

Homework No. 09 (2019 Fall)

PHYS 301: Theoretical Methods in Physics

Due date: Wednesday, 2019 Oct 30, 10:00 AM, in class

0. Keywords: Dirac δ -function.

1. **(80 points.)** (Based on problem 1.44,45/1.43,44 Griffiths 4th/3rd edition.)
Evaluate the following integrals:

$$\int_2^6 dx [3x^2 - 2x - 3] \delta(x - 3) \quad (1a)$$

$$\int_{-7}^7 dx \sin x \delta(x - \pi) \quad (1b)$$

$$\int_{-\pi}^{\pi} dx \sin x \delta\left(x - \frac{3\pi}{2}\right) \quad (1c)$$

$$\int_0^3 dx x^3 \delta(x + 1) \quad (1d)$$

$$\int_{-2}^2 dx [3x + 3] \delta(3x) \quad (1e)$$

$$\int_{-2}^2 dx [3x + 3] \delta(-3x) \quad (1f)$$

$$\int_0^2 dx [3x + 3] \delta(1 - x) \quad (1g)$$

$$\int_{-1}^1 dx 9x^3 \delta(3x + 1) \quad (1h)$$