Name

5.73

Quiz 5

September 13, 2002

$$\delta(a(x-b)) = \frac{1}{|a|}\delta(x-b).$$

$$\delta(g(x)) = \sum_i \left|\frac{dg(x_i)}{dx}\right|^{-1} \delta(x-x_i);\ x_i \text{ are zeroes of } g(x).$$

$\delta'(x-d)$ means derivative of δ-function evaluated at $x = d$.

Infinite box of width L: $E_n = \frac{n^2h^2}{8mL^2}, k_n = \pm\frac{n\pi}{L}, n = 1,2,\ldots$

1. $f(x) = (x-3)(4x+8)$

   A. Evaluate $\int \delta(x-d)f(x)dx$.

   B. Evaluate $\int \delta'(x-d)f(x)dx$.

   C. Express $\delta(f(x))$ in terms of $\delta(x-x_i)$.

2. Density of States.

   A. Compute $\frac{dn}{dk}$.

   B. Compute $\frac{dn}{dE}$.