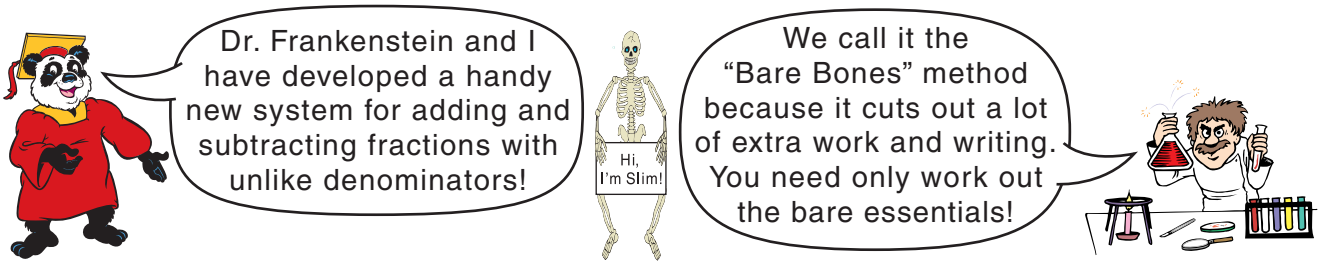
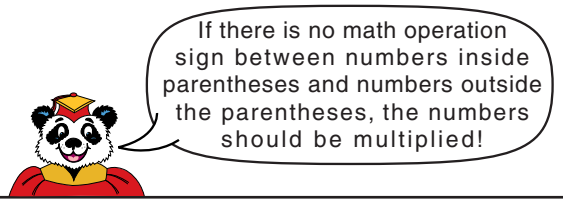
BARE BONES METHOD OF ADDING AND SUBTRACTING WITH UNLIKE DENOMINATORS



Dr. Frankenstein and Professor Panda have made adding and subtracting fractions with different denominators as easy as 1-2-3 and reduce! Just follow the steps below to see how their handy new system works.

STEPS	EXAMPLE
❶ **Factorize and rewrite the problem**: Write the first fraction with the prime factorization of the other fraction's denominator (in parentheses) both above and below the fraction bar. Write the addition or subtraction sign. Then, write the second fraction with the prime factorization of the first fraction's denominator (in parentheses) both above and below the fraction bar.	❶ $\frac{7}{12} + \frac{4}{15} = \frac{7\,(3\times5)}{12\,(3\times5)} + \frac{4\,(2\times2\times3)}{15\,(2\times2\times3)}$ 
❷ **Cancel and multiply**: Cancel any numbers that appear in ***all four sets of parentheses***. After cancelling, multiply the numerators and denominators by the numbers remaining in the parentheses next to them.	❷ $\frac{7}{12} + \frac{4}{15} = \frac{7\,(\cancel{3}\times5)}{12\,(\cancel{3}\times5)} + \frac{4\,(2\times2\times\cancel{3})}{15\,(2\times2\times\cancel{3})}$ $7\times5=35$, $4\times2\times2=16$, $12\times5=60$, $15\times2\times2=60$
❸ **Rewrite and add or subtract**: Use the products from step ❷ to rewite the problem. The fractions should now have a common denominator, so you can add or subtract the numerators and keep the denominator the same!	❸ $= \frac{35}{60} + \frac{16}{60} = \frac{51}{60}$
❹ **After finishing step ❸ check to see if your answer needs to be reduced.**	❹ $\frac{51}{60} = \frac{51\div3}{60\div3} = \frac{17}{20}$
Here's another example. Remember, cancel only factors that appear in ***all four sets of parentheses***. If all the numbers in the parentheses get cancelled, just multiply by one. Tip: If you find the GCF of the two denominators, you can fill the parentheses with factorizations that use the GCF instead of prime factorizing.	**EXAMPLE 2** $\frac{5}{6} - \frac{11}{30} = \frac{5\,(\cancel{2}\times\cancel{3}\times5)}{6\,(\cancel{2}\times\cancel{3}\times5)} - \frac{11\,(\cancel{2}\times\cancel{3})}{30\,(\cancel{2}\times\cancel{3})}$ $5\times5=25$, $11\times1=11$, $6\times5=30$, $30\times1=30$ $= \frac{25}{30} - \frac{11}{30} = \frac{14}{30} = \frac{7}{15}$