Algebra I
Lesson 8.01 – Factoring
Mrs. Snow, Instructor

Factors are the numbers you multiply together to get another number. The number 15, for example has the factor pair of 3 and 5 because $3 \times 5 = 15$. If we look at 16, there are several factor pairs: $1 \times 16,\ 2 \times 8, and\ \ 4 \times 4$. Are there possibly other factorizations of 16?

Another form of factorization is **prime factorization**; breaking down a number into a set of factors that are prime and when all multiplied the resultant product is the given number. The prime factorization of $15\ is\ 3 \times 5$, while the prime factorization of $16\ is\ 2 \times 2 \times 2 \times 2$. Understand that 2 is not the prime factorization of 16. 2 is a factor of 16. To accurately state the prime factorization of 16 you need to list all factors→ $2 \times 2 \times 2 \times 2$.

In algebra you need to be able to determine both basic factor pairs of a number and its prime factorization.

To find the prime factorization of a number, follow the process outlined below. The **"L – Method."**

Here are some important divisibility rules you will want to use

- If the number is even, then it's divisible by 2.
- If the number's digits sum to a number that's divisible by 3, then the number itself is divisible by 3.
- If the number ends with a 0 or a 5, then it's divisible by 5.

Find the prime factorization of 1050 $\cdot$ 1050 2 $\cdot$ 525 3 $\cdot$ 175 5 $\cdot$ 35 5 $\cdot$ 7	1. 1 is not considered a prime number, but if there is a negative, we will need to take that into consideration when we start the factoring. 2. Follow with the first prime number 2, when all 2 factors are exhausted move on to the next prime number. $(2, 3, 5, 7, 11, 13, ???)$ 3. Continue this process until the factor pair is a prime number times a prime number. 4. Box the prime factors and it is the shape of an **L**	Try: 1092

Greatest Common Factor

When given 2 or more numbers, we can find a set of factors that each number has in common. The factor we want to find is the **Greatest Common Factor, GCF**; this is the biggest number that will factor out of each number. The GCF will be the number that has all of the factors in common with each of the numbers. AND!!! The GCF can include variables too! Hummmmm.

Here we will use the rest of the **"L Method" "lunch and leftovers."** Lunch is what each term has in common; the leftovers are as said left over. In section 8.2 we will look at our "left overs."

<table>
<tr>
<td>What is the GCF of $18g^2 \ and \ 27g^3$

$\cdot 18$ $27 \quad g$
$2 \quad \cdot 9 \quad g$ $3 \quad \cdot 9 \quad g$
$3 \quad \cdot 3 \quad g$ $3 \cdot 3 \quad g$

common to each monomial:
(lunch)</td>
<td>1. Factor each number and expand each variable. Note: the factor of 1 is understood (we don’t need to list it)
2. Now use “lunch and leftovers” pick out lunch – what is in common with each monomial
3. Write down your “lunch.” The “leftovers,” we will have later on!</td>
<td>Try:
$27y^3 \qquad 18y^2 \qquad 81y$</td>
</tr>
<tr>
<td>$210x^3 \qquad 140x^5$</td>
<td>$40r^2 \qquad 56r^3s$</td>
<td>$2p^4r \qquad 8p^3r^2 \qquad 16p^2r^3$</td>
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