

Physics 3041 (Spring 2021) Homework Set 7 (**Due 3/24**)

1. Problem 9.7.3. (15 points)
2. Problem 9.7.8. (35 points)
3. Perform appropriate integration to show the following results regarding the Dirac delta function (25 points):

$$\begin{aligned}\delta(ax) &= \delta(x)/|a|, \text{ where } a \text{ is a real number,} \\ \delta(f(x)) &= \sum_i \frac{\delta(x - x_i)}{|df/dx|_{x_i}}, \text{ where } x_i \text{ satisfies } f(x_i) = 0, \\ \frac{d}{dx}\delta(x - x') &= \delta(x - x')\frac{d}{dx'}.\end{aligned}$$

4. For each energy eigenstate of a particle of mass m in the infinitely-deep potential well between $x = 0$ and L , find the probability distribution of the possible results when the particle momentum is measured. (25 points)