University of Crete - Department of Mathematics and Applied Mathematics Problems No $20\,$

All curves are positively oriented unless otherwise noted.

1. Compute the following improper integrals:

(a)
$$\int_{0}^{\infty} \frac{dx}{x^2 + 1}$$
, (b) $\int_{0}^{\infty} \frac{dx}{(x^2 + 1)^2}$, (c) $\int_{0}^{\infty} \frac{dx}{x^4 + 1}$, (d) $\int_{0}^{\infty} \frac{\cos x dx}{x^2 + 1}$,

Notice that the functions are all even, so $\int_0^\infty \ldots = \frac{1}{2} \int_{-\infty}^\infty \ldots$