Advanced Math

Chapter 4 Objectives

4.0 Simplifying Complex Numbers	
I can use the complex conjugate of a number to simplify	0a) Simplify $\frac{2+3i}{1-2i}$
I can simplify complex numbers	0b) Simplify i^{37}
4.1 Polynomial Functions	
I can determine if an expression is a polynomial	1a) Determine if the following are polynomials: $3x^2+4x-7; 4p+p^{-2}; \frac{4}{y}$
I know the definition of a root of a polynomial function	
I can state the number of complex roots of a polynomial function	1b) State the number of complex roots of $6a^4+a^3-2a$ and $3p^2-7p^5-2p^3+5$
I can determine whether or not a given value is a root of a polynomial	1c) Determine whether 1 is a root of $3x-5=0$ 1d) Determine whether -5 is a root of $x^3+2x^2-15x=0$
Given roots, I can write the equation of this function in the lowest degree	1e) Write a polynomial equation of least degree with roots $2i,-2i,3,-3$.
4.2 Quadratic Equations	
I can find the discriminant and determine the type of root based on the value of the discriminant	2a) Find the discriminant of $4x^2-4x-15=0$ and describe the nature of the roots of the equation 2b) Find the discriminant of $3x^2+2x+5=0$ and describe the nature of the roots of the equation.
I can solve a quadratic equation by completing the square	2c) Solve $-4x^2-11x=7$ by completing the square
I can solve a quadratic equation by using the quadratic formula	2d) Solve $5x^2-14x+11=0$ by the using the quadratic equation
4.3 Remainder and Factor Theorems	
I can find the factors of a polynomial equation by using long division	3a) Use long division to factor $\left(2x^3+3x^2-8x+3\right)\div\left(x+3\right)$ completely
I can find the factors of a polynomial equation by using synthetic division	3b) Divide using synthetic division. Write your answer as a polynomial. i. $\left(3x^2+4x-12\right)\div\left(x+5\right)$ ii. $\left(x^4-3x^2+12\right)\div\left(x+1\right)$

I can use the Remainder Theorem to find the remainder and determine whether the binomial is a factor of the polynomial	3c) Find the remainder and state whether the binomial is a factor $\left(2x^4+4x^3-x^2+9\right)\div\left(x+1\right)$
I can find a missing coefficient of a polynomial given a factor	3d) Find k if $\left(x-2\right)$ is a factor of $\left(x^4+kx^3-14x^2\right)$
Given a double root, I can completely factor a polynomial.	3e) Given 2 is a double root of $2x^3 - 7x^2 + 4x + 4$ factor completely.
4.4 Rational Root Theorem	
I can list out all possible rational roots	4a) List the possible rational roots of $x^3+3x^2-6x-8=0$
I can use my calculator to guess and check the correct rational roots of a polynomial	4b) Guess and check the rational roots of 4a
I can find all the rational roots of a polynomial	4c) Find the rational roots of the polynomial in 4a
I can find all complex roots (real and imaginary) of a polynomial	4d) Determine all the complex roots of $f\left(x\right)=x^3-2x^2-19x+20$ $f\left(x\right)=36x^4-13x^2+1$
4.6 Rational Equations and Partial Equations	
I can identify the excluded values of an equation or inequality	6a) Solve for x: $\frac{3x}{2x+1}-\frac{4}{2x-1}=1$. Don't forget excluded values!
I can solve rational equations	
I can decompose a fraction into partial fractions	6b) Decompose $\frac{-3x-29}{x^2-4x-21}$ in partial fractions.
I can solve a rational inequality	6c) Solve for x: $\frac{2x}{4}-\frac{5x+1}{3}>3$
4.7 Radical Equations and Inequalities	
I can solve radical equations	7a) Solve $\sqrt{x-2}=6$ and $\sqrt{6x+12}-\sqrt{4x+9}=1$
I can solve radical inequalities	7b) Solve $\sqrt{3r+5}>1$ and $\sqrt{2t-3}<5$
I can determine extraneous solutions to radical equations and inequalities	

Good luck on the test!