

The Greatest Common Factor

The greatest common factor of two or more whole numbers is the **largest whole number** that divides evenly into each of the numbers. There are **two ways** to find the greatest common factor.

The **first method** is to list all of the factors of each number, then list the **common factors** and choose the largest one.

Example:

Find the GCF of 36 and 54.

The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, and 36.

The factors of 54 are 1, 2, 3, 6, 9, 18, 27, and 54.

The **common factors** of 36 and 54 are 1, 2, 3, 6, 9, 18

Although the numbers in **bold** are all common factors of both 36 and 54, 18 is the greatest common factor.

The **second method** for finding the greatest common factor is to list the **prime factors**, then multiply the common prime factors.

Example:

Let's use the same numbers, 36 and 54 again to find their greatest common multiple.

The prime factorization of 36 is $2 \times 2 \times 3 \times 3$

The prime factorization of 54 is $2 \times 3 \times 3 \times 3$

Notice that the prime factorizations of 36 and 54 both have **one 2** and **two 3s** in common. So, we simply **multiply** these common prime factors to find the greatest common factor. **Like this...**

$$2 \times 3 \times 3 = 18$$

Both methods for finding the greatest common factor work!

Activity 29

Greatest Common Factor

Find the GCF for the following problems

Numbers	Factors	Greatest Common Factor
16 14		
16 12		
8 12		
18 6		
18 12		
20 15		
16 6		
15 10		
4 8		
8 16		

The Least Common Multiple

The Least Common Multiple (LCM) of two numbers, a and b, is the smallest whole number that is divisible by both of the numbers.

Example: Find the Least Common Multiple of 6 and 20.

Multiples of 6: 6, 12, 18, 24, 30, 36, 42, 48, 54, ...

Multiples of 9: 9, 18, 27, 36, 45, 54, 63, ...

Common Multiples: 18, 36, 54, ...

Least Common Multiple is the smallest of these is 18

Another method for finding the LCM.

Multiply the two numbers together. Then divide by their Greatest Common Factor (GCF).

Example: Find the LCM of 6 and 9. (Note: the GCF is 3.)

Multiply: $6 \times 9 = 54$. Divide by the GCF of 3: $54/3 = 18$. (Same answer as the first method.)

There are other methods but this is enough for now.

Practice: Find the Least Common Multiple for each pair of numbers.

1. 5 and 7
2. 6 and 14
3. 10 and 25
4. 4 and 16
5. 9 and 15
6. 12 and 18