Serial No.:_____ Student Name:_____ Student Number: _____

Instructor: M. Z. Abu-Sbeih Math 101- Q3 Date: 15-3-2018

SHOW ALL YOUR WORK. NO CREDITS FOR ANSWERES WITHOUT JUSTIFICATIONS

Show all your work. NO credits for answers not supported by work.

(1) (6 Points) Find the equations of the tangent line and normal line to the curve $y = \frac{\sqrt{x} + x\, e^{x-1}}{x}$ at the point (1, 2).

(2) (5 Points) If $y = sec^3\,(e^{2x})$ find y'. (Do not simplify)

(3) (5 Points) If $y = tan^{-1}\sqrt{1-x}$ find $y'(0)$.

(4) (6 Points) If $x^2y^2 + \sin(x+y) = 1$, find y' at the point $(1, -1)$.

(5) (6 Points) Evaluate the limit if it exists: $\lim_{t \to 1} \frac{\sin(t-1)}{t^2-1}$.

(6) (6 Points) Consider the function $f(x) = \begin{cases} x^2 & \text{if } x \leq 2 \\ mx + b & \text{if } x > 2 \end{cases}$

Find all values of *m* and *b* which will make the function continuous everywhere.

(7) (6 Points) Consider the function $y = xe^{-x}$. Find $y', y'', and\ y'''$. Give a formula for $y^{(100)}$.