Prince Sultan University

Deanship of Educational Services
Department of Mathematics
And General Sciences

COURSE DETAILS:

BUSINESS CALCULUS	MATH 211	MAJOR EXAM I
Semester:	Spring 2018-2019 --Term 182	
Date:	Sunday March 03, 2019	
Time Allowed:	80 minutes	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	
Instructor's Name:	J. Alzabut

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.

GRADING:

	Page 1	Page 2	Page 3	Total
Questions	**1,2**	**3,4**	**5,6**	
Marks	**15**	**11**	**19**	**45**
S. Marks				

Q.1 (4 points) Find the rate of change of $f(x) = (x^2 + 3x - 1)(2 - x)$ at $x = 1$.

Q.2 (5 points) Find the equation of the tangent line to the curve $y = \frac{x}{2x+3}$ at $x = -1$.

Q.3 (6 poimts) Suppose the total cost in dollars of manufacturing q units is $C(q) = 3q^2 + q + 500$.

a) Use marginal analysis to estimate the cost of manufacturing the 41st unit.

b) Compute the actual cost of manufacturing the 41st unit.

Q.4 (4 points) Find $\frac{dy}{dx}$ for $(3xy^2 + 1)^4 = 2x - 3y$.

Q.5 (3 points) Find y''' if $y = \sqrt{x} - \frac{1}{2x}$.

Q.6 (4 points) The gross annual earnings of a certain company are $f(t) = \sqrt{10t^2 + t + 229}$ thousand dollars *t* years after its formation in January 2010. At what rate will the gross annual earnings of the company be growing in January 2015.

Q.6 For the function $f(x) = x^4 - 4x^3 + 10$.

a) (3 points) Find the critical points of *f*.

b) (3 points) Determine intervals where *f* increases and decreases.

c) (3) Find the relative maximum and relative minimum of *f*.

d) (3 points) Determine intervals where *f* is concave up and concave down.

e) (2 points) Find inflection points.

f) (5 points) Sketch the graph roughly.