Math 185, Midterm 1

Section 2, 3-4pm, N.Reshetikhin, Sept 23, 2011

Student's Name:

Student's i.d. number:

Problem	1	2	3	4	5	*Total*
Points	30	30	30	30	30	150
Grade						

1.*30 pnts* Compute the contour integral

$$\int_C \frac{dz}{z^2+4}$$

where $C = \{z||z-i| = 2\}$

2. *30 pnts* Is the function $f(z) = |z|^2$ differentiable at $z = 0$? Is it analytic at $z = 0$?

3.*30 pnts* Find the region of convergence of the series

$$\sum_{n=1}^{\infty} \frac{n}{n^3+1} z^n$$

4. *30 pnts* Is the function

$$g(z) = \begin{cases} \frac{z^2}{\sin(z)} & , \quad z \neq 0 \\ \\ 0 & , \quad z = 0 \end{cases}$$

analytic at $z = 0$? Is it entire?

5. *30 pnts* Compute the integral

$$\int_C z(\cos z)^2 dz$$

where C is: