

Serial No.: \_\_\_\_\_ Student Name: \_\_\_\_\_ Student Number: \_\_\_\_\_  
Instructor: M. Z. Abu-Sbeih Math 101- Q3 Date: 6-7-2015

**SHOW ALL YOUR WORK. NO CREDITS FOR ANSWERS NOT SUPPORTED BY WORK.**

(1) (10 points) If  $y = \tan^7 \sqrt{\cos^5 x^3}$  find  $y'$ .

(2) (10 points) If  $xy + y^2 = 1$  find  $y''$  at the point (0,1).

(3) (10 points) If  $y = (x + \ln x)^{x^2+1}$ , find  $\left. \frac{dy}{dx} \right|_{x=1}$

(4) (10 points) If  $f(x) = \sin^{-1} \frac{x-1}{x+1} - 2 \tan^{-1} \sqrt{x}$  show that  $f'(x) = 0$ .

(5) (7 points) There are two tangent lines to the ellipse  $2x^2 + 3y^2 = 1$  and passing through the point  $(2,0)$ , find their slopes.

(6) If  $y = \log_2 \sqrt{\frac{(x^3 + 1)^e}{\sqrt{x+3}}}$ , find  $y'(1)$ .