KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
MATH 102 TERM 123
MAJOR EXAM II

Exercise # 1: (8 pts) Find

$$I = \int e^{2x} \sin(e^x) dx$$

Exercise # 2: (8 pts) Find

$$I = \int \sec^4(5x) dx$$

Exercise #3: (8 pts) Evaluate the following integral

$$I = \int_1^3 \frac{dx}{x^2 - x + 2}$$

Exercise #4: (9 pts) Find

$$I = \int \frac{x^3 - 4x - 1}{(x^2 - 1)(x - 1)} dx$$

Exercise # 5: (8 pts) Evaluate the improper integral

$$I = \int_0^\infty \frac{x^2}{(x^3 + 1)^2} dx$$

Exercise # 6: (9 pts) Evaluate the improper integral

$$I = \int_0^2 \frac{dx}{(2x - 1)^{2/3}}$$

Exercise # 7: **(9 pts)** Evaluate

$$I = \int \sin^3 x \cos^2 x dx$$

Exercise #8: (8 pts) Show that

$$\int \text{sech}(x) dx = \tan^{-1}(\sinh x) + C$$

where C is an arbitrary constant.

Exercise #9: (8 pts) Find the derivative of

$$y = \sinh^{-1}(x^2 + x)$$

Exercise # 10: (8 pts) Find

$$I = \int \frac{7^{1/x}}{x^2} dx$$

Exercisex # 11: (8 pts) evaluate the following integral

$$I = \int \frac{3x^2 + 1}{x^2 - 2x + 1} dx$$

Exercise # 12: (9 pts) Find

$$I = \int \frac{dx}{(4x^2 + 9)^2}$$