Finding GCF and LCM

If we write down the factors of 12 and 15, they are:

Factors of 12: **1**, 2, **3**, 4, 6, 12

Factors of 15: **1**, **3**, 5, 15

The common factors of 12 and 15: 1, 3

The **greatest common factor** (abbreviated GCF) is the largest common factor. That is, it is the largest factor common to both lists, which is 3.

Next we define the **least common multiple** (abbreviated LCM) as the smallest common multiple of two different numbers. Given the two numbers 2 and 3, first list the multiples of each:

Multiples of 2: 2, 4, **6**, 8, 10, **12**, 14, ……

Multiples of 3: 3, **6**, 9, **12**, 15, ……

So 6 is the LCM of 2 and 3, since it is the smallest number common to both lists of multiples.

Example 1

Find the greatest common factor of 48 and 72.

🔵 **Explanation**

Method 1:

factors of 72: **1**, **2**, **3**, **4**, **6**, **8**, **12**, **24**, 9, 18, 36, 72

factors of 48: **1**, **2**, **3**, **4**, **6**, **8**, **12**, **24**, 16, 48

The common factor of 48 and 72: 1, 2, 3, 4, 6, 8, 12, 24

Therefore, the greatest common factor of 48 and 72 is **24**.

Method 2:

List the **prime factors**, then multiply the **common** prime factors.

72 = **2** × **2** × **2** × **3** × 3

48 = **2** × **2** × **2** × **3** × 2

2 × 2 × 2 × 3 = 24

Therefore, the greatest common factor of 48 and 72 is **2 × 2 × 2 × 3 = 24**.

Example 2

Find the lowest common multiple of 12 and 9.

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Explanation

Method 1:

multiples of 12: 12, 24, **36**, 48, 60, **72,** 84, ……

multiples of 9: 9, 18, 27, **36**, 45, 54, 63, **72**, ……

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The common multiples of 12 and 9:

36, **72**, ……

Therefore, the lowest common multiple of 12 and 9 is **36**.

Method 2:

First **do a factorization to prime factors, with the factors lined up according to occurrence.**

Then carry down **all** the factors and then multiply.

12 = **3** × 2 × 2

 9 = **3** × 3

3 × 3 × 2 × 2 = 36

Therefore, the lowest common multiple of 12 and 9 is **3 × 3 × 2 × 2 = 36.**