Chapter 10

1. Find the Fourier series for the given function

(a) $f(x) = \begin{cases} x, & -\pi \le x < 0 \\ 0, & 0 \le x < \pi \end{cases}$, $f(x+2\pi) = f(x)$

(b) $f(x) = \begin{cases} 0, & -2 \le x \le -1 \\ x & -1 < x < 1 \\ 0, & 1 < x < 2 \end{cases}$; $f(x+4) = f(x)$

(c) $f(x) = \begin{cases} x+2, & -2 \le x < 0 \\ 2-2x, & 0 \le x < 2 \end{cases}$; $f(x+4) = f(x)$

2. Find the values of the fourier series at values $x = -\frac{\pi}{2}$, $x = 0$, $x = \frac{\pi}{2}$ of 1(a)

3. Use method of separation of variables to solve

$$\begin{cases} u_{tt} = u_{xx}, & 0 < x < 2\pi \\ u(x,0) = \sin x - \sin 4x \\ u(0,t) = 0, \; u(2\pi, t) = 0 \end{cases}$$

4. Solve $\begin{cases} u_{tt} = u_{xx}, & 0 < x < \pi \\ u(x,0) = \cos 2x, \; u_t(x,0) = \cos^2 x \\ u_x(0,t) = 0, \; u_x(\pi, t) = 0 \end{cases}$

5. Solve $\begin{cases} u_t = u_{xx}, & 0 < x < \pi \\ u(x,0) = \sin^2 x \\ u(0,t) = 0 \quad u(\pi, t) = 0 \end{cases}$