

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Department of Physics

Physics 221A

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Fall 2008

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ASSIGNMENT #5

Due 5 PM, Monday, Oct 27

Problems 8.4, 8.7, 9.2, and 9.3 in the book.

10.6) Let $F(x_1, \dots, x_n)$ be a function only of the coordinate differences $x_i - x_j$. Define the Fourier transform

$$\tilde{F}(k_1, \dots, k_n) \equiv \int d^4x_1 \dots d^4x_n e^{ik_1x_1 + \dots + ik_nx_n} F(x_1, \dots, x_n).$$

Show that

$$\tilde{F}(k_1, \dots, k_n) \propto \delta^4(k_1 + \dots + k_n).$$