Sec 3.6
Factoring Polynomials

Today we are just using the division process to factor a polynomial function. We need this skill to find the zeros.

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The Remainder Theorem

To determine the remainder of a division without doing the entire division is a simple process of substitution.

EX: $(2x^3 - 5x^2 + 4x - 4) \div (x + 4)$

f(x)=(x+4)(quotient) + (remainder)

f(-4)=

Note: When -4 is subbed into (x+4) it is equal to zero!

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The Factor Theorem

-the Factor Theorem is a special case of the Remainder Theorem when the remainder equals 0.

-to find a factor of a polynomial, find a value of x that gives a remainder 0.
-this factor is found by substituting values of x into f(x) until a solution of 0 is found. This gives a factor of (x-a).

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So... to find a zeros of a cubic or higher polynomial, we first "guess" to find a factor, then divide to find the resultant.

Ex Factor $x^3 - 5x^2 - 2x + 24$ completely.

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Once we know how to factor, then we can graph a cubic given in standard form.

Ex:

Sketch a graph of the function $y = 4x^4 + 6x^3 - 6x^2 - 4x$

Step 1:

Step 2:

Step 3:

Step 4:

Step 5:

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