

HW7 Due Apr 6, 2017

1. Evaluate

$$(a) \int_0^{\infty} \frac{3x^2 dx}{(x^2+1)(x^2+4)}, \quad (b) \text{P.V.} \int_{-\infty}^{\infty} \frac{dx}{2x^2+2x+1}$$

$$(c) \int_0^{\infty} \frac{\cos ax}{x^2+4} dx, \quad (d) \text{P.V.} \int_{-\infty}^{\infty} \frac{x \sin 2x dx}{2x^2+2x+1}$$

2. Compute  $\text{P.V.} \int_{-\infty}^{\infty} \frac{x \sin 2x}{x^2-1} dx$

3. Using the fact that  $\sin^3 x = \text{Im} \left( \frac{3}{4} e^{ix} - \frac{1}{4} e^{i3x} - \frac{1}{2} \right)$ ,  
evaluate  $\text{P.V.} \int_{-\infty}^{\infty} \frac{\sin^3 x}{x^3} dx$ .

4. Evaluate  $\int_0^{\infty} \frac{\sqrt{x}}{x^2+1} dx$