

MULTIPLICATION

Multiplication is a very important concept in mathematics. It's a way of adding the same number together many times.

A DEFINITIONS

Definition Multiplication

Multiplication is the process of repeated addition. When we multiply, we calculate the total by adding a number to itself a specified number of times.

The $\times$ symbol is called the multiplication or times sign, indicating that the numbers should be multiplied together. Multiplication can be represented in several ways:

- Numbers:

$$4 \times 3 = 12$$

- Groups:

$$4 \text{ groups of } 3 = 12$$

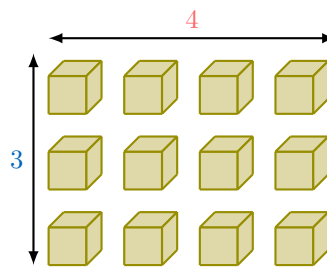
- Repeated addition:

$$3 + 3 + 3 + 3 = 12$$

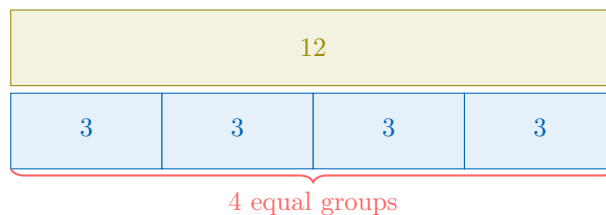
- Words:

four times three equals twelve

- Items:



- Part-whole model:



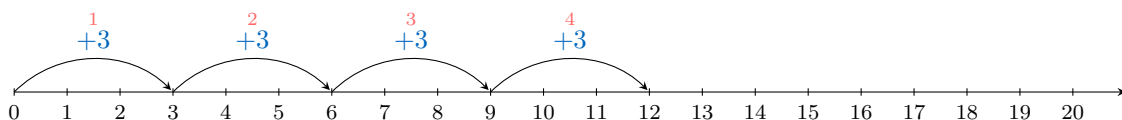
Ex: Write the repeated addition $5 + 5 + 5$ as a multiplication.

Answer: $5 + 5 + 5 = 3 \times 5$

B IN NUMBER LINE

Method Multiplication in number line

To evaluate 4×3 , we start from 0 and we move 3 ones to the right 4 times.



We end up at 12, which is the result of the multiplication 4×3 .

C REPRESENTATION OF MULTIPLICATION IN WORD PROBLEMS

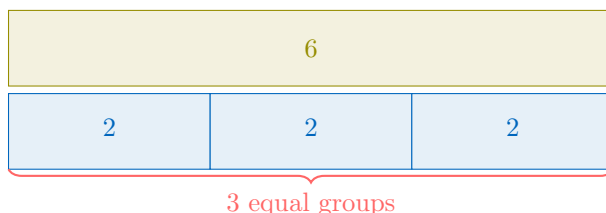
Method Groups of items

When we multiply, we often think about groups and the number of items in each group.

$$\text{number of groups} \times \text{number of items in each group} = \text{total}$$

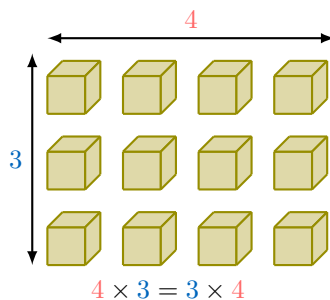
For example, there are 3 bags, and each bag contains 2 apples. The total number of apples is:

$$\begin{aligned} 3 \times 2 &= 2 + 2 + 2 \\ &= 6 \end{aligned}$$



D COMMUTATIVE

Proposition Commutative

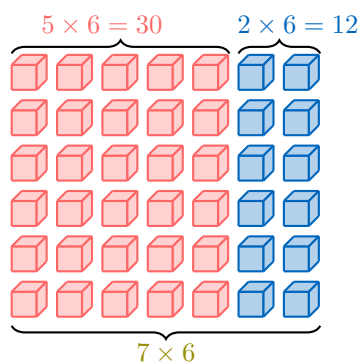


E DISTRIBUTIVE WITH ADDITION

Proposition Distributive with Addition

When multiplying, we can break one of the numbers into smaller parts to make it easier. Then, we multiply each part and add the results. For example:

$$\begin{aligned} 7 \times 6 &= (5 \times 6) + (2 \times 6) \\ &= 30 + 12 \\ &= 42 \end{aligned}$$



Or:

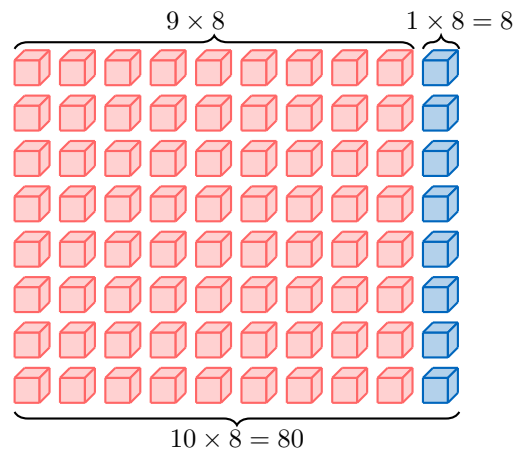
$$\begin{aligned} 6 \times 7 &= (6 \times 5) + (6 \times 2) \\ &= 30 + 12 \\ &= 42 \end{aligned}$$

F DISTRIBUTIVE WITH SUBTRACTION

Proposition Distributive with Subtraction

When multiplying, you can break numbers apart in a way that makes subtraction easier. For example:

$$\begin{aligned}9 \times 8 &= (10 \times 8) - (1 \times 8) \\&= 80 - 8 \\&= 72\end{aligned}$$



Or:

$$\begin{aligned}8 \times 9 &= (8 \times 10) - (8 \times 1) \\&= 80 - 8 \\&= 72\end{aligned}$$