

MATH6502 Example Sheet 2. Hand in all questions from section A.
Cover sheet with DEPARTMENT/TUTOR/YOUR NAME & signed.
Due into Maths room 6.10 by 2pm on Wednesday 15 October.

Section A

1. For each of the following functions, state whether they are odd, even, or neither odd nor even.

(i) x^n (ii) $3x^4 - 5x^2 + 4$ (iii) $x^3 - 2x$ (iv) $3x^4 + 2x - 1$ (v) $e^{\lambda x}$ (vi) $\sin x^2$ (vii) $\cosh x$

2. Find the Fourier series for the function $g(x) = x^2$ for $-L < x \leq L$ with a periodic extension of period $2L$.

3. Consider the function $g(x) = x$ in $0 \leq x \leq \pi$.

- (a) Sketch the even periodic extension of $g(x)$ to period 2π . Find the Fourier cosine series for this extension.
- (b) Sketch the odd periodic extension of $g(x)$ to period 2π . Find the Fourier sine series for this extension.

Section B

1. Find the Fourier series for the following function, with a periodic extension of period 2π :

$$g(x) = \begin{cases} -\cos x & -\pi < x \leq 0 \\ \cos x & 0 < x \leq \pi \end{cases}$$

2. Find the Fourier series for the following function, with a periodic extension of period 2π :

$$f(x) = \begin{cases} 0 & -\pi < x \leq 0 \\ \sin x & 0 < x \leq \pi \end{cases}$$