Factoring and the Greatest Common Factor

The GCF of a pair of numbers is the largest number that both numbers can be divided by evenly. There are several schemes for finding this.

The Stacking Method

First factor each number to primes, then stack the numbers in columns, make a new column for each new factor. Then strike down the columns and don’t double count anything stacked. Multiply each number in a fully stacked column.

For example (8, 12)

08 = 2 x 2 x 2

12 = 2 x 2 x 3

Run a vertical line through the first twos…this is one 2 and the second, another two. The other two columns only have one entry so we skip those. 4 is the largest number that divides both 8 and 12 evenly.

Sometimes there are more than two numbers:

 with 3 numbers, you will use any column that has THREE entries and ignore the ones with 2 or 1 entries.

3 x 5 x x

3 x x x

 5 x x y

So “x” is the GCF.

Sometimes the numbers are relatively prime – there is no GCF other than one, the universal GCF.

(3, 11)

(x, 2y)

With factoring polynomials, you are “unmultiplying”

Factor the GCF out of



x x x x x x

x x 3 y

x x 5

two fully stacked columns!

Let’s look at

 

Not every GCF is a monomial.

This is then, undoing the polynomial multiplication

Sometimes, with FOIL, the O + I terms are not like and they don’t add down to one term:



Successive UNdistribution is the key here.

And there are some famous ones like the Difference of Two Squares where the O + I terms add to zero.



Sometimes there’s just a pattern to the work.

Suppose you have a trinomial. You can factor it back to the product of two binomials in a variety of ways. Here’s one.



Find two numbers that add to 5 and multiply to 4. 2 and 2 multiply correctly but don’t add up right. So use 4 and 1.

Because the coefficient of x squared is ONE…we got it.



But what about when the coefficient is NOT one? Well there’s one more step to the process.

 Set up two factors 

Find two numbers that multiply to negative 3 and add to 1. We’ll use 3 and negative 2. Put these in the factors  NOW factor out the GCF and

Now take a moment to check for the Sum of Two Cubes and the Difference of Two Cubes on the internet.

And we’re done with factoring except for practicing.

Find the GCF

(9, 48)

(5, 29)

(25, 85)

 (16, 32, 52)

(





Factor



Check with me or with the tutors in CASA, please