0.1 Division

: is the symbol for divison. Division has three different interpretations, here exemplified by the calculation $12 : 3$:

0.1 The three interpretations of division

- **Distribution of amounts**

  $12 : 3 =$ "The number in each group when evenly distributing 12 into 3 groups"

- **Number of equal terms**

  $12 : 3 =$ "The number of 3's added to make 12"

- **The inverse operation of multiplication**

  $12 : 3 =$ "The number which yields 12 when multiplied by 3"

The language box

A calculation involving division includes a *dividend*, a *divisor* and a *quotient*. In the calculation

$$12 : 3 = 4$$

12 is the dividend, 3 is the divisor and 4 is the quotient.

Common ways of saying $12 : 3$ are

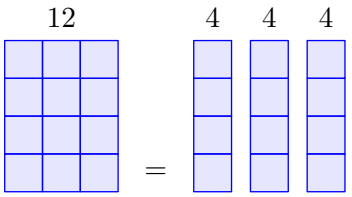
- "12 divided by 3"
- "12 to 3"

In a lot of contexts, / is used instead of :, especially in computer programming.

Sometimes $12 : 3$ is called "the *ratio* of 12 to 3".

Distribution of amounts

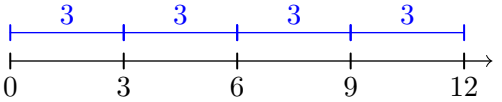
The calculation $12 : 3$ tells that we shall distribute 12 into 3 equal groups:



We observe that each group contains 4 boxes, which means that

$$12 : 3 = 4$$

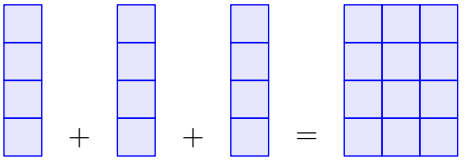
Number of equal terms



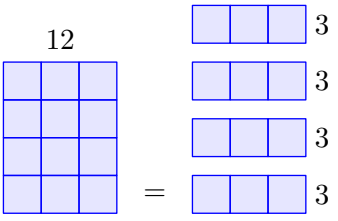
12 equals the sum of 4 instances of 3, that is $12 : 3 = 4$.

The inverse operation of multiplication

We have just seen that if we divide 12 into 3 equal groups, we get 4 in each group. Hence $12 : 3 = 4$. The sum of these groups makes 12:



However, this is the same as multiplying 4 by 3, in other words: If we know that $4 \cdot 3 = 12$, we also know that $12 : 3 = 4$. As well we know that $12 : 4 = 3$.



Example 1

Since $6 \cdot 3 = 18$,

$$18 : 6 = 3$$

$$18 : 3 = 6$$

Example 2

Since $5 \cdot 7 = 35$,

$$35 : 5 = 7$$

$$35 : 7 = 5$$