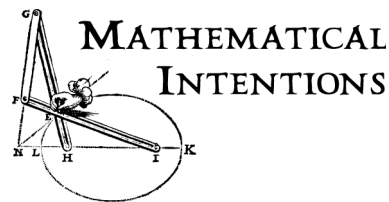


# Napier Rods



John Napier (1550-1617) computed and published the first table of logarithms. He also invented a set of carved rods to make multiplication easier. They were sometimes made of bone or ivory, and so were sometimes called "Napier's Bones."

Each rod is a column of the multiplication table.

**Example 1.** Multiplying a multidigit number by a 1-digit number:  $8 \times 769$ .

- Get out the rods for the 7, 6, and 9 columns of the multiplication table, in order. Use the strip without diagonals on the left.
- Find the 8<sup>th</sup> row, using the strip on the left.
- Read off the answer, adding as you go. Place values are separated by the diagonals.

The 8th row 56, 48, 72. The 56 is really 5600, since it was  $8 \times 700$ . Similarly, the 48 is really 480. The 72 is just 72.

In the total, there are 2 ones, 7+8 tens, 6+4 hundreds, and 5 thousands, before regrouping. This amounts to 6 thousands, 1 hundred, 5 tens, and 2 ones, so the product is 6152.

**Try this (1).**

- Figure out how to multiply two multidigit numbers, such as  $657 \times 789$ . You will probably want to do the final addition in writing.
- How do you decide where to put the decimal point when multiplying decimals? For example,  $0.000328 \times 0.017$  or  $926 \times 0.000028$
- Look up the Lattice, or Gelosia, method of multiplying, which was widely used until the printing press. How is it related to Napier rods?

9	6	5	8
	3	4	1
8	5	4	7
	6	8	2
7	4	4	6
	9	2	3
6	4	3	5
	2	6	4
5	3	3	4
	5	0	5
4	2	2	3
	8	4	6
3	2	1	2
	1	8	7
2	1	1	1
	4	2	8
1	0	0	0
	7	6	9
0	0	0	0
	0	0	0
	7	6	9

9	0	0	1	8	2	7	3	6	4	5	4	5	4	6	3	7	2	8	1		
8	0	0	0	8	1	6	2	4	3	2	4	0	8	4	0	5	6	4	7	2	
7	0	0	0	7	1	4	2	1	2	8	4	2	3	5	4	2	5	6	6	3	
6	0	0	0	6	1	2	1	8	2	4	3	6	3	0	6	4	2	4	8	5	4
5	0	0	0	5	1	0	1	5	2	0	2	5	0	3	0	3	5	4	0	4	5
4	0	0	0	4	0	8	1	2	1	6	2	0	2	4	2	8	3	2	3	6	6
3	0	0	0	3	0	6	0	9	1	2	1	5	1	8	2	1	2	4	2	7	7
2	0	0	0	2	0	4	0	6	0	8	1	0	1	2	1	4	1	6	1	8	8
1	0	0	0	1	0	2	0	3	0	4	0	5	0	6	0	7	0	8	0	9	9
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	1	2	3	4	5	6	7	8	9											