Math 185, Midterm 1

Section 1, 1-2pm, 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

$$\int_C \frac{dz}{z(z-2)}$$

where $C = \{z||z-2| = 1\}$

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

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

$$\sum_{n=1}^{\infty} \ln(1 + \frac{1}{n(n+1)})z^n$$

4.*30 pnts* Is the function

$$g(z) = \begin{cases} \frac{\sin(z)}{z(z-\pi)} & , \quad z \neq \pi, |z-\pi| < \frac{\pi}{2} \\ \\ \frac{1}{\pi} & , \quad z = \pi \end{cases}$$

analytic in $|z-\pi| < \frac{\pi}{2}$? Is it entire?

5. *30 pnts* Compute the integral

$$\int_C \frac{dz}{(\cos z)^2}$$

where C is: