

# M597K: Homework Assignment 12

Date: Nov. 25, Monday; Due Wed. Dec. 4.

1. Use separation of variables to derive a solution formula for

$$\begin{aligned}\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} &= 0, & 0 < x < L, 0 < y < H \\ u(0, y) &= 0, \\ u(L, y) &= 0, \\ u(x, 0) &= 0, \\ u(x, H) &= g(x).\end{aligned}\tag{1}$$

2. By guessing or eigenfunction expansion, find a solution to

$$\begin{aligned}\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} &= 5 \sin \frac{3\pi x}{L} \sin \frac{2\pi y}{H}, & 0 < x < L, 0 < y < H \\ u(0, y) &= 0, \\ u(L, y) &= 0, \\ u(x, 0) &= 0, \\ u(x, H) &= 0.\end{aligned}\tag{2}$$

End.