Useful Integrals

$$\int \frac{xdx}{(a^2+x^2)^{3/2}} = \frac{-1}{\sqrt{a^2+x^2}} \; ; \quad \int \frac{dx}{(a^2+x^2)^{3/2}} = \frac{x}{a^2\sqrt{a^2+x^2}} \; ;$$

$$\int \sin^2(ax)dx = \frac{x}{2} - \frac{1}{4a}\sin(2ax)$$

$$\int x\sin^2(ax)dx = \frac{x^2}{4} - \frac{x}{4a}\sin(2ax) - \frac{1}{8a^2}\cos(2ax)$$

$$\int e^{-bx}dx = -e^{-bx}(\frac{1}{b}) \; ; \quad \int xe^{-bx}dx = -e^{-bx}(\frac{x}{b} + \frac{1}{b^2})$$

$$\int x^2 e^{-bx}dx = -e^{-bx}(\frac{x^2}{b} + \frac{2x}{b^2} + \frac{2}{b^3})$$