Sec. 5.6 FIND RATIONAL ZEROS
p. 370 AA2

BIG IDEAS so far through Ch. 5

- Deciding whether a function is a polynomial based on it's exponents, and simplifying powers.
- Performing operations with polynomials. $+, -, x, \div$, using synthetic substitution and division.
- Recognizing types of polynomial graphs and describing their end behaviors, based on the degree and leading coefficient.
- Using special factoring patterns and grouping to factor polynomials and find solutions (zeros) to polynomials

This section is about using the constant term and leading coefficient of a polynomial to make a list of all the possible rational zeros, and then narrowing that list down to find the actual zeros. Last section you were given a zero, and went from there. The theorem below will give you a starting point when you don't know any of the zeros.

Example 1: Find zeros when the leading coefficient is 1

$$f(x) = x^3 - 8x^2 + 11x + 20$$

List the possible rational zeros of *f* using the rational zero theorem.

1. Factors of constant term:

   _____

2. Factors of the leading coefficient:

   _____

3. Possible rational zeros (using $\frac{p}{q}$)

   _____

4. Simplified list of possible zeros.

   _____

NOW: begin testing these zeros using synthetic division, to find the actual zeros.

Example 2: Find zeros when the leading coefficient is not 1

$$f(x) = 10x^4 - 11x^3 - 42x^2 + 7x + 12$$

1. Factors of constant term:

   _____

2. Factors of the leading coefficient:

   _____

3. Possible rational zeros (using $\frac{p}{q}$)

   _____

4. Simplified list of possible zeros.

   _____

5. Graph the function on the graphing calculator and choose reasonable zeros from the list above to test. (yes, you Can get all the zeros from the calculator, however, Mr. Baird said for pre-calc can take two off the calc., and just prove the other two with the method below. ☺)

Check zeros you chose with synthetic division for a remainder of zero, and to find the trinomial left after dividing those zeros out as factors.

Solutions: _____

Factored Form: _____