

Lesson: Greatest Common Factor and Least Common Multiple

Sixth Grade Objective: 1.05 Develop fluency in the use of factors, multiples, exponential notation, and prime factorization

You first need to remember that a **factor** is a number that will divide into another number without a remainder. For example, the number 10 has four factors: 1,2,5,10. Also keep in mind that a **composite number** has more than two factors, for example the number 10 has four factors, 1,2,5,10. A **Prime number** only has two factors, one and itself. For example, the number 3 has 1 and 3 as factors.

We are going to find the GREATEST COMMON FACTOR (GCF)– The largest factor that will divide evenly into a given set of numbers.

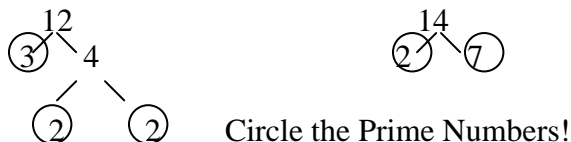
We are also going to find LEAST COMMON MULTIPLE (LCM) – Example, the multiples of 2 are 2, 4, 6, 8, 10 and so on. The multiples of 8 are 8, 16, 24 and so on. The least common multiple of 2 and 8 is 8! (We will learn a new way to find the LCM!)

Let's START!

Find the GCF and LCM of 12 and 14.

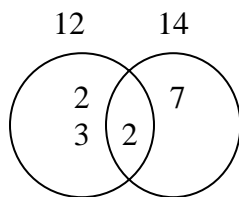
Step 1:

Create factor trees for 12 and 14. Ask yourself what times what equals 12. One answer is $2 \cdot 6$ or you can use $3 \cdot 4$. It doesn't matter what you start with because you will end up with the same prime numbers.



Step 2:

Draw a Venn diagram.



Compare the prime numbers circled in your factor trees. Look for pairs first. The numbers 12 and 14 both have a pair of twos. Place one two in the middle of the diagram to represent the pair of twos on the factor trees. Now look at the factor trees and find any more pairs and do the same. Once you have used the pairs place the uncommon numbers to the left and right of the diagram.

Step 3:

The GCF is the number in the middle of the diagram. If there is more than one then multiply them together to determine the GCF. The GCF for 12 and 14 is 2!

The LCM is the numbers in the diagram multiplied together: $2 \cdot 2 \cdot 3 \cdot 7 = 84$.

*****Many students ask why not list the factors and multiples to determine the GCF and LCM. This method is fine to use but will be more difficult as the numbers get larger!*****

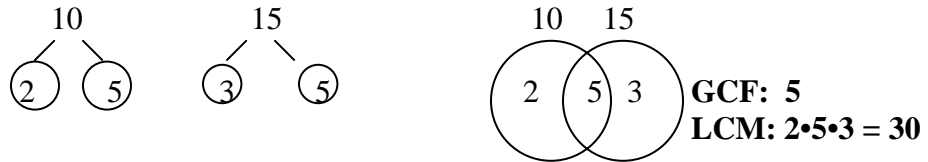
Try these on your own!

Find the GCF and LCM.

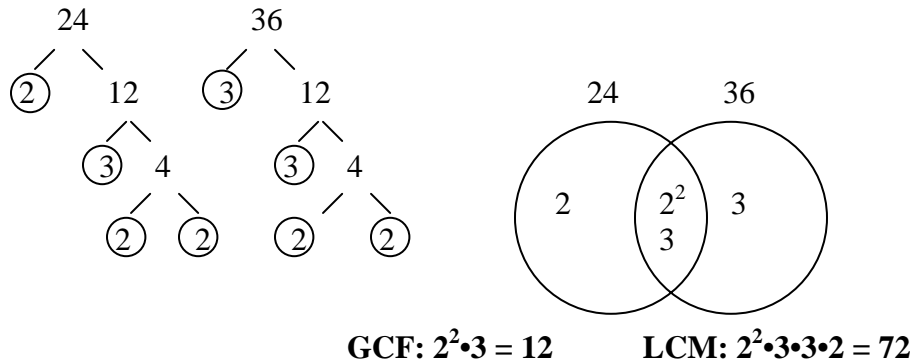
1. 10 and 15 2. 24 and 36

Check your answers!

