Coreq Support for Section 1.4

Topic 1: Multiplying Binomials
(Video: Multiplying Polynomials 3:40 – 8:06)

To multiply two binomials, we must use the distributive property. We saw in a previous section that one way to apply the distributive property to multiply two binomials is to use the FOIL method.

Topic 2: Factoring a Greatest Common Factor
(Video: Greatest Common Factor and Factoring by Grouping 0:00 – 14:00)

The first step to factoring a polynomial is to check to see if there is a **greatest common factor** (GCF) that can be factored out of each term. The GCF of a list of terms or monomials is the product of the GCF of the numerical coefficients and each GCF of the variable factors.

Topic 3: Factoring by Grouping
(Video: Greatest Common Factor and Factoring by Grouping 14:00 – 20:46)

Sometimes it is possible to factor a polynomial by grouping the terms of the polynomial and looking for common factors in each group. This method of factoring is called factoring by grouping. In particular, look to see if factoring by grouping will work when the polynomial has four terms.

Topic 4: Factoring Trinomials of the Form $x^2 + bx + c$
(Video: Factoring Trinomials of the Form $x^2 + bx + c$)

Consider the quadratic expression $x^2 + 3x - 10$. Since $(x-2)(x+5) = x^2 + 3x - 10$, we say that $(x-2)(x+5)$ is a **factored form** of $x^2 + 3x - 10$.

The factored form of a quadratic expression is the product of two linear factors and possibly a constant. If a quadratic expression cannot be factored over the integers, then we say that it is **prime**.

Topic 5: Factoring Trinomials of the Form ax^2+bx+c
(Video: Factoring Trinomials of the Form ax^2+bx+c)

When the leading coefficient, a, is not equal to one, we will use one of two methods to factor the expression. The first is trial and error. Trial and error can be an efficient choice when a and c do not have many factor pairs.

Another method that can be used is factoring by grouping by first rewriting the trinomial as a four-term polynomial. This method is sometimes referred to as splitting the linear term or the ac method.

Steps For Factoring a Trinomial of the Form ax^2+bx+c by Grouping:

Step 1: Find two numbers that have a product of $a \cdot c$ and a sum of b.
Step 2: Write the term bx as a sum using the numbers found in Step 1.
Step 3: Factor by grouping.

Topic 6: Factoring the Difference of Squares
(Video: Factoring Binomials)

A binomial is a **difference of two squares** when it is the difference of the square of some quantity a and the square of some quantity b.

Difference of two squares:

$$a^2-b^2=(a+b)(a-b)$$

Topic 7: Simplifying Square Roots
(Video: Simplifying Square Roots)

A square root is simplified when the radicand contains no perfect square factors other than 1. For example, $\sqrt{20}$ is not simplified because $\sqrt{20} = \sqrt{4 \cdot 5}$ and 4 is a perfect square.

Product Rule for Square Roots:
If $\sqrt{a}$ and $\sqrt{b}$ are real numbers, then

$$\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b} .$$

Applying this rule, we can simplify $\sqrt{20}$ as follows:

$$\sqrt{20} = \sqrt{4 \cdot 5} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$$

Topic 8: Evaluating Expressions that Contain Exponents
(Video: Exponents 0:00 – 7:10)