

Finger multiplication method: history, equation and proof

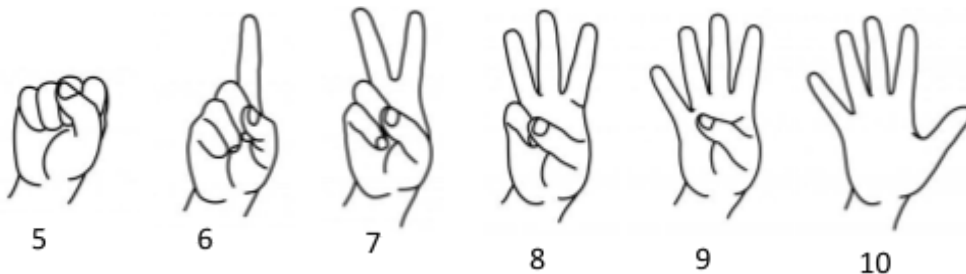
History:

In the 17th century, arithmetic was not always a common subject taught to the general public, but it was important for merchants and farmers to know multiplication for their businesses. As such, this was a common time that many mathematicians created easier ways to multiply. One method, created by Arab mathematicians, is the nine-finger multiplication trick. Another trick, most commonly known as the French peasant algorithm, is used to multiply numbers 5-10 and is traced back to Italy as *regula ignavi*, or “the lazy rule”.

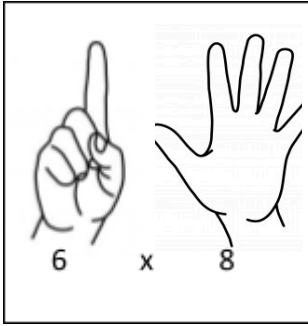
While this method isn't taught in curriculum, because of its significant use in many different parts of the world by working class people, it is still used as a regular method by many cultures today.

Algorithm:

- Step 1:** For each number you are multiplying, put the fingers up to represent that number, where a fist represents the number 5, and every finger you add after that is added onto 5.
- Step 2:** Add the fingers that are up and multiply that number by 10.
- Step 3:** Take the number of fingers down on the left hand and multiply by the number of fingers down on the right hand.
- Step 4:** Add the number in **Step 2** to the number you got in **Step 3**.



Example:



Solution to equation:

Step 1: Name the variables:
Let x be the first number you are multiplying.
Let y be the second number you are multiplying.

Step 2: Take $(x-5)+(y-5)$ and multiply by 10.
You should get $10(x+y-10)$.

Step 3: Take $(10-x)(10-y)$.

Step 4: $x \cdot y = 10(x+y-10) + (10-x)(10-y)$.
(Note: There are multiple variations of this equation.)

Step 1: Show 6×8 on fingers, as shown to the left.

Step 2: Add the fingers that are up ($1+4$) and multiply that by 10, giving 40.

Step 3: Take the number of fingers down on the left hand (4) and multiply by the number of fingers down on the right hand (2) giving you 8.

Step 4: Add 40 to the 8, giving your answer: $6 \times 8 = 48$.

Proof:

$$\begin{aligned}x \cdot y &= 10(x + y - 10) + (10 - x)(10 - y) \\&= (10x + 10y - 100) + (100 - 10x - 10y + xy) \\&= x \cdot y\end{aligned}$$

QED.

Solution to equation with 4 fingers:

Step 0: Recognize that a fist will now be 4, and each finger up after that will be 5, 6, 7, 8 respectively.

Step 1: Name the variables:

Let x be the first number you are multiplying.

Let y be the second number you are multiplying.

Step 2: Take $(x-4)+(y-4)$ and multiply by 8.
You should get $8(x+y-8)$.

Step 3: Take $(8-x)(8-y)$.

Step 4: $x*y=8(x+y-8) + (8-x)(8-y)$.
(Note: There are multiple variations of this equation.)