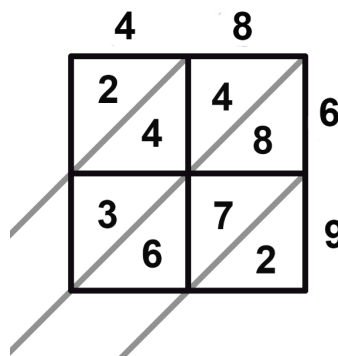
Then we can just add up each diagonal slot's numbers (always start with the bottom right – the ones digits!) and write those sums down below (here, in orange). And guess what? That's our answer: $42 \times 35 = 1,470!$



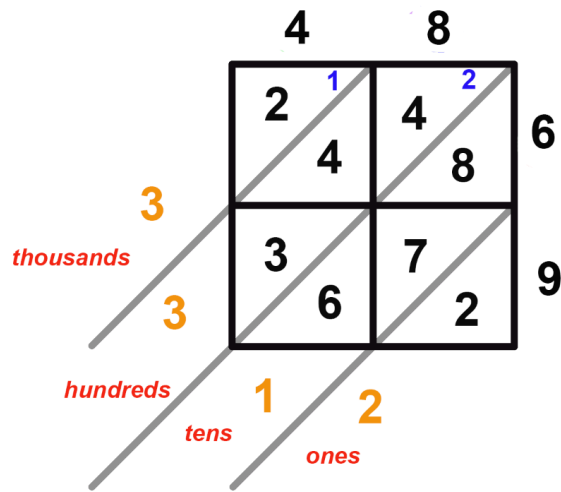
Why does this work? The diagonal lines separate the products by place value so that the 4 slots each show a different *place value* for the digits, and it works out to give us the right answer!

ANOTHER EXAMPLE:

By the way, if any of the diagonal sections gives a sum that is more than 9, we need to regroup. Let's do $48 \times 69 = ?$ to see how that works. First we'll do all the little multiplication problems and write in the answers like we just learned how to do:



And now it's time to add up the numbers in those diagonal slots. Starting with the right bottom slot, the ones place is just 2, right? Next, in the tens slot, since $8 + 7 + 6 = 21$, we write the 1 down below and regroup the 2 to the hundreds slot. In the hundreds slot, since $2 + 4 + 4 + 3 = 13$, we write the 3 down below and regroup the 1 to the thousands slot. The thousands slot is just $1 + 2 = 3$. And we've discovered that $48 \times 69 = 3,312$!



Understanding why this method works can be a little tricky, but if you spend some time with it, you'll start to see that it's really just good 'ol place value, except our columns are slanted. Try the GameTime on p.194 using this method, and see if you can get the right answers with this method. You got this!

