LAST NAME: ────────────────────────────

FIRST NAME: ────────────────────────────

STUDENT NUMBER: ────────────────────────

SIGNATURE: ──────────────────────────────
(I understand that cheating is a serious offense)

Please indicate your instructor and section by checking
the appropriate box below:

☐	A01 MWF (9:30 – 10:20 AM, EITC E3 270)	G. Krause
☐	A02 MWF (1:30 – 2:20 PM, St. Paul's College 305)	A. Prymak
☐	A03 MWF (1:30 – 2:20 PM, EITC E2 155)	M. Despic

INSTRUCTIONS TO STUDENTS:

Fill in all the information above.

This is a 1 hour exam.

***No** notes, books, cell phones, calculators or other computing devices are permitted.*

***Show your work clearly** for full marks.*

This test has a title page, 4 pages of questions, and 1 blank page for rough work. Please check that you have all pages.

The value of each question is indicated in the left-hand margin beside the statement of the question. The total value of all questions is 100.

*Answer all questions on the exam paper in the space provided. If you need more room, you may continue your work on the **reverse** side of the page, but **clearly indicate** that your work is continued there.*

Question:	1	2	3	4	5	Total
Points:	30	10	18	22	20	100
Score:						

[30] **1.** Evaluate and simplify to Cartesian form:

(a) $i^{51}(\overline{7i-3})$

(b) $\dfrac{3i+4}{2+5i}$

(c) $\left(\dfrac{1+i}{i-\sqrt{3}}\right)^{9}$

[10] **2.** Express the sum

$$\frac{1}{5} - \frac{2}{7} + \frac{4}{9} - \frac{8}{11} + \frac{16}{13} - \frac{32}{15} + \frac{64}{17} - \frac{128}{19} + \frac{256}{21} - \frac{512}{23} + \frac{1024}{25}$$

in sigma notation.

[18] **3.** Evaluate the sum

$$\sum_{k=11}^{22} [5(k-4)^3 + 7]$$

using any of the following identities that you may find relevant:

$$\sum_{j=1}^{n} j = \frac{n(n+1)}{2}, \qquad \sum_{j=1}^{n} j^2 = \frac{n(n+1)(2n+1)}{6}, \qquad \sum_{j=1}^{n} j^3 = \frac{n^2(n+1)^2}{4}.$$

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[22] **4.** Find all solutions of the equation

$$z^6 + 3z^3 + 9 = 0 \,.$$

Express your answers in exponential form.

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FIRST TERM TEST

DATE: October 5, 2011

PAGE: 4 of 5

DEPARTMENT & COURSE NO: MATH 1210

TIME: 1 hour

EXAMINATION: Techniques of Classical and Linear Algebra

EXAMINER: various

[20] **5.** Use mathematical induction to prove that

$$\sum_{j=1}^{n} \frac{1}{j} < \frac{2}{3}n$$

for every integer $n \geq 3$.

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