Sri Lanka Institute of Information Technology

B.Sc. Degree
in
Information Technology

Mid-Term Examination
Year 1, Semester 1 (2015)

Mathematics for Information Technology (N109)

Duration: 1 Hour

Instructions to Candidates:

- This is a closed book examination.
- This paper contains 6 questions on 1 page without the cover page.
- Answer all questions in the WORKBOOK provided.
- Read all questions before answering.
- The total marks obtainable for this examination is 30.

1) Specify the domain of the given functions.

i) $f(x) = \frac{1}{\sqrt{-2x+3}}$

ii) $f(x) = \frac{x+2}{x^2+2x-15}$ (3 marks)

2) Solve the given exponential equations for x.

i) $3^{2x-1} = 27^x$

ii) $8 + 2e^x = 12$

iii) $\log(x) + \log(x-1) = \log(3x+12)$

iv) $2\log_b(x) = \log_b(4) + \log_b(x-1)$ (6 marks)

3) Differentiate the following functions.

i) $y = (1 - 3e^x)^2$

ii) $y = x^2 \ln x$ (3 marks)

4) Use calculus to sketch the graph of $f(x) = x^4 - 2x^2 + 7$. Find the **relative extrema** and **inflection points** if any. (8 marks)

5) A postal clerk spends 4 hours each morning sorting mail. During that time, the clerk can sort approximately $f(t) = -t^2 + 6t$ letters in t hours. At what time during this period is the clerk performing at peak efficiency? (4 marks)

6) Find the anti-derivatives of the given indefinite integrals.

i) $\int (e^{3x} + \frac{2}{x^2} - 2x + 5)\, dx$

ii) $\int (xe^{2x})dx$ (6 marks)

End of the Question Paper.