

King Saud University

Math department

April 22nd/2025

Midterm2 106(90mn)

Question1(3+3+3)

a) Find $\lim_{x \rightarrow 0} \frac{\cos x - 1 + \frac{x^2}{2}}{x^4}$

b) Evaluate the integral $\int e^x \sin 2x dx$

c) Compute the integral $\int (\tan x)^6 (\sec x)^6 dx$

Question2 (2+3+3)

a) Compute $\int \sin 4x \cdot \cos 2x dx$

b) Find $\int \frac{dx}{x^3 \sqrt{x^2 - 4}}$

c) Evaluate $\int \frac{4x^2 + 4x + 5}{(x+1)(x^2+4)} dx$

Question3(3+2+3)

a) Compute the integral $\int \frac{dx}{4 + 3\cos x - \sin x}$

b) Find $\int \frac{dx}{x^{6/5} + 2x + x^{4/5}}$

c) Does the integral $\int_1^{+\infty} \frac{\ln x \cdot dx}{x^4}$ converge? Find its value if it does.