

Chapter 3 Section 1

LEAST COMMON MULTIPLE AND GREATEST COMMON FACTOR

LEAST COMMON MULTIPLE (Most popular as “LCM”)

Lets start this section recalling what are “the multiples of a number”.

The multiples of a number are the products of the number and the numbers “1,2,3,4...”

For instance:

$$8 \cdot 1 = 8$$

$$8 \cdot 2 = 16$$

$$8 \cdot 3 = 24$$

$$8 \cdot 4 = 32$$

$$8 \cdot 5 = 40$$

$$8 \cdot 6 = 48$$

$$8 \cdot 7 = 56$$

$$8 \cdot 8 = 64$$

$$8 \cdot 9 = 72$$

$$8 \cdot 10 = 80$$

All the results above (8,16,**24**,32,40,**48**,56,64,**72**,80...) are **multiple** of **8**.

Now, lets check the **multiples** of **6**:

$$6 \cdot 1 = 6$$

$$6 \cdot 2 = 12$$

$$6 \cdot 3 = 18$$

$$6 \cdot 4 = 24$$

$$6 \cdot 5 = 30$$

$$6 \cdot 6 = 36$$

$$6 \cdot 7 = 42$$

$$6 \cdot 8 = 48$$

$$6 \cdot 9 = 54$$

$$6 \cdot 10 = 60$$

$$6 \cdot 11 = 66$$

$$6 \cdot 12 = 72$$

The **multiples** of **6** are: 6,12,18,**24**,30,36,42,**48**,54,60,66,**72**...

Did you realize **24,48** and **72** are common multiples of 8 and 6?

But what is a **Least common multiple**?

It is the least number among the common multiples.

Since the least number among **24**, **48** and **72** is “**24**”, the LCM of 8 and 6 is **24**.

We can find the **LCM** using the list of numbers (as we did), or using the **prime factorization** (or bases) of each number.

To find the **LCM** of 8 and 6 using **prime factorization** (or bases of the numbers):

Write the prime factorization (bases) of each number $6 = 2 \cdot 3$ $8 = 2 \cdot 2 \cdot 2 = 2^3$

Circle the **HIGHEST** power of each prime factor. $6 = 2 \cdot \textcircled{3}$ $8 = \textcircled{2^3}$

The **LCM** is the product of the emboldened factors: $\mathbf{3} \cdot \mathbf{2^3} = 24$

GREATEST COMMON FACTOR (Most popular known as **GCF**)

We need to recall what is a factor of a number. **The factor of a number is a number that divides another number evenly.**

24 can be divided by **1,2,3,4,6,8, 12** and 24. So 1,2,3,6, 8,12 and 24 are factors of 24.

36 can be divided by **1,2,3,4,6,9,12,18** and 36. So 1,2,3,4,6,9,12 and 36 are factors of 36

Did you realize that 1,2,3,4,6, and 12 are common factors of 24 and 36? So the greatest common factor of 24 and 36 is **12**

We can find the **GCF** using the list of factors (as we did), or using the **prime factorization** of each number.

To find the **GCF** of 24 and 36 using factorization:

Write the **prime factorization** (bases) of each number $24 = 2^3 \cdot 3$ $36 = 2^2 \cdot 3^2$

Select the **LOWEST** power of each prime factor. $24 = 2^3 \cdot \mathbf{3}$ $36 = \mathbf{2^2} \cdot 3^2$
(These are the bold numbers)

The **GCF** is the product of the selected factors: $\mathbf{2^2} \cdot \mathbf{3} = 12$