

Squaring a Two-Digit Number

Overview: This neat little trick shortcuts the multiplication process by breaking it into easy chunks that your brain can handle. The first thing you need to do is multiply the digits together, then double that result and add a zero, and then square each digit separately, and finally add up the results.

Materials

- Pencil
- Paper

Activity: Finding the square of a number simply means multiplying the number by itself. For example, the square of 5 = $5^2 = 5 \times 5 = 25$

What about larger numbers? What is: $23^2 = ?$

This is done in a couple of steps. First, multiply the digits of the number (2 and 3) together to get $2 \times 3 = 6$. Now double this to get $6 \times 2 = 12$, and add a zero to the end to get 120. Keep this number in mind.

Next, square the tens digit (2) to get 4. We want this number to be a two-digit number for this technique to work, so write 04.

Now square the ones digit to get 09.

Place these two numbers together to get 0409, and add the 120 to it to get the final result: $0409 + 120 = 529$.

$23^2 = 529!$

Next example: $45^2 = ?$

First, multiply $4 \times 5 = 20$, double it to get 40, and add a zero to get 400.

Now square the tens digit to get $4^2 = 16$.

Square the ones digit to get $5^2 = 25$.

Place these two numbers together to get 1625, and add 400 to get the final answer of 2,025.

$45^2 = 2025!$

How about a larger number? Find the square of 86. Try this on your own before turning the page for the solution.

First multiply 8 by 6 to get 48, double the product $48 \times 2 = 96$ and add a zero to get 960.

Square the tens digit to get $8^2 = 64$, and the ones digit $6^2 = 36$ and place them together to get 6,436.

Add $6,436 + 960$ together using our addition trick we learned about recently. Since 960 is 40 away from 1,000, the problem becomes: $6,436 + 960 = 6,436 + 1,000 - 40 = 7,396$.

$$86^2 = 7,396!$$

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

Exercises

1. 21^2
2. 43^2
3. 37^2
4. 69^2
5. 99^2
6. 82^2
7. 58^2
8. 64^2
9. 53^2
10. 86^2

Answers to Exercises: Squaring Two-Digit Numbers

1. 441
2. 1849
3. 1369
4. 4761
5. 9801
6. 6724
7. 3364
8. 4096
9. 2809
10. 7396