

Due Date: 5 October 2017, Thursday



NAME:.....

STUDENT NO:.....

### Math 503 Complex Analysis - Homework 1

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)** Find the real and imaginary parts of  $\left(\frac{1}{2} - i \frac{\sqrt{3}}{2}\right)^{2018}$  .

**Solution:**

NAME:

STUDENT NO:

DEPARTMENT:

**Q-2)** Find the real and imaginary parts of  $\frac{7+i}{(8+i)^2}$ .

**Solution:**

NAME:

STUDENT NO:

DEPARTMENT:

**Q-3** Write all cube roots of  $i$  in rectangular form, i.e. in the form  $a + ib$ .

**Solution:**

NAME:

STUDENT NO:

DEPARTMENT:

**Q-4)** Let  $(X, d)$  be a metric space and  $\{x_n\}$  a Cauchy sequence in  $X$ . Assume that  $\{x_n\}$  has a subsequence  $\{x_{n_k}\}$  which converges to some point  $a$  in  $X$ . Show that  $\{x_n\}$  also converges to  $a$ .

**Solution:**