Changing the Order

$4 + 7 = 7 + 4$ & $3 \times 5 = 5 \times 3$

Numbers can be added or multiplied in any order.

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Using this property can make calculations easier by changing the order of operations.

1. $18 + 5 + 5 + 2 =$

   $(18 + 2) + (5 + 5) = 20 + 10 = 30$

2. $20 + 35 + 80 + 65 + 7 =$

   $(35 + 65) + (20 + 80) + 7 =$

3. $2 \times 48 \times 5 =$

   $(2 \times 5) \times 48 = 10 \times 48 = 480$

4. $25 \times 11 \times 7 \times 4 = (4 \times 25) \times (11 \times 7)$

   $= 100 \times 77$

   $= 7700$

Multiplying & dividing by 4 or 8

This strategy involves repeated doubling & halving.

Examples:

76 x 4

Double 70 = 140
Double 6 = 12
140 + 12 = 156
Double 156 = 312

Or Double twice.
Double 76 = 152
Double 152 = 312

13 x 4

Double 13 = 26 x 4 = Double, Double
Double 26 = 52

12 x 8

Double 12 = 24 x 8 = Double, Double, Double
Double 24 = 48
Double 48 = 96

144 / 4

Half 144 = 72
Half 72 = 36 /4 = Half, Half

848 / 8 Half 848 = 424
Half 424 = 212 /8 = Half, Half, Half
Half 212 = 106

Multiplying by a multiple of ten

By adding zeroes to the end of a number all the digits in the number shift one place value or more to the left.

$43 \times 10 = 430$

$79 \times 100 = 7\,900$

$87 \times 1000 = 87\,000$

$100 \times 1000 = 100\,000$

$9 \times 70 = 9 \times 7 \times 10 = 630$

$40 \times 300 = 4 \times 3 \times 10 \times 100 = 12\,000$