

King Saud University

Math department

March 4th

Midterm1 106

Question1(2+3+3)

- a) If $F(x) = \int_{2x}^{x^3} \sqrt{1+t^4} dt$, find $F'(x)$.
- b) Compute the integral $\int \frac{dx}{x^{\frac{1}{3}}(2+3x^{\frac{2}{3}})^4}$
- c) Find the number c in the mean value theorem for $f(x) = \sqrt{1+4x}$ on $[0,2]$.

Question2 (3+2+3)

- a) Evaluate the integral $\int \frac{(2+e^{4x})dx}{8x+e^{4x}}$
- b) If $y = \frac{(3x+1)^5 \cdot \sqrt[3]{x^3+1}}{(1+x^2)^4 e^x}$, find $\frac{dy}{dx}$
- c) Find $\int \frac{e^x \sin^{-1}(e^x)}{\sqrt{1-e^{2x}}} dx$

Question3(3+3+3)

- a) Compute the integral $\int \frac{dx}{x\sqrt{x^8-16}}$
- b) Evaluate $\int \frac{x^2 dx}{\sqrt{4+x^6}}$
- c) Find $\int \frac{\tan x \cdot dx}{\sqrt{9-(\cos x)^2}}$