Math Math Math World

Egyptian Multiplication

As the Ancient Egyptians did not have a number system based on place value, it was not easy for them to do written calculations. They made a list of products, each one double the previous one, and then selected those needed to give the final product. Keep doubling both columns until 16 is reached. (16 is more than half of 27.) As 27 = 16 + 8 + 2 + 1, the '4 line' is crossed out. *Add the rest to give 27 x 41 = 1107.

28 x 17		
1	x 17	17
2	x 17	34
4	x 17	
8	x 17	
16	x 17	
Answer		

35 x 41		
1	x 41	41
2	x 41	82
4	x 41	
8	x 41	
16	x 41	
32	x 41	
Answer		

48 x 32		
1	x 32	
2	x 32	
4	x 32	
8	x 32	
16	x 32	
32	x 32	
Answer		

24 x 22		
1	x 22	22
2	x 22	44
4	x 22	
8	x 22	
16	x 22	
Answer		

59 x 43		
1	x 43	
2	x 43	
4	x 43	
8	x 43	
16	x 43	
32	x 43	
Answer		

55 x 37		
1	x 37	
2	x 37	
4	x 37	
8	x 37	
16	x 37	
32	x 37	
Answer		

'Russian Peasant' Multiplication

The two factors to be multiplied are set down. One is progressively halved with remainders disregarded and the other is progressively doubled until the process cannot continue further.

Delete numbers on the doubled side that are opposite numbers on the halving side that are even. The sum of the rest gives the correct product. Thus for 29 x 123 we have:

29 x 123	
Halve	*Double*
29	123
~~14~~	~~246~~
7	492
3	984
1	1968
Total	3567

Try these using the Russian Peasant method:

28 x 34	
Halve	*Double*
28	34
14	68
	136
Total	

24 x 43	
Halve	*Double*
24	43
12	86
Total	

73 x 69	
Halve	*Double*
73	69
Total	

31 x 84	
Halve	*Double*
31	84
Total	

33 x 153	
Halve	*Double*
Total	

64 x 167	
Halve	*Double*
Total	

Lattice Method

The Lattice, or Gelosia method of multiplication (so called because the setting out of the algorithm resembled the grate, or lattice, placed on windows at the time) was used in Europe from the 15th century onwards.
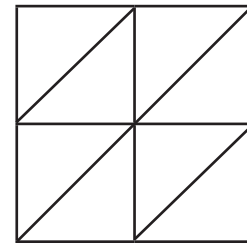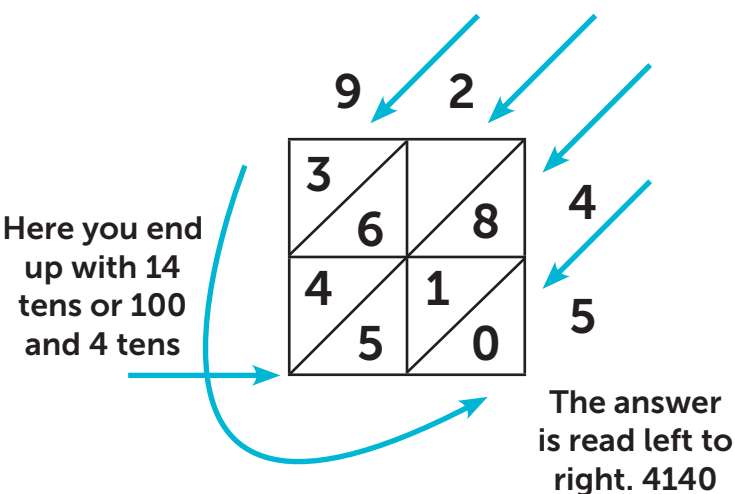
To multiply 92 x 45, you would draw a grid (or lattice) two cells across and two cells down.

9   2

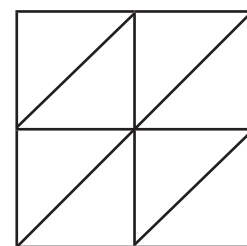The numbers to be multiplied are written across the top and side of the grid.

9   2
4
5

The results of multiplying 2 by 45 are then recorded in the grid. (In reality it does not matter where you start.)

The units digit is placed in the bottom. The top may be left blank.

9   2

8   4
1
0   5

The results of multiplying 92 x 45 are then recorded. The answer is found by adding diagonally, beginning at the lower right.
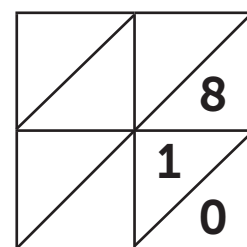
9   2
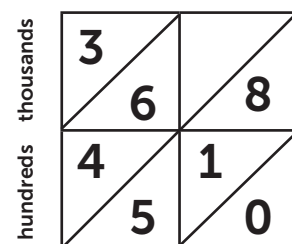
thousands hundreds

3
6   8   4
4
1
5   0   5

9   2

Here you end up with 14 tens or 100 and 4 tens

3
6   8   4
4
1
5   0   5

The answer is read left to right. 4140

Try these!

35 x 41

73 x 69

64 x 167 (requires a lattice two squares wide and three squares tall)

Product Puzzles

Put the numbers *1, 2, 3, 4 and 5* in the boxes below and make the:

☐☐☐
x ☐☐

largest product _____

smallest product _____

Now try these numbers:

5, 2, 4, 6, 0

☐☐☐
x ☐☐

largest product _____

smallest product _____

8, 9, 0, 4, 3

☐☐☐
x ☐☐

largest product _____

smallest product _____

6, 4, 2, 3, 8

☐☐☐
x ☐☐

largest product _____

smallest product _____

2, 7, 6, 1, 8

☐☐☐
x ☐☐

largest product _____

smallest product _____

- Look for a pattern for producing the **largest product** and the **smallest product.** Describe the pattern.