

Homework, week 6

Compute the following improper integrals:

1.
$$\int_{-\infty}^{\infty} \frac{dx}{(x^2+1)(x^2+a^2)}, \quad \int_{-\infty+ia}^{\infty+ia} \frac{dx}{x(x^2-1)}, \quad \int_{-i\infty+1/2}^{i\infty+1/2} \frac{dx}{x^2-1}$$

2.
$$\int_{-\infty}^{\infty} \frac{\sin(\alpha x)}{(x-a)^2+1}, \quad \int_{-\infty}^{\infty} \frac{dx}{\cosh(x-a)\cos(2x)}$$

3.
$$\int_{-\infty}^{\infty} \frac{xdx}{\cosh(x-a)}$$