

April 2022

Math 106 midterm(120mn)

Part 1[2+2+3+2+3+3+3]

- a) Use Trapezoid rule, with $n = 4$, to approximate $\int_0^4 x^2 \sqrt{1+x^2} dx$
- b) Find the number α so that $\sum_{k=1}^n (2k + \alpha) = n^2$
- c) Find the number z that satisfies the mean value theorem for $f(x) = 2 + 3x^2$ on $[0,4]$
- d) If $y = (2 + \sqrt{x})^{x^2}$, compute $\frac{dy}{dx}$
- e) Evaluate the integral $\int \frac{e^{5x}}{e^{10x}+16} dx$
- f) Find the indefinite integral $\int \frac{dx}{x\sqrt{x^6-4}}$
- g) Compute $\int \frac{dx}{x\sqrt{9+(\ln x)^2}}$

Part 2[3+3+3+3]

- a) Evaluate $\int x \tan^{-1} x dx$
- b) Find $\int (\sin x)^5 (\cos x)^4 dx$
- c) Evaluate the integral $\int \frac{1}{(4-x^2)^{3/2}} dx$
- d) Compute the indefinite integral $\int \frac{6x+6}{(x-4)(x+2)} dx$