Exam 2

Full credit will be given for correct answers with complete explanations. Give exact answers whenever possible, otherwise give answers accurate to two decimal places.

- 1. (10 pts) Determine whether the given statement is TRUE or FALSE. Briefly explain your reason for each answer.
 - (a) $(a+bi)^2 = a^2 b^2$
 - (b) $\ln\left(\frac{a}{b}\right) = \frac{\ln a}{\ln b}$
 - (c) $\sqrt{a} + \sqrt{b} = \sqrt{ab}$
 - (d) $\log 10^c c = 0$
 - (a) $\log 10^{a} \cdot c^{b} = 2^{ab}$ (e) $2^{a} \cdot 2^{b} = 2^{ab}$
 - $(0) \ 2 \ 2 \ = 2$
- 2. (15 pts) For the rational function $f(x) = \frac{2x+1}{x-3}$,
 - (a) Find the the x-intercept(s).
 - (b) Find the y-intercept (where the graph of f(x) crosses the y-axis).
 - (c) Find the vertical asymptote.
 - (d) Find the horizontal asymptote.
 - (e) Sketch the graph of f(x), clearly indicating the above information on the graph.
- 3. (15 pts) Find a polynomial f(x) of degree 4 whose roots are 1, -2, 2*i*, and -2*i* and satisfies f(2) = 64.
- 4. (15 pts) Solve: $2x 1 \le x + 4 < 3x + 2$.
- 5. (15 pts) Find all roots, real and complex, of $x^3 3x^2 + x + 5 = 0$.
- 6. (15 pts) Suppose you put \$2000 into a savings account with an interest rate of 5%, compounded quarterly. How long will it take for the account balance to reach \$2250?
- 7. (15 pts) Find all solutions to the equation: $4^x = 3^{2x-3}$.