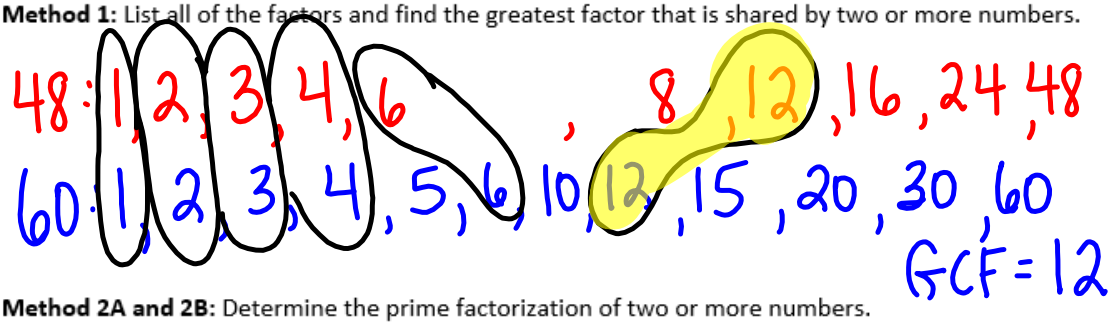
Greatest Common Factor

What is GCF?

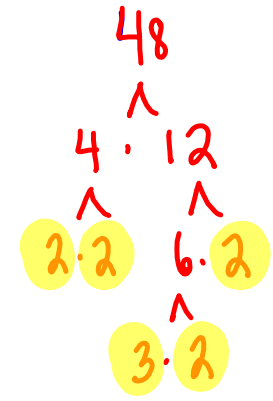
IT IS THE GREATEST FACTOR OF ALL OF THE COMMON FACTORS

It can be found using several methods.

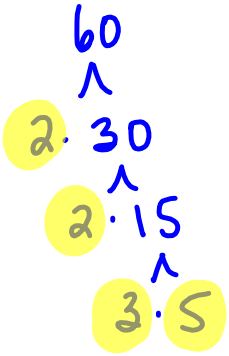
Method 1: List all of the factors and find the greatest factor that is shared by two or more numbers.



Method 2A and 2B: Determine the prime factorization of two or more numbers.



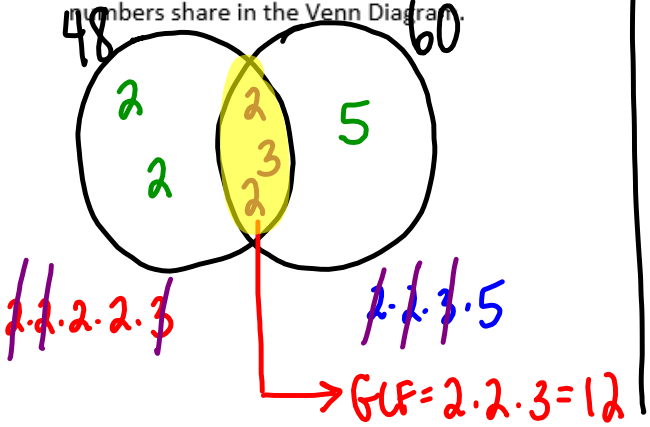
$2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$



$2 \cdot 2 \cdot 3 \cdot 5$

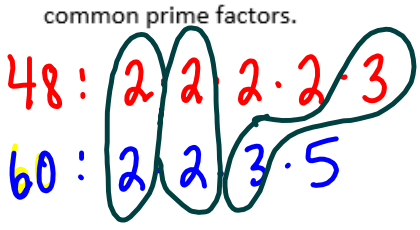
Method 2A:

Using the prime factorizations, fill in a Venn Diagram that shows prime factors that the numbers share and do not share. To determine the GCF, multiply the common prime factors that the numbers share in the Venn Diagram.



Method 2B:

Using the prime factorizations, compare the prime factorizations of the numbers. Identify common prime factors that the numbers share. (Idea: Circle and list the common prime factors.) Multiply the common prime factors.



