

DUE ON OCT 16, 2018

North South University

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**Problem 1:** Find the Taylor's series of  $f(x) = 1/x$  at  $x = 2$ . Show all the steps as needed.

**Problem 2:** Expand  $f(x) = (\ln(1+x) - x)/x^2$  at  $x = 0$  using Taylor's series expansion method. (Hint: Find the Taylor's expansion of  $\ln(1+x)$  and then do rearrangments using algebraic manipulation)

**Problem 3:** Expand  $f(x) = e^x$  at  $x = 0$ . Take upto  $3^{rd}$ ,  $5^{th}$  and  $7^{th}$  term in the Taylor's expansion of  $e^x$  and show the comparison with  $f(x) = e^x$ .

**Problem 4:** Find the equation of the tangent line to  $\frac{x^2}{16} + \frac{y^2}{4} = 1$  at a point  $(2, -\sqrt{2})$

**Problem 5:** Find the Taylor's expansion of  $g(x) = \int_0^x \cos(m)dm$ .

**Problem 6:** Find the limit of the below sequence:

$$\left(\sqrt{n^2+1}\right)/(2n+1) \text{ as } n \rightarrow \infty$$

**Problem 7:** Find the limit, and the rate of convergence, of  $\lim_{x \rightarrow 0} f(x) = (e^x - 1)/x$ .

**Problem 8:** Find the limit, and the rate of convergence, of  $\lim_{x \rightarrow 0} f(x) = \sin x/x$ .

**Problem 9:** Write a note (1 page limit) on Fixed Point and Floating Point number representation system with examples of your own.

**Problem 10:** Convert the number  $(1234.125)_{10}$  to  $(\dots)_2$