

# The Magic of 11's

**Overview:** Here's our first lesson. It is so easy that one night, I wound up showing it to everyone in the pizza restaurant. Well, everyone who would listen, anyway. We were scribbling down the answers right on the pizza boxes with such excitement that I couldn't help it – I started laughing right out loud about how excited everyone was about math ... especially on a Saturday night.

When you do this calculation in front of friends or family, it's more impressive if you hand a calculator out first to an unsuspecting friend, letting them know that you are "testing to see if the calculator is working right," Ask for a two-digit number and have them check the calculator's answer against yours.

## Materials

- Pencil
- Paper

## Activity

We're going to be able to multiply any two digit number by 11 magically in our head. At first, you'll want to use a paper and pencil, but you'll soon feel confident enough to do the entire calculation completely in your head. Here's the deal:

Let's figure out this one:  $11 \times 23 = ?$

Take the 2 and 3 and spread them apart, so it looks like this:  $2\boxed{\phantom{0}}3$   
(That little box means "space", where you'll be placing a digit in a moment.)

Now add  $2 + 3$ . Did you get 5?

Put the "5" in the box to get your answer:  $11 \times 23 = \underline{253}$ !

That's it! How cool is that?

Let's try another one:  $11 \times 45 = ?$

First spread apart the 4 and 5, then add  $4 + 5$  to get 9.

Now put 9 between 4 and 5 to get  $11 \times 45 = \underline{495}$ !

How about this one:  $11 \times 86 = ?$

Spread apart the 8 and 6 like this:  $8\boxed{\phantom{0}}6$

Now add  $8 + 6$  to get 14. But wait a second... is the answer 8146? That doesn't sound right, because the answer has to be a three-digit number, not four! So here's how to handle it: place the 4 in the box, and carry the 1 to the 8 and add it to make 9.

So  $11 \times 86 = \underline{946}$ !

What do you think is going to happen once you show this to your friends? If they're like *my* friends, then they're going to ask you to do the biggest two-digit number you can think of. So let's do that one right now:

What is  $11 \times 99$ ?

The first step looks like this:  $9\boxed{\phantom{0}}9$

Since  $9 + 9 = 18$ , write the 8 in the box and carry the "1" and add it to the first 9 to get 10.

Your final answer is  $11 \times 99 = \underline{1,089}$ !

Let's try one last example: What is  $11 \times 78$ ?

The first step looks like this:  $7\boxed{\phantom{0}}8$

Add  $7 + 8$  to get 15, and write the "5" in the box. Where does that "1" go from the 15? Add it to 7 to get 8.

$11 \times 78 = \underline{858}$ !

Now it's your turn! Work out the exercises below. (You'll find answers at the back of this book.)

### Exercises

1.  $11 \times 11$
2.  $11 \times 27$
3.  $11 \times 43$
4.  $11 \times 49$
5.  $11 \times 50$
6.  $11 \times 67$
7.  $11 \times 79$
8.  $11 \times 89$
9.  $11 \times 92$
10.  $11 \times 96$

## Answers to Exercises: The Magic of 11's

1. 121
2. 297
3. 273
4. 539
5. 550
6. 737
7. 869
8. 979
9. 1012
10. 1056