

Physics 451: Homework #4

Due Thursday, Sep 18, 5:00PM, 2008

2.22 (worth double)

$$\int_{-\infty}^{\infty} e^{-\alpha x^2 + \beta x + \gamma} dx = \sqrt{\frac{\pi}{\alpha}} e^{\frac{\beta^2}{4\alpha} + \gamma} \quad \text{Re } \alpha > 0$$

$$\int_{-\infty}^{\infty} x e^{-\alpha x^2 + \beta x + \gamma} dx = \frac{\beta}{2\alpha} \sqrt{\frac{\pi}{\alpha}} e^{\frac{\beta^2}{4\alpha} + \gamma} \quad \text{Re } \alpha > 0$$

$$\int_{-\infty}^{\infty} x^2 e^{-\alpha x^2 + \beta x + \gamma} dx = \frac{\sqrt{\pi}}{2\alpha^{3/2}} \left(1 + \frac{\beta^2}{\alpha} \right) e^{\frac{\beta^2}{4\alpha} + \gamma} \quad \text{Re } \alpha > 0$$

2.43 just (a) and (b).

2. Peatross1 Find the probability current for the solution to problem 2.43.