$GCF = 2 \cdot 2 \cdot 3 = 12$

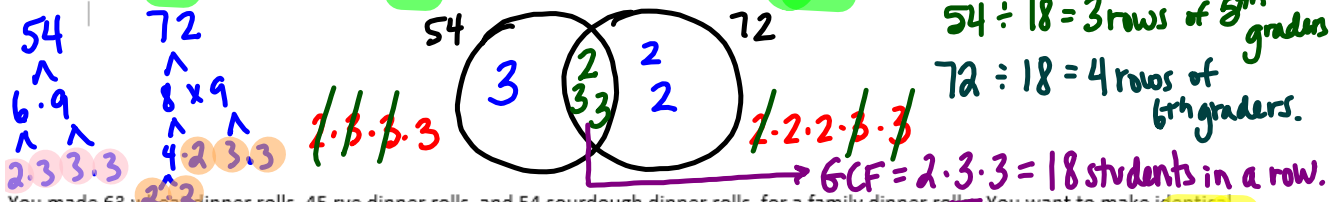
G greatest, biggest, largest — Maximum, most

C Common, same, equal, identical — even, alike

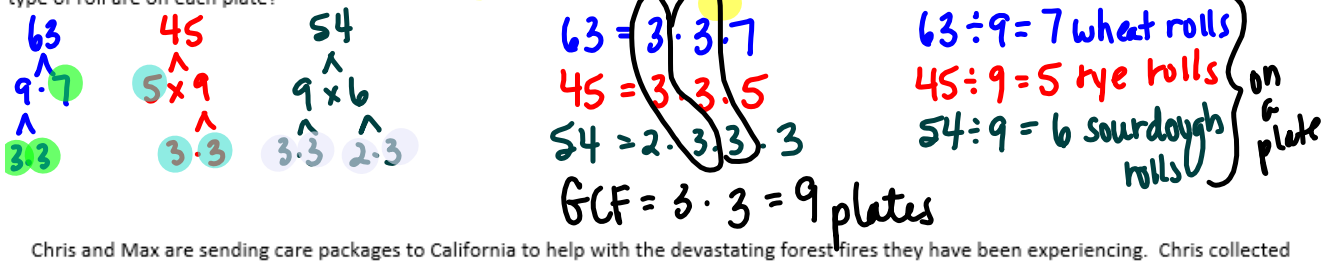
F factor, groups, divided, split — separate, distribute

HINT: Separate into equal groups or separate into an equal number of groups.

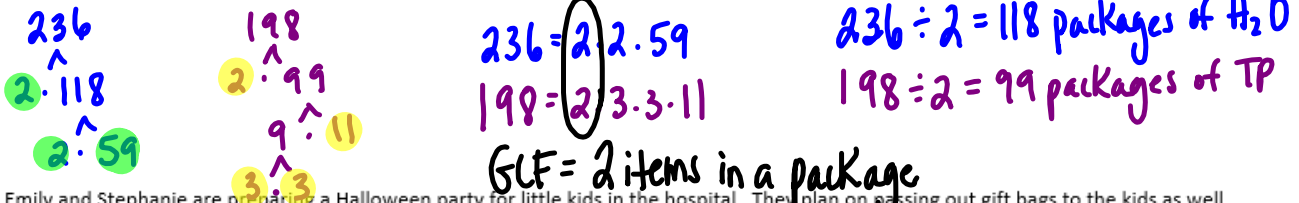
Bill Nye the Science Guy is performing science experiments with the 5th and 6th grade at the Boonshoft Museum of Discovery in Dayton. 54 fifth graders and 72 sixth graders have been selected to attend. Bill requires the students to line up in identical rows with the largest number of students in a row possible without mixing the grade levels because they are doing different experiments. How many students should be in a row? How many 5th grade rows would there be? How many 6th grade groups would there be?



