TUTORIAL-5

PROBLEMS BASED ON FOURIER SERIES (ODD AND EVEN FUNCTIONS AND HALF RANGE)

1. Find the Fourier series for f(x) =|x| in $(-\pi, \pi)$.And hence find the sum of the series

    $$\sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} = \frac{\pi^2}{8}.$$

2. Find the half range sine series of $f(x) = lx - x^2 \; in \, (0, l)$.

3. Obtain sine series for $f(x) = \begin{cases} x & ; 0 \le x \le \dfrac{l}{2} \\ l - x ; \dfrac{l}{2} \le x < l \end{cases}$

4. Obtain the Fourier cosine series for $f(x) = \begin{cases} kx & ; 0 \le x \le \dfrac{l}{2} \\ k(l-x) ; \dfrac{l}{2} \le x < l \end{cases}$