1. 10 and 15



2. 24 and 36



Look at the middle of the Venn diagram. You will find 2^2 and 3. The reason they are in the middle is because on the factor tree there are two pairs of twos and one pair of threes. (Remember: 2^2 is the same as $2 \cdot 2$) That leaves a two left under the 24 and a three left under the 36 to place on the left and right of the Venn diagram.

Quiz Yourself!

A. Write Prime or Composite

1. 24 _____ 3. 9 _____
 2. 30 _____ 4. 2 _____

B. Find the GCF and LCM.

1. 4 and 22 2. 12 and 46

C. Evaluate.

Mary is working on a school project. She needs to cut two pieces of ribbon of equal length that are as long as possible. One ribbon is 48 inches long and the other ribbon is 72 inches long. How long should she cut each band of ribbon?

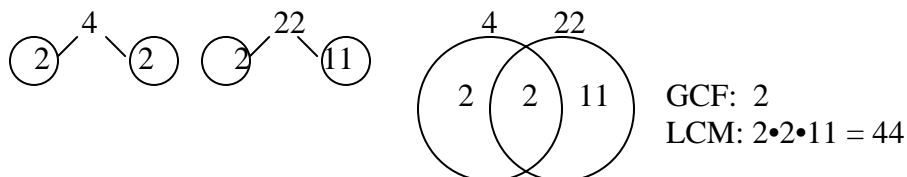
Check Your Answers!

A. Write Prime or Composite

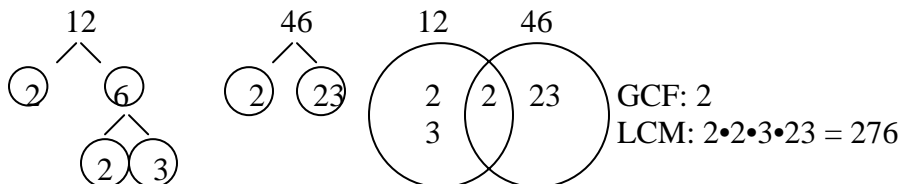
1. 24 Composite (1,2,3,4,6,8,12,24)
2. 9 Composite (1,3,9)
3. 30 Composite (1,2,3,5,6,10,15,30)
4. 2 Prime (1,2)

B. Find the GCF and LCM.

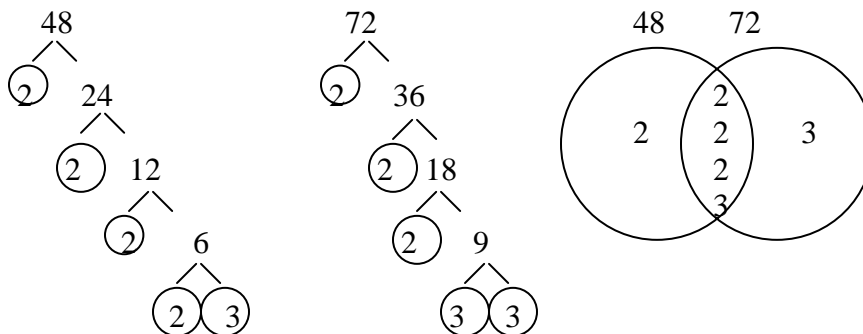
1. 4 and 22



2. 12 and 46



C. What Mary needs to find is the GCF of the two lengths of ribbon?



***Note: In the middle of the Venn diagram you will also see the twos written in exponential form 2^3 ***

Each band of ribbon should be cut into 24 inch pieces because the GCF is $2^3 \cdot 3 = 24$.

Extra Practice! Click on the website.

<http://www.aaamath.com/fra66i-lcm.html>

<http://www.aaaknow.com/exp-eval-exp.htm>

http://nlvm.usu.edu/en/nav/frames_asid_202_g_3_t_1.html