



TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION



Southern Nevada Regional Professional Development Program
January 2006 — Middle School Edition

www.rpd.net

Students often have difficulty finding the least common denominator when they do arithmetic with fractions. In this issue of *Take It to the MAT*, we'll discuss common denominators and whether the least common denominator is that important.

When adding or subtracting fractions, like $\frac{1}{6} + \frac{3}{8}$, we must have a common denominator. The denominators are much like units of measure, so they must be alike in order to combine the numerators. Adding the fractions $\frac{1}{6}$ and $\frac{3}{8}$ without a common denominator would be like trying combine 1 yard and 3 inches using a single unit of measure without converting one of them first.

So, when it's time to add/subtract fractions with unlike denominators we have two options:

- (1) Find *a* common denominator.
- (2) Find *the least* common denominator.

Finding *a* common denominator is easy—simply multiply the denominators. When finding the sum

$\frac{1}{6} + \frac{3}{8}$, we could use 48 as a common denominator. Some teachers call this the *quick* common denominator. When rewritten with common denominators, we get $\frac{1}{6} + \frac{3}{8} = \frac{8}{48} + \frac{18}{48} = \frac{26}{48}$. The final sum simplifies to $\frac{13}{24}$.

There are several methods to find the least common denominator, which is the *least common multiple* of the denominators. The most basic is to write multiples of each denominator and find the *least* that is *common* to both lists. For our denominators, 6 and 8, the first several multiples are:

of 6:	6	12	18	24	30	36	42	48	54	60	66	72
of 8:	8	16	24	32	40	48	56	64	72	80	96	108

There are many common multiples, but 24 is the *least*. (Notice the *quick* common multiple of 48.) Using

24 as a common denominator, we get $\frac{1}{6} + \frac{3}{8} = \frac{4}{24} + \frac{9}{24} = \frac{13}{24}$. We get the same result as before, except that we didn't have to simplify our sum; $\frac{13}{24}$ is already in simplest form.

That's the catch to using the *quick* common denominator. If the two denominators have a common factor, as they do in this case—it's 2—then the sum/difference will have to be simplified. This is not to say we won't have to simplify the sum/difference if we use the *least* common denominator; sometimes we will, sometimes we won't. It just depends on the values of the numerators.

There are times when finding the least common denominator is preferable to using the quick common denominator, and vice versa. It comes down to a matter of time and the potential for mistakes. Using the quick common denominator always works, but may require some serious computation. Finding the least common denominator may save us from a lot of computation, but finding it can be tedious. Next time we'll look at a few ways to find the least common denominator other than the method used above.