

# The 7 Forms of Factoring

CENTER FOR ACADEMIC SUPPORT \* LRC 213 \* 271-4524

**A. Introduction:** Factoring is perhaps the most important skill you will need for much of Beginning Algebra, Intermediate Algebra, and even College Algebra and Finite Math. Let's look briefly at what it means to factor.

## **B. The Meaning of "to factor."**

"To factor" means, "to rewrite as a product (things being multiplied)."

For instance, if we were to rewrite 12 as  $9 + 3$ , we would be rewriting it as a SUM (things being added, or as terms).

However, if we choose to rewrite 12 as  $3 * 4$ , we would be rewriting it as a PRODUCT (things being multiplied).

Then, we could make the following observations:

1. We factored the 12 as  $3 * 4$ .
2. And, 3 and 4 are factors of 12.

## **C. Why Do We Factor?**

There are a number of reasons why we factor but perhaps the two most important are:

1. We factor in order to simplify or reduce algebraic expressions so they are simpler and easier to work with.
2. We also factor in order that we may rewrite an equation so it fits the ZERO-FACTOR PROPERTY. The Zero- Factor Property, very simply put, says that if the product of two "things" is zero, then one or both of the "things" must be zero. This allows us to set each of the "things" equal to zero and to solve equations we were not able to previously solve.

## **D. How to Master Factoring**

As a warning, if you don't master it quickly, you will fall behind in understanding and applying new skills and concepts since so many of them will involve factoring. I suggest the following approach:

1. Memorize the names of the 7 Forms of Factoring given on the next page.
2. Notice how the name of each describes the structure or appearance of the next factoring form.

3. Think of each of the 7 Factoring Forms as a separate "room" in the larger "house" of Factoring.
4. In order to factor, we use a different procedure in each room. When you know which room you're in, then you can know what to do.

This approach of giving attention to the names and accompanying structures is critical for success in your long-range math goals of completing the core requirement.

### E. The 7 Forms of Factoring

Always

1. Greatest Common Factor (G. C. F.)

2. Difference of Two Squares

2 Terms

3. Difference of Two Cubes

4. Sum of Two Cubes

3 Terms

5. Perfect Square Trinomial

6. A Quadratic Trinomial

4 Terms

7. Factor by Grouping

Note: As you factor, you will be following a certain pattern:  
Always check for the Greatest Common Factor, and do that first.  
Then, look at what remains.

- Is it Two Terms? Then look to see if it fits the structure of #2, #3, or #4 above.
- Is it Three Terms? See if it fits the structure of #5 or #6.
- Is it Four Terms? Then it may be #7, Factor by Grouping.

For specific examples of each of the above, please feel free to get the video from the IMC or come to the Center for Academic Support for help.