Parents' guide to multiplication

Repeated addition

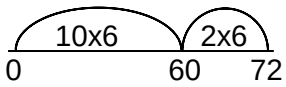
As children begin to understand multiplication, they use repeated addition, either on their fingers or a number line (e.g. to do 8x5, count up in 8s 5 times or 5s 8 times).

Partitioning

This is breaking the numbers into tens and ones ('partitioning') and multiplying each bit separately before adding up the totals. It can be done with or without a number line.

Examples:

12 x 6



or:

12 x 6 = 10 x 6 = 60
2 x 6 = 12
= 72

The grid method

This method prevents children from making this common mistake (with, for example, 34 x 23):
30 x 20 = 600 and 4 x 3 = 12 so it's 612

1. Draw a grid, with one row and column for each digit in the numbers to be multiplied (e.g. 34 x 23 needs 2 rows and 2 columns; 234 x 5 needs 3 rows and 1 column or 3 columns and 1 row, it doesn't matter which).
2. Partition each number into hundreds, tens and ones and write them next to their rows and columns.
3. In each box, multiply the two numbers at the end of that row or column.
4. Add up all the boxes you've just worked out.

Example:

34 x 23

	20	**3**
30	600	90
4	80	12

600
90
80
\+ 12
782
1

NB: To do 30 x 20 etc, first do 3 x 2 = 6. There are 2 zeroes in the question (one on the 30 and one on the 20) so put that many zeroes after the 6.

Example:

234 x 5

	5
200	1000
30	150
4	20

= 1170

The grid method also works for decimals. Partition 34.5 into 30 + 4 + 0.5 for example.

NB: To do 4 x 0.3 etc, first do 4 x 3 = 12. There is 1 decimal place in the question (the 3) so put that many decimal places in the answer, counting in from the right. So it's 1.2. If there are zeroes and decimal places (e.g. 40 x 0.6) put the zeroes on first, then count in the decimal places. So for 40 x 0.6, do 4 x 6 = 24, then put one zero on the end (from the 40) to make 240 And count in one decimal place (from the 0.6) to get 24.0 or 24.

Short multiplication

This may look more familiar to you?

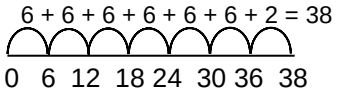
549
x 6
54 (6 x 9)
240 (6 x 40)
3000 (6 x 500)
3294 add them up

Parents' guide to division

Repeated addition or subtraction on a number line: *it is important for children to realise that both methods (counting up and back) work.*

1. Draw an empty number line (with zero or the target number at the start).
2. Count up or down in jumps of the divisor.
3. Stop when you reach the target number or zero.
4. Count up how many jumps were made.
5. Note any remainder.

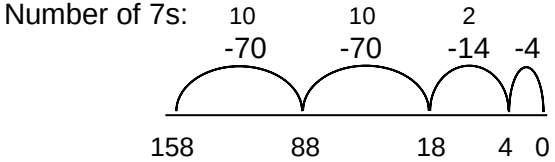
Example: 38 ÷ 6 *by repeated addition*



= 6 sixes plus 2 = 6 r2

For larger numbers, bigger jumps can be recorded using known facts.

Example: 158 ÷ 7 *by repeated subtraction*



=22 sevens plus 4 = 22 r4

'Chunking'

This is the same as repeated subtraction but set out differently. Encourage subtracting 'chunks' of 2, 5, 10, 20, 50, 100 or 200 – which are also the values of the coins we use in the UK!

Example: 285 ÷ 12

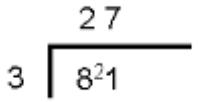
285
- 120 (10 x 12)
165
- 120 (10 x 12)
45
- 36 (3 x 12)
9

For the answer, count how many 12s were subtracted (look in the brackets).
Answer: 23 r9

Short division (a.k.a. 'the bus-stop method')

This is the one you were probably taught when you were at school!

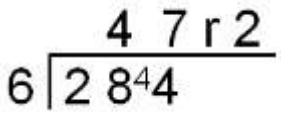
Example: 81 ÷ 3



"How many 3s are there in…?"
Start with how many 3s are in 8 – 2 remainder 2. The answer (2) goes on top; the remainder is carried over to the next number, making the 1 into 21. Now how many 3s are there in 21? The answer (7) goes on the top, making the answer 27.

If there is a remainder, it can be presented as such – or as a fraction or decimal.

Example:



Answer: 47 r2.
As a fraction: 47 2/6 (the remainder goes on the top part of the fraction; what you divided by goes on the bottom). It can be simplified to 47 1/3

As a decimal: can be done by extending the target number (e.g. 284 becomes 284.0000) and continuing the original method. It is useful for children to learn the following fraction/decimal equivalents:

½ = 0.5
¼ = 0.25 and ¾ = 0.75
1/10 = 0.1 (and 2/10, 3/10 etc.)
1/5 = 0.2 (and 2/5, 3/5 etc.)