2.1N – Factoring with the GCF and Grouping

Factoring:

Greatest Common Factor (GCF):

Prime Polynomial:

Factoring Out a Common Factor:

- Find the GCF.
- Use the distributive property in reverse to "factor out" the GCF:
  - Write the GCF outside a set of parentheses.
  - Inside the parentheses, write what you are left with when you *divide* the original terms by the GCF.
  - **Note:** If the GCF is the same as one of the terms of the polynomial, there will be a 1 left inside the parentheses.
- When the leading coefficient is negative, factor out a common factor with a negative coefficient.

Examples: Factor the following expressions**.**

a) x^2+3x b) $-4n^2-20$ c) $15d^2+20d^4$

d) $2a^2b^3c^4+8a^4b^8c^7-6a^3bc^5$ e) $p(q-6)+2(q-6)$

Factoring by Grouping (4 Terms):

1. Factor out any common factors from all four terms first.
2. Look at the first two terms and the last two terms of the polynomial separately.
3. Factor out the GCF from the first two terms, write a plus sign (or a minus sign if the GCF on the last two terms is negative), then factor out the GCF from the last two terms.
4. You should have the same thing left in both sets of parentheses after you take out the GCFs. Factor out this common binomial factor from the two groups.

Examples: Factor the following expressions.

a) $4v^3-14v^2+12v-42$ b) $15w^3z^2-20w^2z-60wz+80$