Course 2E2 2008-09 (SF Engineers & MSISS & MEMS)

S h e e t 12

Due: at the end of the tutorial

Exercise 1

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) $\{1, 2x\}$;

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

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

Exercise 2

Find the Fourier series of the function $f(x) = 1 - x$, where $-\pi \leq x \leq \pi$.