Problem Set 7: Integrals you will need

Problems 1 and 2

$$\int_0^\infty dx \frac{x^2}{(a^2+x^2)^2} = \frac{\pi}{4a} \tag{1}$$

$$\int_0^\infty dx \frac{x^2}{(a^2+x^2)^3} = \frac{\pi}{16a^3} \tag{2}$$

$$\int_0^\infty dx \frac{x}{(a^2+x^2)^2} = \frac{1}{2a^2} \tag{3}$$

$$\int_0^\infty dx \frac{x^4}{(a^2+x^2)^4} = \frac{\pi}{32a^3} \tag{4}$$

Note that for problem 1, the limits are 0 and ∞ for r, while for problem 2 the limits are $-\infty$ and ∞ for x. Ask yourself which of the above integrals are even functions and which are odd for the second question.