Algebra 2 **Name**_____
Notes: 4.4 Factoring Polynomials **Date**_____**Block**_____

Factor Theorem:
A polynomial $f(x)$ _____.

Example 1: Determining Whether a Linear Binomial is a Factor
Determine whether the given binomial is a factor of the polynomial $P(x)$.

A. $(x - 2)$; $(x^2 + 2x - 4)$

B. $(x + 5)$; $(3x^4 + 15x^3 - x^2 + 25)$

Check It Out! Example 1
Determine whether the given binomial is a factor of the polynomial $P(x)$.

A. $(x + 1)$; $(x^2 - 3x + 1)$

B. $(x + 2)$; $(3x^4 + 6x^3 - 5x - 10)$

Factoring, revisited.

What we already know……..

Example 2: Factor each polynomial completely.

A. $x^3 - 4x^2 - 5x$ B. $3y^5 - 48y^3$ C. $5z^4 + 30z^3 + 45z^2$

Check it Out! Example 2
Factor each polynomial completely.

A. $x^3 - 7x^2 + 10x$ B. $3n^7 - 75n^5$ C. $8m^5 - 16m^4 + 8m^3$

Example 3: Factoring by Grouping
Factor: $x^3 - x^2 - 25x + 25$.

Check It Out! Example 3a
Factor: $x^3 - 2x^2 - 9x + 18$.

Factoring the Sum and the Difference of Two Cubes

Sum of Two Cubes: _____

Difference of Two Cubes: _____

Example 4A: Factoring the Sum or Difference of Two Cubes
Factor the expression $x^3 - 125$

Example 4B: Factoring the Sum or Difference of Two Cubes
Factor the expression $16x^5 + 54x^2$

Check It Out! Example 4a
Factor the expression $z^6 + 8$

Check It Out! Example 4b
Factor the expression $2x^5 - 16x^2$