MAT 121 – G81 Fall, 2011
Makeup
Test 3, Chapter 3 100 Points Name_____

1. (10 pts) Form a polynomial in factored form with *real* coefficients with the given zeros and degree. Please do not expand the polynomial.

Zeros: -2, multiplicity 1; - 5, multiplicity 2. Degree 3.

2. (10 pts) Expand $(x-3-2i)(x-3+2i)$

3. (10 pts) Use synthetic division to find $P(3)$ if $P(x)=3x^5-2x^4+2x^2-7x+5$.

4. (10 pts) Divide $f(x)=x^4-3x^3+2x+5$ by $d(x)=x^2+3$. Then write the result in the form $Dividend = Divisor \cdot Quotient + Remainder$.

5. Solve the inequalities:

   a. (10 pts) $3(x-2)^2(x+1)(x-1)^2 \geq 0$

   b. (10 pts) $\dfrac{3(x-2)^2}{(x+1)(x-1)^2} \geq 0$ (A very different-looking function, but not so very different, when it comes to solving inequalities).

   c. (10 pts) What is the domain of $f(x) = \log_2\left(\dfrac{3(x-2)^2}{(x+1)(x-1)^2}\right)$?

6. (20 pts) Find the *real* zeros of $f(x) = x^5 - 4x^4 + 2x^3 + 14x^2 - 23x + 10$. Factor f over the set of real numbers.

7. (10 pts) Find the remaining (nonreal) zeros of f and factor f over the set of *complex* numbers.