PHYS 2210 Fall 2010 Homework Set 11

Due at start of class on **Nov 18th, 2010**
Show your work!

1. (2 pt) Boas 7.5.6. Be sure to include a sketch of the function.

2. (2 pt) Find the Fourier Series expansion for the following function:

$$
\begin{aligned}
f(x) &= 0, \text{ for } -3 < x < -1 \\
&= 1, \text{ for } -1 < x < 1 \\
&= 0, \text{ for } 1 < x < 3
\end{aligned}
$$

3. (2 pt) Boas 7.9.10

4. (2 pt) Evaluate the following integrals:

   (a) $\int_0^\pi \sin(x)\delta(x - \frac{\pi}{2})dx$

   (b) $\int_0^3 (5x - 2)\delta(2 - x)dx$

   (c) $\int_0^5 (x^2 + 1)\delta(x + 3)dx$

   (d) $\int_{-\infty}^\infty e^x \delta(3x)dx$

5. (2 pt) Prove the following properties of the the delta function:

   (a) $\delta(x) = \delta(-x)$

   (b) $x\delta(x) = 0$