Ministry of Education
Al-Imam Mohammed Ibn Saud Islamic University
College of Science
Department of Mathematics and Statistics

Course Name: Calculus I
Course Code: MAT 101
Semester/Year: Second/1436-1437
Date/Time: 27-6-1437 / 4:00 pm

Midterm 2

Duration: 75 min's

Instructions: Only ordinary calculators are allowed.

Answer the following questions

Question 1 [4x2=8 marks]: Find the first derivatives of the following functions:

(1) $f(x) = x^3 \cos(x^2)$

(2) $f(x) = \sqrt{5x^2 + e^{7x}}$

(3) $f(x) = \dfrac{5^{x^2}}{\sin x + \cos x}$

(4) $f(x) = \tan^{-1} x^2 + \ln(\sin^2 x)$.

Question 2 [4 marks]: Determine the first derivatives $y'(x)$ of the following:

1- $y = x^{2x}$

2- $x^3 y^2 + 2xy = -3$.

Question 3 [4 marks]: Find an equation of the tangent line at the point $(1, 8)$

for $f(x) = (x+1)^3$

Question 4 [4 marks]: Find a value of c satisfying the conclusion of the Mean Value Theorem for

$$f(x) = x^3 + 4x - 3$$

on the interval $[0,1]$.

Extra question[2 marks]: $Find \ f^{(21)}(x)$ for

$$f(x) = \sin(2x)$$