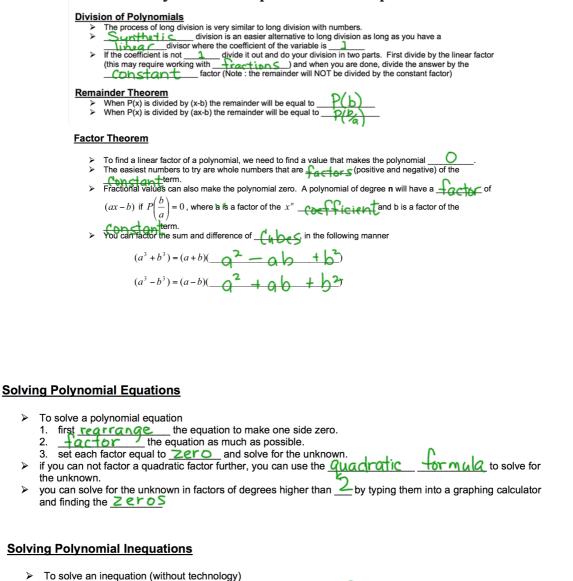Today's Topic : Polynomials Equations and Inequations

Today's Goal : to review topics covered this unit

MHF 4U Chapter 2 Review:
Polynomials Equations & Inequations

Division of Polynomials
➤ The process of long division is very similar to long division with numbers.
➤ __Synthetic__ division is an easier alternative to long division as long as you have a __linear__ divisor where the coefficient of the variable is __1__
➤ If the coefficient is not __1__ divide it out and do your division in two parts. First divide by the linear factor (this may require working with __fractions__) and when you are done, divide the answer by the __constant__ factor (Note : the remainder will NOT be divided by the constant factor)

Remainder Theorem
➤ When P(x) is divided by (x-b) the remainder will be equal to __P(b)__
➤ When P(x) is divided by (ax-b) the remainder will be equal to __$P(b/a)$__

Factor Theorem

➤ To find a linear factor of a polynomial, we need to find a value that makes the polynomial __0__.
➤ The easiest numbers to try are whole numbers that are __factors__ (positive and negative) of the __constant__ term.
➤ Fractional values can also make the polynomial zero. A polynomial of degree **n** will have a __factor__ of $(ax-b)$ if $P\left(\dfrac{b}{a}\right) = 0$, where **a** is a factor of the x^n __coefficient__ and b is a factor of the __constant__ term.
➤ You can factor the sum and difference of __cubes__ in the following manner

$$(a^3 + b^3) = (a+b)(\underline{a^2 - ab + b^2})$$
$$(a^3 - b^3) = (a-b)(\underline{a^2 + ab + b^2})$$

Solving Polynomial Equations

➤ To solve a polynomial equation
  1. first __rearrange__ the equation to make one side zero.
  2. __factor__ the equation as much as possible.
  3. set each factor equal to __zero__ and solve for the unknown.
➤ if you can not factor a quadratic factor further, you can use the __quadratic__ __formula__ to solve for the unknown.
➤ you can solve for the unknown in factors of degrees higher than __2__ by typing them into a graphing calculator and finding the __zeros__

Solving Polynomial Inequations

➤ To solve an inequation (without technology)
  1. follow the steps to solving equations and find all the __zeros__
  2. check the __sign__ of the function in all the intervals between zeros
  3. determine which intervals satisfy the inequation (<0 means the function is __negative__ ; >0 means the function is __positive__)
➤ To solve an inequation (with technology)
  1. arrange the __equation__ so that one side is equal to zero
  2. find all the zeros of the function using **2nd** **TRACE** **2:** __zero__
  3. look at the graphed function to determine when it is >0 (__above__ the x-axis) or <0 (__below__ the x-axis)

Suggested Study Questions
Anything from pages 140 - 143 – don't do them all, but at least look at them and be sure that you know how to do them.
The chapter test is strongly suggested
Key Questions: Pg 140 #6, 11, 13, 16
Pg 142 #7, 10, 13, 17