

① Evaluate the integral

(a) $\int_1^{\infty} \frac{dx}{(x^2+1)^2}$

(b) $\int_{-\infty}^0 e^{3x} dx$

(c) $\int_0^3 \frac{dx}{\sqrt{3-x}}$

(d) $\int_0^1 \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

② Find Cauchy's principle value for $\int_{-1}^1 \frac{dx}{x^4}$

3. Test the convergence

(a) $\int_0^1 \frac{\sin x}{x^{3/2}} dx$

(b) $\int_2^{\infty} \sin(1/x) dx$

(c) $\int_1^3 \frac{dx}{\sqrt{(3-x)(x-1)}}$

4) For what values of 'p' $\int_0^1 \frac{\sin(1/x)}{x^p} dx$ converges absolutely

5. Evaluate using Γ functions

(a) $\int_0^{\infty} \frac{e^{-4x} x^{3/2}}{x} dx$

(b) $\int_0^{\infty} \frac{e^{-ax^2} x^2}{x^2} dx$

⑥ Evaluate using Γ - β functions

(a) $\int_0^1 x^3 (1-\sqrt{x})^5 dx$

(b) $\int_0^1 x^{5/2} (1-x^2)^{3/2} dx$

(c) $\int_0^{\pi/2} \sqrt{\tan \theta} d\theta$