King Saud University | **MATH 111 (Integral Calculus)**

Department of Mathematics | **1st Midterm Exam**

2nd Semester 1432-1433 H | **Duration: 105 Minutes**

Student's Name	Student's ID	Group Number	Lecturer's Name

Question Number	I	II	III	Total
Mark				

Question I: A. Choose the correct answer

(1) If $\int f(x)dx = x - \ln|\cos x| + C$ **, then**

(a) $f(x) = \frac{x^2}{2} + \frac{1}{\cos x}$ **(b)** $f(x) = 1 + \tan x$

(c) $f(x) = 1 - \sec x$ **(d) None of the previous**

(2) $\int_{-2}^{1} |x|\, dx$ **equals**

(a) $\frac{5}{2}$ **(b)** $-\frac{3}{2}$

(c) $\frac{3}{2}$ **(d) None of the previous**

(3) $\int_{0}^{1} \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$ **equals**

(a) $2e - 2$ **(b)** $\frac{1}{2}e - \frac{1}{2}$

(c) $e - 1$ **(d) None of the previous**

B. If f is a continuous function on $[a,b]$, prove that there is a number $c \in (a,b)$ for which

$$f(c) = \frac{1}{b-a}\int_a^b f(x)dx$$

<u>Question II</u>: A. Compute the area under the curve of $f(x) = x + x^2$ on $[0,2]$ using the limit of Riemann sum

B. Without evaluating the integrals, show that $\int_0^5 (x^2 - 1)\, dx \geq \int_0^5 (x - 1)\, dx$

<u>Question III:</u> A. Compute $F'(x)$ **for** $F(x) = e^x + \int_{\tan x}^{x^2} \frac{1}{\sqrt{2 + t^4}}\, dt$

B. Compute the following integrals

(a) $\int \frac{1}{(4x + 6)^3}\, dx$

(b) $\int x^2\sqrt{x-1}dx$

(c) $\int \frac{2+\sin x}{\cos^2 x}dx$

Good Luck