International Institute for
Technology and Management
November 17 ,2008 **Duration :1 hr**

Unit 05a: Mathematics 1 – (MathA) Assignment – 2

1. Determine the derivatives of the following functions :

a. y = **(3lnx – x)(lnx – 2)²** b. y = $\left(\sqrt{1+x^2}\right)e^x$

c. y = $\frac{x^2-1}{x} + e^{\frac{-x^2}{2}}$ d. y = $\sqrt{\frac{1-x}{1+x}}$

e. y = $\frac{1-\sin x}{1+\sin x}$ f. y = $\ln(\sqrt{x+\sqrt{x}})$

(18 Marks)

2. Find all stationary points of the following functions and determine whether they are maxima,minima or inflection points: **(12 Marks)**

a. y = $x^4 - \frac{5}{3}x^3 + \frac{1}{2}x^2$ b. y = $\frac{x^2-x+1}{x}$

c. y = **x^2 lnx**

3. Find all stationary points of the following function and Specify their nature: **(8 Marks)**

$$f(x) = \frac{1}{12}x - \sqrt[3]{x}$$

4. A firm has average variable cost **(6 Marks)**

$$q + 5e^{2q^2-1} + \frac{\ln(2q^2-1)}{q}$$

and fixed costs of 8 .Find the total cost function and the marginal cost function.

5. Find the values of the constant $a \neq 0$ for the which the function

$$f(x) = \ln x - \frac{2}{a}x^2$$

admits a maximum. **(6 Marks)**

END of QUESTIONS