PreCalculus Name: Period: Date:

10/28

Lesson 3-5b: Complex Zeros II

Objective
Students will…
- Be able to find polynomials with specified zeros.
- Be able to understand what Conjugate Zeros Theorem says and use it to find polynomials.

Finding Polynomials with Specified Zeros
We have been learning how to factor a polynomial in order to find its zeros. The backward process can also be done. Consider a polynomial *P* with zeros 0 and -3. Based on what we know about factored polynomials. These zeros can be derived from $P(x) = x(x + 3)$
So, when we multiply it out, $P(x) = x^2 + 3x$
Hence, if the degree of the polynomial is known, along with its zeros, we can derive the original function.

Example
Find a polynomial $Q(x)$ of degree 4, with zeros -2 and 0, where -2 is a zero of multiplicity 3.
Note: $(A + B)^3 = (A^3 + 3A^2B + 3AB^2 + B^3)$

Find a polynomial $P(x)$ of degree 4, with zeros $i,\ -i,\ 2$, and -2.

Conjugate Pairs
There is an interesting thing to observe regarding conjugates of complex numbers.
Conjugate Zeros Theorem-

In other words, if a certain $a + bi$ is a zero (x-intercept) of a polynomial, then its conjugate, is also a zero.

Example
Find a polynomial $P(x)$ of degree 3 that has integer coefficients and zeros $\frac{1}{2}$ and $3 - i$.

Homework 10/28
TB pg. 298 #31-37 (odd), 41, 46