

## Physics 452: Homework #4

Due Thursday, Jan. 22, 5:00PM, 2009

6.1

6.2

6.3 HINT:  $\int_0^a \sin^4 \frac{\pi}{a} x dx = \frac{3a}{8}$ ;  $\int_0^a \sin^2 \frac{\pi}{a} x \sin^2 \frac{2\pi}{a} x dx = \frac{a}{4}$ .

6.4 HINT: Don't just use this; please go through it:

$$\sum_{\substack{m \neq n \\ \text{odd}}}^{\infty} \frac{1}{n^2 - m^2} = \frac{1}{2n} \sum_{\substack{m \neq n \\ \text{odd}}}^{\infty} \left[ \frac{1}{n-m} + \frac{1}{n+m} \right] = \frac{1}{2n} \left[ \sum_{\substack{\ell=-\infty \\ \ell \neq 0}}^{\frac{n-1}{2}} \frac{1}{2\ell} + \sum_{\substack{\ell=\frac{n+1}{2} \\ \ell \neq n}}^{\infty} \frac{1}{2\ell} \right] = \frac{1}{2n} \left[ \left( \sum_{\substack{\ell=-\infty \\ \ell \neq 0}}^{\infty} \frac{1}{2\ell} \right) - \frac{1}{2\ell} \Big|_{\ell=n} \right]$$