

Midterm1-106

Question1(2+3+3)

a) If $F(x) = \int_{\ln x}^{3^x} e^{t^2} dt$, find $F'(x)$.

b) Compute the integral $\int \frac{(6x+9\sqrt{x})dx}{(x^2+2x\sqrt{x})^4}$

c) Use the trapezoid rule with $n=4$ to approximate $\int_1^4 \frac{1}{x} dx$

Question2 (3+2+3)

a) Find the number c in the mean value theorem for $f(x) = \frac{x}{\sqrt{x^2+9}}$ on $[0,4]$.

b) If $y = (\sqrt{x^2 + x + 1})^{\cosh x + x}$, find $\frac{dy}{dx}$.

c) Evaluate the integral $\int \frac{(x^2 - \sin x) \cdot 2x^3 + 3 \cos x}{2x^3 + 6 \cos x + 5} dx$

Question3(3+3+3)

a) Compute the integral $\int \frac{x \cosh x + \sinh x}{\sqrt{(x \sinh x)^2 + 4}} dx$

b) Evaluate $\int \frac{dx}{x\sqrt{x^6-3}}$.

c) Find $\int \frac{\cot x \cdot dx}{\sqrt{9 - (\sin x)^4}}$