

Methods of Multiplication

Brittany Zaccaria

Lattice multiplication: is a method of multiplication that uses a lattice to multiply two multi-digit numbers. It is algorithmically the same as regular long multiplication, but it breaks the process into smaller steps, which some practitioners find easier to use

History:

first was introduced to Europe by Fibonacci (Leonardo of Pisa), whose 1202 treatise *Liber Abacii (Book of the Abacus)* was the most sophisticated work on arithmetic and number theory written in medieval Europe

(will go in further detail in my talk)

Long multiplication: sometimes called grade-school multiplication, sometimes called Standard Algorithm multiply the multiplicand by each digit of the multiplier and then add up all the properly shifted results. It requires memorization of the multiplication table for single digits

History: previously, medieval European mathematics were based on Roman numerals, which are straightforward enough to add (at least for small quantities), but extremely difficult to multiply or divide. Such calculations were traditionally performed using an abacus and counters. Arithmetic was a complex subject, taught to mature young men, not schoolboys

The basis of any method of multiplying is the distributive property

$$a \times (b + c) = a \times b + a \times c$$

Looking at the the example of 469 x 37.

$$\begin{aligned} 469 \times 37 &= (400 + 60 + 9) \times (30 + 7) \\ &= (400 + 60 + 9) \times 30 + (400 + 60 + 9) \times 7 \\ &= 400 \times 30 + 60 \times 30 + 9 \times 30 + 400 \times 7 + 60 \times 7 + 9 \times 7 \end{aligned}$$

-We can break each number up into a sum of terms, one term for each digit, and the product will be the sum of all possible products of a term from one number and a term from the other
-A multiplication table does the same thing ...

<http://mathforum.org/library/drmath/view/59087.html>

<http://ualr.edu/lasmoller/medievalmult.html>

http://en.wikipedia.org/wiki/Multiplication_algorithm