MAT 121 Fall, 2011
100 Points
Test 3 Makeup 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 3; -5, multiplicity 2. Degree 5.

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

3. (10 pts) Use synthetic division to find $P(3)$ if $P(x)=2x^5-2x^2+4x-1$.

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

5. Solve the inequalities:

a. (10 pts) $(x-1)^2(x-2)(x-4)^3 \le 0$

b. (10 pts) $\dfrac{(x-1)^2\left(x-4\right)^3}{(x-2)} \le 0$

c. (5 pts) What is the domain of $f(x)=\sqrt{\dfrac{(x-1)^2\left(x-4\right)^3}{(x-2)}}$?

d. (5 pts) What is the domain of $f(x)=\log_3\left(\dfrac{(x-1)^2\left(x-4\right)^3}{(x-2)}\right)$?

6. (15 pts) Find all real zeros of $f(x) = x^5 - 4x^4 + 2x^3 + 14x^2 - 23x + 10$. Factor $f(x)$ over the real number field. This will likely entail an irreducible quadratic factor that can not be split over the real number field

7. (15 pts) Use your work from #6 to find any *non*real zeros of $f(x)$. Then write $f(x)$ as the product of *linear* factors. That is, break $f(x)$ *all* the way down, with the nonreal zeros you find (plus the real zeros you already found from #6).