

1. (3 points) Find the Fourier Series for the 6-periodic function $f(x)$ if $f(x) = \begin{cases} 1 & -3 < x \leq 0 \\ 0 & 0 < x \leq 3 \end{cases}$.

2. (3 points) Solve $y_{tt} = 9y_{xx}$ if $y_x(0, t) = 0 = y_x(\pi, t)$, $y(x, 0) = 0$, and $y_t(x, 0) = 2 - 3 \cos(5x)$. Show the steps discussed in lecture.

3. (4 points) Solve $u_t = 2u_{xx}$ if $u(0, t) = 0 = u(1, t)$, and $u(x, 0) = 1 + x$. Show the steps discussed in lecture.