Dr. Z.'s Calc5 Homework assignment 9

1: Determine whether the following functions are (i) even (ii) odd (iii) neither.

a. $f(x) = \sin 17x$

b. $f(x) = \cos 200x$

c. $f(x) = \cos x + \sin x$

d. $f(x) = x^{12} \cos 2x$

e. $f(x) = 2x + x^{13} + 7x^{25}$

f. $f(x) = x + x^{100}$

2: Expand the function $f(x) = |x|$ in an appropriate cosine or sine series on the interval $(-\pi, \pi)$.

3.: Using **2** (don't do it from stratch!), expand the function $f(x) = |x|$ in an appropriate cosine or sine series on the interval $(-1, 1)$.

4: Expand the given function in an appropriate cosine or sine series.

$$f(x) = \begin{cases} 1, & \text{if } -\pi < x < -\pi/2; \\ 2, & \text{if } -\pi/2 \le x < \pi/2; \\ 1, & \text{if } \pi/2 \le x < \pi; \end{cases}$$

4': Expand the given function in an appropriate cosine or sine series.

$$f(x) = \begin{cases} 1, & \text{if } -8 < x < -4; \\ 2, & \text{if } -4 \le x < 4; \\ 1, & \text{if } 4 \le x < 8; \end{cases}$$

5: Find the half-range sine expansion of $f(x) = x$ on $(0, 4\pi)$.

6: Find the half-range cosine expansion of $f(x) = x$ on $(0, 4\pi)$.

Note: You may use the indefinite integrals

$$\int x \cos ax \, dx = \frac{1}{a^2} \cos ax + \frac{1}{a} x \sin ax \quad .$$

$$\int x \sin ax \, dx = \frac{1}{a^2} \sin ax - \frac{1}{a} x \cos ax \quad .$$