

University of Toronto at Scarborough
Department of Computer & Mathematical Sciences

TEST 3

MATC34H – Complex Variables

Examiner: J. Friedlander

Date: November 13, 2007

1. **(4 marks each)** State each of the following.
 - (a) Morera's theorem
 - (b) Liouville's theorem

2. **(6 marks)** Using Cauchy's formula for the derivatives of an analytic function evaluate

$$\int_{|z+1|=2} \frac{e^z}{(z+1)^{100}} dz.$$

3. **(6 marks)** Find the first three non-zero terms in the Laurent expansion about $z_0 = 0$ of the function

$$f(z) = \cot z$$