Math 121 Midterm #1 Prof Doyle Fall 2011

Read and follow the following directions.

1. Write your name, your TA's name, and your Tu/Th discussion time in the box on the front of the answer booklet.
2. SIGN your name in the box on the front of the answer booklet.
3. ALL WORK MUST BE SHOWN in the booklet for full credit.
4. There is NO SHARING OF CALCULATORS; forfeiture of exam is the penalty.
5. Keep your eyes on your own paper, cheating will be dealt with severely.
6. Place your exam question sheet INSIDE the booklet when you hand in your exam TO YOUR TA.
7. Read and follow all of the directions in #1-6 above, especially 3,4, and 5!!!!

1) Given $f(x) = 4x - 6x^2$, find

a) f(-3) 4pts b) $\frac{f(x+h) - f(x)}{h}$ (answer in simplified form!!!) 8pts

2) Given the function $R(x) = \frac{x+4}{5-2x}$, answer the following: 16pts

a) **Show** whether $\left(\frac{3}{2}, \frac{11}{2}\right)$ is a point on the graph of R(x).

b) Find ALL intercepts, **in proper form**.

c) If f(x) = 2, what does x equal?(Show Work)

3) For the Quadratic function $f(x) = -2x^2 + 5x + 3$, find: 16pts

a) the Vertex and Axis of Symmetry

b) ALL intercepts, **in proper form**.

c) Sketch a graph, with coordinates shown for values found above.

4. Solve the Inequality, putting answer into Interval Notation: $x^4 \geq 9x^2$ 12pts

5. A rational function is given below. Find the requested information and SKETCH a rough graph of $R(x) = \frac{2x^2 - 8}{x^2 - 5x + 6}$ 16pts

a) List ALL Intercepts, **in proper form**. Also, name the coordinates of any **holes** in the graph.

b) List ALL Asymptotes(Vert, Hor, Obl), **in proper form**.

c) Sketch a graph with the above information, plus several coordinate pairs labeled correctly.

6. Perform the following and find ALL COMPLEX roots of $f(x) = 2x^4 + 7x^3 - 24x^2 + 34x - 12$ 18pts

a) List ALL POSSIBLE Rational Zeros

b) Using Synthetic Division and/or the fact that x = 1 – i is a Root, find the remaining roots of f(x).

7. Find the **rule of the function** which resembles $y = \sqrt{x}$ but has been shifted down 7, shifted left 3, and **then** reflected over the x-axis. 10pts