King Saud University
Department of Mathematics

Second Midterm Exam
Course Title: Math 111 (Calculus)
Date: First Semester - Wednesday 7 December 2016
Instructions:
This examination paper has 5 pages (including this page).

Name:	Student No.:
Teacher's Name:	Section No.:

Question	1	2	3	4	total
Maximum marks					
Marks obtained					

Question 1

(a) Choose the correct answer

1. $e^{\ln x} = x$			
i. $\forall x \in \mathbb{R}$	ii. $\forall x \geq 0$	iii. $\forall x > 0$	iv. None of the previous.
2. $\ln(\ln e)$ is equal to :			
i. 1	ii. 0	iii. e	iv. None of the previous.
3. The value of x that satisfies the equation $\ln\left(2e^{x^2-1}\right) - \ln\left(2e^{2x-2}\right) = 0$ is equal to :			
i. 0	ii. 1	iii. -1 , 3	iv. None of the previous.
4. If $y = e^{-x}$ then			
i. $y > 0$	ii. $y < 0$	iii. $y \leq 0$	iv. None of the previous.

Question 2

(a) Find $\dfrac{dy}{dx}$, if $y = \ln \dfrac{\left(x^2 + 2x\right)^{\frac{3}{2}}\left(\sqrt{\sec x}\right)}{3^x - \sin x}$

(b) Find $f'(x)$ if, $f(x) = \left(x^3 + 1\right)^{\cos x}$, $\qquad x \geq 0$

Question 3

(a) Find the following integrals

1. $\displaystyle\int 3^x \left(3 + \tan 3^x\right) dx$

2. $\displaystyle\int e^{\left(x^2 - 4x\right)} e^{\ln(x-2)} dx$

3. $\displaystyle\int \frac{1}{x \log x} dx$

b) Find the arc length of the graph of the equation $(y+1) = (x-4)^{\frac{3}{2}}$, from $A(5,0)$ to $B(8,7)$

Question 4

(a) The region bounded by the graphs of $y = \sqrt{4-x^2}$, $\quad y = x$, $\quad y = 0$. Find the volume of the resulting solid if it revolved about:

(i) x-axis

(ii) y-axis

(b) Find the area of the region bounded by the graphs

$y = 2x - 6$, $\qquad y = \dfrac{x}{2}$, $\qquad y = 0$