# PHYS 301
# HOMEWORK #13

Due : 29 April 2016

1. Problem 11.82, text, all parts except b). 5 pts each part.

2. Problem 11.84

3. Problem 11.91

4. Consider a semi-infinte plate of width 10 cm; the temperature on the vertical boundaries is zero and the temperature across the bottom edge is T(x,0) = x. Find the solution to Laplace's equation for this plate.

5. Consider a semi - infinite plate of width $\pi$. The vertical sides are at T = 0 and the bottom edge satisfies T (x, 0) = cos x. Find the solution to Laplace' s equation for this plate.

**HOMEWORK #14 (OPTIONAL)**

This is an optional homework, your grade will not be effected if you do not submit this homework. If you do submit it, turn it in no later than 5 pm in my office (Cudahy 404). Your grade on this homework will replace your lowest homework score of the semester.

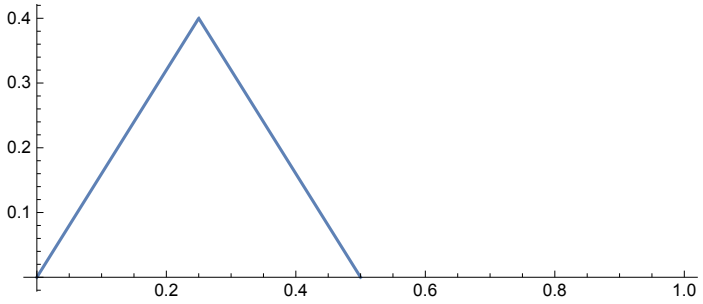
1. Problem 11.94

2. Problem 11.96

3. Problem 11.146 (submit any Mathematica output with your answers)

4. A string of length L is fixed at the ends and has zero initial velocity. Its initial position is given by :

$$y(x, 0) = \begin{cases} 4\,h\,x/L, & 0 < x < L/4 \\ 2\,h - 4\,h\,x/L, & L/4 < x < L/2 \\ 0, & L/2 < x < L \end{cases}$$



(The graph above used the specific values h = 0.4 and L = 1; this was necessary to get Mathematica to produce a graph, your answers should just use the variables h and L). Solve the wave equation for this set of boundary and initial conditions.

5. Find the steady state temperature inside a sphere of radius 1 if the surface temperature is 35 $\cos^4\theta$ (assume azimuthal symmetry).

6. Find the steady state temperature inside a sphere of radius 1 if the surface temperature is :

$$T(1, \theta) = \begin{cases} 100, & 0 < \theta < \pi/3 \\ 0, & \text{otherwise} \end{cases}$$