Homework 8, due 4/30, 10pm

1. [5pts] Solve the problem:

$$\begin{aligned} u_t - 4u_{xx} &= \sin(t) && 0 < x < 1, t > 0, \\ u_x(0,t) = u_x(1,t) &= 0, && t \geq 0, \\ u(x,0) &= 1 + \cos^2(\pi x), && 0 \leq x \leq 1, \end{aligned}$$