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:

\[
\begin{align*}
8 \cdot 1 &= 8 \\
8 \cdot 2 &= 16 \\
8 \cdot 3 &= 24 \\
8 \cdot 4 &= 32 \\
8 \cdot 5 &= 40 \\
8 \cdot 6 &= 48 \\
8 \cdot 7 &= 56 \\
8 \cdot 8 &= 64 \\
8 \cdot 9 &= 72 \\
8 \cdot 10 &= 80 \\
\end{align*}
\]

All the results above (8,16,\textbf{24},32,40,\textbf{48},56,64,\textbf{72},80…) are multiple of 8.

Now, lets check the multiples of 6:

\[
\begin{align*}
6 \cdot 1 &= 6 \\
6 \cdot 2 &= 12 \\
6 \cdot 3 &= 18 \\
6 \cdot 4 &= 24 \\
6 \cdot 5 &= 30 \\
6 \cdot 6 &= 36 \\
6 \cdot 7 &= 42 \\
6 \cdot 8 &= 48 \\
6 \cdot 9 &= 54 \\
6 \cdot 10 &= 60 \\
6 \cdot 11 &= 66 \\
6 \cdot 12 &= 72 \\
\end{align*}
\]

The multiples of 6 are: 6,12,18,\textbf{24},30,36,42,\textbf{48},54,60,66,\textbf{72}…

Did you realize \textbf{24,48} and \textbf{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 . 3 
8 = 2 . 2 = 2^3 

Circle the HIGHEST power of each prime factor: 
6 = 2 3 
8 = 2^3 

The LCM is the product of the emboldened factors: 
3 . 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 . 3 
36 = 2^2 . 3^3 

Select the LOWEST power of each prime factor. 
(These are the bold numbers) 
24 = 2^3 . 3 
36 = 2^2 . 3^3 

The GCF is the product of the selected factors: 
2^2 . 3 = 12