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

Instructor: M. Z. Abu-Sbeih Math 101- Q3 Date: 4-2-2019

SHOW ALL YOUR WORK. NO CREDITS FOR ANSWERES WITHOUT JUSTIFICATIONS

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

1. (7 Points) If $f(x) = \frac{(\tan x)-1}{\sec x}$ find $f'(\frac{\pi}{4})$.

2. (8 Points) If $y = tan^2(sin^3 x)$ find y'. (**Do not simplify**)

3. (8 Points) Evaluate the limit if it exists: $\lim_{x\to 0} \frac{[1-\cos(2\sin x)]}{\sin 2x}$

4. (8 Points) If $f(x) = \sin x \cos x$ find $f^{(101)}(0)$.

5. (8 Points) Find all values of a and b for which the line $x - y = a$ is tangent to the parabola

$y = b\,x^2 - x - 3$ at $x = 1$.