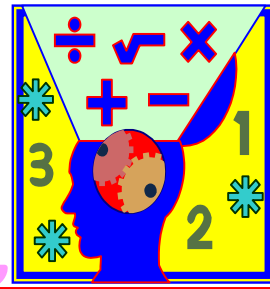


# Algebra Connections



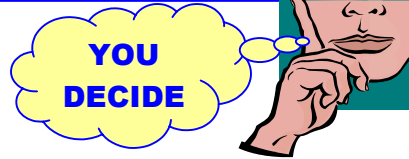
Mr. Breitsprecher's Edition

January 18, 2005

FREE!

**Different Views  
Same Concept**

## LCM & LCD



Some of us have a hard time learning algebra because we get to caught up worrying about "the right way" or "best way." The truth is that there are many ways to look at applying algebra concepts.

Textbooks are written to present algebra from a certain viewpoint - on that "leads" students through the lessons. Sometimes, trying to look at an idea from a different point of view is helpful.

A good example of this is how textbooks present **Least Common Multiple**, which happens to be the same thing as the **Lowest Common Denominator**. In **Beginning Algebra** class, K Elayn Martin-Gay's text starts her presentation with factoring and building the Least Common Multiple.

She presents fractions and lowest common denominators next and wants to start students thinking about factoring early, she starts with a great deal of information about prime factorization. Another class or book might have empathized prime factorization later - students can find the Least Common Multiple/Lowest Common Denominator without a detailed review of factoring.

Which is better? It's six versus a half-dozen - you can decide for yourself. What is important is that we practice procedures until we are comfortable and reasonably accurate. For many students in **Beginning Algebra**, the class will become easier if we practice our homework one-on-one with someone that knows the material - your instructor or the Math Center at UW-W are great places to start.

Textbooks and classroom lectures emphasize a method that "leads"

people to the next topic. Working outside of class, one-on-one or in small study groups, allows us to focus on sharing **DIFFERENT** ways to look at procedures - perhaps ways that are more compatible with a person's strengths or learning styles. Here are 2 ways to look at a basic algebraic skill that is necessary for success in a college level algebra class.

### Point Counterpoint: *Least Common Multiple = Lowest Common Denominator*

**Method 1.** The Least (or Lowest) Common Multiple (LCM) is the smallest number that two or more numbers will divide into evenly. The LCM also represents the simplest, or Lowest Common Denominator, when we need to add or subtract fractions. To find the LCM/LCD:

1. Find the Greatest Common Factor (GCF) of the numbers or the largest number that divides evenly into both numbers.
2. Multiply the numbers together
3. Divide the product of the numbers by the Greatest Common Factor.

**Example:** Find the LCM of 15 and 12

1. Determine the Greatest Common Factor of 15 and 12 which is 3
2. Either multiply the numbers and divide by the GCF ( $15 \cdot 12 = 180$ ,  $180/3 = 60$ )
3. OR - Divide one of the numbers by the GCF and multiply the answer times the other number ( $15/3 = 5$ ,  $5 \cdot 12 = 60$ )

**Method 2:** Because we can only add or subtract fractions if they represent the same pieces of the whole

(same denominators), finding the lowest common denominator (LCD) is important. The lowest common denominator is also the least common multiple. Here is a short review on how to find the LCD (which is the LCM), so that we can create equivalent fractions that maintain their original identify.

1. Factor each denominator into its prime factors
2. Build the LCD
  - a. Each unique prime factor must appear at least once
  - b. Raise factors to the highest power it appears in any one of the original denominators

**Example:** Find the lowest common denominator between fractions that have the denominators of 15 and 12.

1. Prime factors of 15 =  $3 \cdot 5$ . Prime factors of 12 =  $2 \cdot 2 \cdot 3$
2. Using EACH prime factor (step 2a) and raising each to the highest power it appears in the original denominator, we get:  $2^2 \cdot 3 \cdot 5 = 60$ .

Which of these 2 approaches is "best"? You will have to decide for yourself - note that our textbook presents the process in a manner similar to Method 2. Finding alternative ways to learn can be helpful. Sometimes, working with another person is the best way to look at your options - it is often the only way that someone can see the best way to "teach" a complex process, procedure, or idea. Many believe that this "self-understanding" is the real value of higher-level math classes. Isn't this really what a college education is all about?

**Math Center**



**Basement of McCutchan Hall, Rm. 1; Mon-Thurs: 9 a.m. - 9 p.m.  
Fri: 9 a.m. - 3 p.m. and Sun 5 p.m. - 9 p.m.**