ASSOCIATION OF CANADA LANDS SURVEYORS - BOARD OF EXAMINERS
WESTERN CANADIAN BOARD OF EXAMINERS FOR LAND SURVEYORS
ATLANTIC PROVINCES BOARD OF EXAMINERS FOR LAND SURVEYORS

SCHEDULE I / ITEM 1
MATHEMATICS

This examination consists of **10** questions on **2** pages   **(Closed Book)**

Time: 3 hours   **Marks**

1.	a)	What is a mathematical function? Give simple examples.	5
	b)	Does continuity of a mathematical function imply differentiability? Explain.	5
2.	a)	Differentiate explicitly the function $y = \log (\sin x)$ for an arbitrary logarithm.	5
	b)	What is integration by parts? Give an example of application	5
3.	a)	What is the general Cartesian equation of an ellipse? Describe the parameters used.	5
	b)	What is the general polar equation of an ellipse? Describe the parameters used.	5
4.	a)	In three dimensions, what is the scalar or dot product of two arbitrary vectors? Give the geometrical interpretation.	5
	b)	In three dimensions, what is the vector or cross product of two arbitrary vectors? Give the geometrical interpretation.	5
5.	a)	What is de Moivre's formula for complex exponentials? Give an example.	5
	b)	What is the natural logarithm of a complex number? Give an explicit example.	5
6.	a)	Given an arbitrary square matrix, what is its symmetric part? Give an example with a matrix of order 3.	5
	b)	Given an arbitrary square matrix, what is its skew-symmetric part? Give an example with a matrix of order 3	5
7.	a)	What is the Gaussian elimination method for solving a linear system of algebraic equations? Illustrate with three linear equations.	5
	b)	What is the matrix formulation for the solution of a linear system of algebraic equations? Illustrate with the previous three linear equations.	5

8.	a)	Set up the integral for evaluating the length of the curve $f(x) = e^x \sin x$ between $x = 0$ and $x = \pi/2$.	5
	b)	Set up the integral for evaluating the area under the curve $f(x) = e^x \sin x$ between $x = 0$ and $x = \pi/2$.	5
9.	a)	What is called the spherical excess in spherical triangles?	5
	b)	How does one compute the area of an arbitrary spherical triangle given the coordinates of the vertices?	5
10.		Briefly describe ambiguity situations in solving spherical triangles with simple examples and how to resolve them.	10

Total Marks: 100