Quiz 10

1. Find a Fourier <u>sine</u> series representation of

$$f(x) = 2, \quad 0 < x < \pi, \text{ with odd extension}$$

$$f(x) = \frac{a_0}{2} + \sum_{m=1}^{\infty} \left(a_m \cos \frac{m\pi x}{L} + b_m \sin \frac{m\pi x}{L} \right)$$

where

$$a_m = \frac{1}{L} \int_{-L}^{L} f(x) \cos \frac{m\pi x}{L} \, dx, \quad m = 0, 1, 2, \ldots$$

and

$$b_m = \frac{1}{L} \int_{-L}^{L} f(x) \sin \frac{m\pi x}{L} \, dx, \quad m = 1, 2, 3, \ldots$$

2. Solve the wave equation

$$u_{xx} = u_{tt}, \quad 0 \le x \le L, \quad t > 0$$
$$u(0, t) = 0, \quad u(L, t) = 0$$
$$u(x, 0) = \sin \frac{\pi x}{L} + 0.5 \sin \frac{3\pi x}{L}$$