AA6: Polynomials Notes

Questions	Notes

How do you perform mathematical operations with polynomials?
   ● Addition
$(x^3 + 3x^2 - 2x + 1) + (-4x^3 - x + x^2 - 3)$
 	
   ● Subtraction
$(x^3 + 3x^2 - 2x + 1) - (-4x^3 - x + x^2 - 3)$
 	
   ● Multiplication
$(x - 2)(x^2 + 5x - 6)$
 	
   ● Division
 	
$\dfrac{x^3 - 4x^2 + 2x + 4}{x - 2}$
 	
How do you rewrite rational expressions?
   ● Addition
$\dfrac{x^2+1}{x-1} + \dfrac{x^2+2x-1}{x-1}$
 	
   ● Subtraction
$\dfrac{x^2-1}{x-1} - \dfrac{x^2-2x-1}{x-1}$
 	
   ● Multiplication
$\dfrac{x^2-1}{x+1} \cdot \dfrac{x+1}{x-1}$	

What is the relationship between the Roots and Factors of a Polynomial?
- Use Polynomial Division to find additional roots.

Given that $x = 1$ is one root of the polynomial, $g(x) = x^3 + 2x^2 - 7x + 4$, find the other roots.

- Sketch the graph of a polynomial

Sketch the graph of $f(x) = (x-1)^2(x-2)(x-3)^2$ showing the roots and end behavior.

- Determine if a binomial is a factor of a polynomial

Is $(x-2)$ a factor of $x^3 + 3x^2 + 4x - 8$? Show how you know.

How do you prove identities for Polynomials?
- Difference of two squares

Show that for any values of x and y,
$x^2 - y^2 = (x+y)(x-y)$

- Generalize patterns of multiplication/division with polynomials.

Find a. $\frac{x^2-1}{x-1}$

b. $\frac{x^3-1}{x-1}$

c. $\frac{x^4-1}{x-1}$.

Hence, find a general formula for $\frac{x^n-1}{x-1}$