

① a) Use the Trapezoid rule to approximate $\int_0^5 \frac{dx}{1+x^3}$ with $n=5$

b) Find c that satisfies the conclusion of the mean value theorem for $f(x) = (x-2)^2$ on $[-1, 5]$

c) Evaluate the integral

$$\int x \sin(x^2) \cos(x^2) dx$$

② a) Compute $\int \frac{\cos x dx}{\sin x \sqrt{1-(\sin x)^4}}$

b) Find $\int \frac{dx}{x \sqrt{x^4-1}}$

c) Evaluate $\int \cosh x dx$

③ a) Compute $\int \frac{dx}{(x^2+25)^2}$

b) Find $\int \frac{dx}{5+3\cos x+4\sin x}$

c) Compute $\int \frac{dx}{x^{\frac{1}{2}} - x^{\frac{1}{3}}}$

4) a) Find the area of the region bounded by $y = (x-1)^2$, $y = (x+1)^2$, $y=0$ after sketching the region

b) Find the volume obtained by revolving the region bounded by $y = x^2$, $x = y^2$ about the x -axis

c) Determine the surface area of the solid obtained by rotating the parametric curve $x = 9+2t^2$, $y = 4t$ about the x -axis

5) a) Find the area of the region inside $r = 1 + \sin \theta$ and outside $r = 1 - \sin \theta$ after sketching it.

b) Does the integral $\int_0^{+\infty} (1+x)e^{-2x} dx$ converge? Find its value if it does.