Complex Variables / MAT 3223.001

Midterm 2 / April 1, 1998 / Instructor: D. Gokhman

Name: _____

Please show all work and box the answers, where appropriate.

1. (20 pts.) Find all values of

$$\text{(a) } \log(-1) \qquad \text{(b) } (-i)^i$$

2. (20 pts.) Find all branch points of $f(z) = \sqrt{1 - z^3}$. What is the smallest number of branch cuts needed to make f single valued? Sketch the branch points and an example of branch cuts as above. What would be the radius of convergence of the power series expansion of f at -1?

3. (20 pts.) Find all points in the complex plane, where each of the following functions of $z = x + iy$ is analytic? complex differentiable?

$$\text{(a) } y^2 - x^2 + 2ixy \qquad \text{(b) } \frac{x - iy}{x^2 + y^2}$$

4. (20 pts.) Show that if $f(z)$ is analytic and real for all z, then f must be constant.

1	2	3	4	total (80)	%