

Math 325: Differential Equations

Name: _____

Quiz 10 *April 20, 2001*

You may use your own calculator. You may not use anything else. You may not pass a calculator to another person.

Show all your work. Erase or cross out any work you do not want graded.

Find the solution of the heat equation

$$u_{xx}(x, t) = u_t(x, t), \quad 0 < x < 1, \quad 0 < t,$$

satisfying the initial condition

$$u(x, 0) = 351 \sin 5\pi x, \quad 0 < x < 1,$$

and the boundary conditions

$$u(0, t) = 0 = u(1, t), \quad t > 0.$$

Bonus Questions (5 points each) These questions can be done very quickly and in a short amount of space. I will not read lengthy solutions.

a) Find the Fourier series of $\cos(4235679801x)$ on the interval $-\pi < x < \pi$.

b) Find the Fourier series of $\cos^2(\pi x)$ on the interval $-1 < x < 1$.