

KING SAUD UNIVERSITY

Department of Mathematics

(Summer Term 1437/1438)

Second Mid Term

Max. Marks: 25

(M-106)

Time: 90 mins

Question 1(3+3)

- (a) Find the $\lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \sin(x)}{1 + \cos(2x)}$ if it exists. (b) Evaluate $\int x^2 \sinh x \, dx$.

Question 2(3+3)

- Evaluate the integrals a) $\int \sin^3 x \sqrt{\cos x} \, dx$. b) $\int \frac{x^2}{(4-x^2)^{3/2}} \, dx$.

Question 3(3+4)

- Evaluate the integral (a) $\int \frac{1}{\sqrt{-x^2 - 6x - 5}} \, dx$. (b) $\int \frac{x+2}{(x-1)(x^2-3x+2)} \, dx$.

Question 4(3+3)

- a) Determine whether the integral $\int_0^9 \frac{1}{\sqrt[3]{x}-1} \, dx$ is convergent or divergent and if it

is convergent, find its value.

- b) Evaluate the integral $\int \frac{x^{1/3}}{x^{2/3}+1} \, dx$.