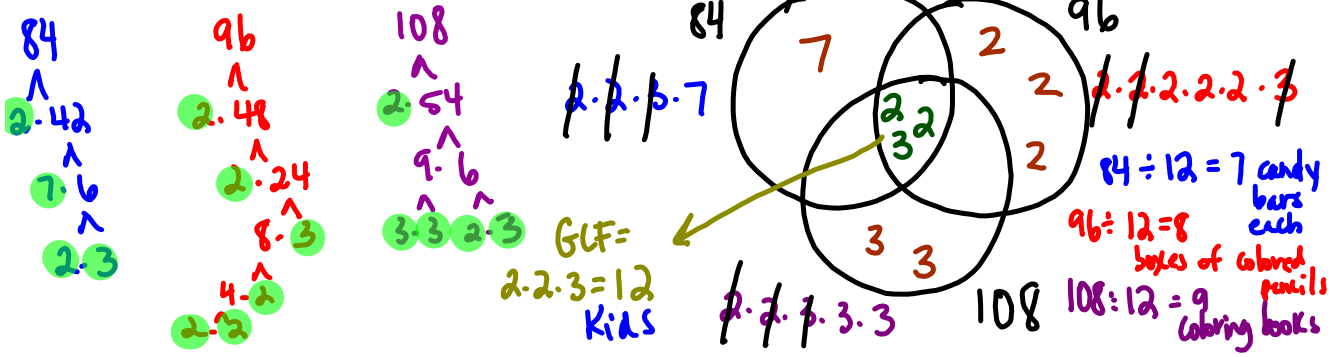
You made 63 wheat dinner rolls, 45 rye dinner rolls, and 54 sourdough dinner rolls, for a family dinner roll. You want to make identical plates of rolls to put on the picnic tables with no leftovers. What is the greatest number of plates that can be made? How many of each type of roll are on each plate?



Chris and Max are sending care packages to California to help with the devastating forest fires they have been experiencing. Chris collected 236 water bottles and Max collected 198 rolls of toilet paper. They are sending the items through the American Red Cross. The American Red Cross is asking that they pack the same number of items in each care package without mixing the items. They also request that they pack the maximum number of items in each package as well. How many items will they put in a package? How many packages of water bottles will there be? How many packages of toilet paper will there be?

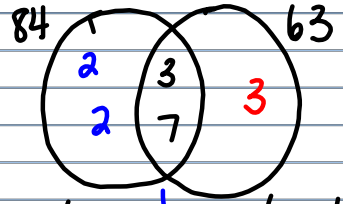


Emily and Stephanie are preparing a Halloween party for little kids in the hospital. They plan on passing out gift bags to the kids as well. They have 84 Hershey's Chocolate Bars, 96 boxes of colored pencils, and 108 coloring books. They divide the items equally among each gift bag. What is the greatest number of little kids that will be able to attend their party so that each kid gets an identical gift bag? How many of each item is in each gift bag?



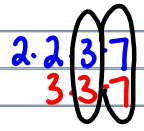
84 = $2 \cdot 2 \cdot 3 \cdot 7$

63 = $3 \cdot 3 \cdot 7$



$2 \cdot 2 \cdot \cancel{3} \cdot \cancel{7}$ $\quad \cancel{3} \cdot 3 \cdot \cancel{7}$

GCF = $3 \cdot 7 = 21$



GCF = $3 \times 7 = 21$

50: 1, 2, 5, 10, 25, 50

99: 1, 3, 9, 11, 33, 99

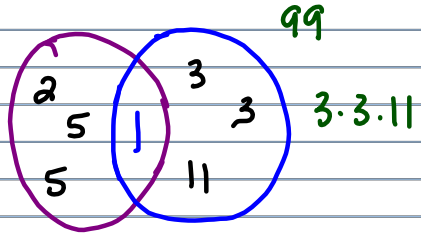
50 = $2 \cdot 5 \cdot 5$

99 = $3 \cdot 3 \cdot 11$

$1 \times 2 \cdot 5 \cdot 5$

$1 \times 3 \cdot 3 \cdot 11$

50 = $2 \cdot 5 \cdot 5$



NOTE to SELF: When two or more numbers have no prime factors in common, they will ALWAYS have the factor of one in common.

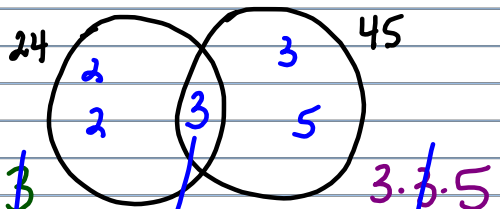
24 = $2 \cdot 2 \cdot 2 \cdot 3$

45 = $3 \cdot 3 \cdot 5$

24 = $2 \cdot 2 \cdot 2 \cdot \cancel{3}$

24 = $\cancel{3} \cdot \cancel{3} \cdot 5$

GCF = 3



$2 \cdot 2 \cdot 2 \cdot \cancel{3}$ $\quad \cancel{3} \cdot \cancel{5}$

GCF = 3