Phys 208 – Homework (HW 17) – SP13 Due Monday, March 18, 2013

Read Chapter 7 – Sections 1 through 9.

Problems: 7.4.5, 7.4.13, 7.4.15, 7.5.7, 7.6.7, 7.6.14,

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Phys 208 – Homework (HW 18) – SP13 Due Wednesday, March 20, 2013

Chapter 7 -- Read Sections 11 and 12
Chapter 8 – Read Section 11 (Dirac Delta Function)

Problems: 7.7.9 (Just compare to the result for problem 7.5.9 on page 355. You do not need to calculate the sine-cosine series.), 7.7.13, 7.8.1 (Just expand in the complex exponential series and show that it is equivalent to the result for problem 7.5.1 on page 354 if $\ell = \pi$.), 7.11.5, 7.11.7, 7.11.9 (You do not need to work out the series for these 3 problems. Just use the results given in the book for them on pages 370 and 355.)

Answers: 7.7.9 $f(x) = \frac{\pi}{2} - \frac{2}{\pi} \sum_{\substack{n=-\infty \\ n\ odd}}^{\infty} \frac{e^{inx}}{n^2}$ 7.8.1 $f(x) = \frac{1}{2} + \frac{i}{\pi} \sum_{\substack{-\infty \\ n\ odd}}^{\infty} \frac{e^{in\pi x/\ell}}{n}$

Phys 208 – Homework (HW 19) – SP13 Due Friday, March 22, 2013

Chapter 8 – Read Section 11 (Dirac Delta Function)

Problems: 7.12.3, 7.12.17, 7.12.21, 7.12.23, 7.12.24, 7.12.33

HW19.1 Use your result for problem 7.12.3 and Parseval's theorem to show that

$$\int_{-\infty}^{\infty} \frac{[1-\cos(\alpha\pi)]^2}{\alpha^2} d\alpha = \pi^2 .$$

Answer: 7.12.3 $f(x) = \int_{-\infty}^{\infty} \frac{1-\cos(\alpha\pi)}{i\alpha\pi} e^{i\alpha x} d\alpha$

7.12.17 $f_s(x) = \frac{2}{\pi}\int_0^{\infty} \frac{1-\cos(\alpha\pi)}{\alpha} \sin(\alpha x)\, d\alpha$ 7.12.24 (c) $g_c(\alpha) = \sqrt{\frac{\pi}{2}}\, e^{-|\alpha|}$

1. Note: Some properties of the delta function are given on page 456 of the book. Evaluate the following integrals:

a) $\int_2^6 (3x^2 - 2x - 1)\,\delta(x-3)\,dx$ b) $\int_0^5 \cos x\,\delta(x-\pi)\,dx$ c) $\int_0^3 x^3\,\delta(x+1)\,dx$

d) $\int_{-\infty}^{\infty} \ln(x+3)\,\delta(x+2)\,dx$ e) $\int_{-2}^{2} (2x+3)\,\delta(3x)\,dx$ f) $\int_{-1}^{1} 9x^2\,\delta(3x+1)\,dx$