February 11, 2008 Lecturer Dmitri Zaitsev Hilary Term 2008

Course 2E2 2007-08 (SF Engineers & MSISS & MEMS)

S h e e t 12

Due: at the end of the tutorial

Exercise 1

Find the smallest period for the functions:

$$\sin 2x, \quad \cos\frac{x}{7}, \quad \sin n\pi x, \quad |\sin x|.$$

Exercise 2

Which systems of functions are orthogonal with respect to the inner product $\langle f, g\rangle = \int_{-\pi}^{\pi} f(x)g(x)dx$?

(i) $\{1, x\}$;

(ii) $\{1, (x^2 - \frac{\pi^2}{3})\}$;

(iii) $\{1, x, (x^2 - \frac{\pi^2}{3})\}$.