Math 3363 – Spring 2016   Name:

HW #7

Please, write clearly and justify all your steps, to get proper credit for your work. You can cite general results from the book.

(1)[5Pts] Solve the wave equation problem

$$\frac{\partial^2 u}{\partial t^2} = c^2 \nabla^2 u,$$

with boundary condition $u(a, \theta, t) = 0$ and initial condition

$$u(r, \theta, 0) = \alpha(r) \cos 2\theta, \quad \frac{\partial u}{\partial t}(r, \theta, 0) = 0.$$

[Hint: You can use the general solution (7.7.46) from textbook. You also need to write, without solving it, the integral expression to compute the coefficients A_{mn}, B_{mn}.]

(2)[5Pts] Solve the wave equation problem

$$\frac{\partial^2 u}{\partial t^2} = c^2 \nabla^2 u,$$

with boundary condition $u(a, \theta, t) = 0$ and initial condition

$$u(r, \theta, 0) = 0, \quad \frac{\partial u}{\partial t}(r, \theta, 0) = \alpha(r) \sin 4\theta.$$

[This is problem 7.7.1 from the textbook. Organize the solution similarly to problem above].

(3)[5Pts] Problem 7.7.3 (a-b)