Due Date: 16 November 2017, Thursday

NAME:..

STUDENT NO:..

Math 503 Complex Analysis - Homework 3

1	2	3	4	TOTAL
25	25	25	25	100

Please do not write anything inside the above boxes!

Check that there are **4** questions on your booklet. Write your name on top of every page. Show your work in reasonable detail. A correct answer without proper or too much reasoning may not get any credit.
Submit your solutions on this booklet only. Use extra pages if necessary.

General Rules for Take-Home Assignments

(1) You may discuss the problems with your classmates or with me but it is absolutely mandatory that you **write your answers alone**.

(2) You must obey the usual rules of attribution: all sources you use must be explicitly cited in such a manner that the source is easily retrieved with your citation. This includes any ideas you borrowed from your friends. (It is a good thing to borrow ideas from friends but it is a bad thing not to acknowledge their contribution!)

(3) Even if you find a solution online, you must rewrite it in your own narration, fill in the blanks if any, making sure that you **exhibit your total understanding of the ideas involved**.

Affidavit of compliance with the above rules: I affirm that I have complied with the above rules in preparing this submitted work.

Please sign here:

NAME: STUDENT NO: DEPARTMENT:

Q-1) Show that $e^{\frac{1}{z}}$ has an essential singularity at $z = 0$.

Solution:

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Q-2) Some details of the proof of Lemma 5.1 on page 83 is left to the reader. Fill out these details. (This lemma is crucially used in developing the theory of Laurent series on page 107.)

Solution:

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Q-3 Solve Exercise 10 on page 111, using what we developed so far. Note that the result trivially follows from Great Picard Theorem on page 300.

Solution:

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Q-4) Find the value of $\int_0^\infty \frac{(\log x)^4}{1+x^2}\,dx$.

Solution: