

Problems - 81 - Improper Integrals with Jordan's Lemma

Evaluate the following integrals.

(4)

$$\int_0^{\infty} \frac{x \sin 2x}{x^2 + 3} dx$$

(6)

$$\int_0^{\infty} \frac{x^3 \sin ax}{x^4 + 4} dx, \quad \text{where } a > 0$$