

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

Instructor: M. Z. Abu-Sbeih

Math 101- Q4

Date: 4-12-2016

SHOW ALL YOUR WORK. NO CREDITS FOR ANSWERES WITHOUT JUSTIFICATIONS1. (7 points) Find the limit if it exists. Write ∞ or $(-\infty)$ when appropriate.

$$\lim_{x \rightarrow 0} \frac{\ln(1+2x)}{x}$$

2. (6 points) Find the slope of the line tangent to the curve $y = (x^2 + \ln x)^x$ at the point (1,1).3. (6 points) Find a linear approximation of $f(x) = \frac{1}{\sqrt{1-x}}$ at $a = 0$.

4. (7 points) Use differentials to approximate $(2.04)^5$

5. (7 points) The side of a square is measured to be 10 cm with a possible error of $\frac{1}{32}$ cm. Estimate the error in calculating the area of the square.

6. (7 points) A conic shaped coffee filter is 16 cm high and has a radius of 4 cm at the top. The filter is filled with water which is flowing out at the rate of $2 \text{ cm}^3/\text{min}$. At what rate is the depth of the water changing when it is 8 cm deep?

