

Quantum Mechanics I, Problem Set 8

Due Wednesday, November 7

1. Townsend Chapter 6, Problem 2.
2. Townsend Chapter 6, Problem 3.
3. Townsend Chapter 6, Problem 6.
4. Townsend Chapter 6, Problem 7.
5. Suppose $g(x)$ is a function with a single root at $x = x_1$, that is, $g(x_1) = 0$. Show that

$$\delta(g(x)) = \frac{1}{|g'(x_1)|} \delta(x - x_1).$$

(Hint: Taylor expand around the point $x = x_1$ and use a formula from class.) Now generalize your result to a function $g(x)$ with n roots $\{x_1, \dots, x_n\}$.