

MULTIPLES

A **multiple** is a number obtained by multiplying other numbers together. For example, the numbers 0, 3, 6, 9, and 12 are all multiples of 3.

$$3 \cdot 0 = 0, 3 \cdot 1 = 3, 3 \cdot 2 = 6, 3 \cdot 3 = 9, 3 \cdot 4 = 12$$

Some numbers are multiples of many numbers.

$$\begin{array}{ll} 1 \cdot 12 = 12 & 12 \text{ is a multiple of 1 and a multiple of 12...} \\ 2 \cdot 6 = 12 & \text{a multiple of 2 and a multiple of 6...} \\ 3 \cdot 4 = 12 & \text{a multiple of 3 and a multiple of 4.} \end{array}$$

FACT: Zero is a multiple of all numbers!

Some numbers are only multiples of themselves and 1. We call this a **prime number**.

$$1 \cdot 13 = 13 \quad 13 \text{ is a multiple of 1 and 3 only.}$$

FACT: Every number is a multiple of 1!

In order to find the common multiple that has the lowest value (**least common multiple**), multiply the highest powers of all the prime factors together.

The LCM of any sized group of numbers can be found.

$$12 = 2 \cdot 2 \cdot 3 = 2^2 \cdot 3$$

$$33 = 3 \cdot 11$$

$$81 = 3 \cdot 3 \cdot 3 \cdot 3 = 3^4$$

The LCM of 12, 33 and 81 is 2^2 (the highest power of the prime factor 2) times 3^4 (the highest power of the prime factor 3) times 11^1 (the highest power of the prime factor 11).

$$2^2 \cdot 3^4 \cdot 11 = 4 \cdot 81 \cdot 11 = 3,564$$

