

Extra Questions

1. Use residues to evaluate $\int_0^\infty f(x)dx$ where $f(x) = \frac{x^2}{(x^2 + 9)(x^2 + 4)^2}$.

2. Determine the Cauchy Principal Value of the following convergent integral:

$$\int_{-\infty}^{\infty} \frac{\sin x}{x^2 + 4x + 5} dx.$$

3. Use residues to establish:

$$\int_0^{2\pi} \frac{1}{5 + 4 \sin \theta} d\theta.$$

Check: Answers 1. $\pi/200$; 2. $-(\pi/e) \sin 2$; 3. $2\pi/3$.