1. Evaluate

\[ I = \int_0^\infty \frac{\cos ax}{1 + x^2} \, dx \]  

(1)

2. Evaluate the Cauchy principal value

\[ I = P \int_{-\infty}^\infty \frac{\cos mx}{x - a} \, dx \]  

(2)

for \( a \) real and \( m > 0 \).

3. Evaluate

\[ I = \int_0^\infty \frac{dx}{(x + a)^3 x^{1/2}} \]  

(3)

for \( a > 0 \).

4. Evaluate

\[ I = \int_0^\infty \frac{\cos x}{(1 + x^2)^2} \, dx \]  

(4)

Hint: use a residue calculated in Homework 1.

5. Evaluate \( I(x) = \int_0^\infty e^{xt-e^t} \, dt \) approximately for large positive \( x \).