

April 21, 2009

MAE 105 Homework #4

Due: Tuesday, 04/28/09

PROBLEM 1 (3 Points): Solve the Laplace's equation inside a quarter circle,

$$\nabla^2 u = 0, \quad 0 < r < a, \quad 0 < \theta < \pi/2,$$

with boundary conditions

$$u(r, 0) = 0, \quad u(r, \pi/2) = 0, \quad u(a, \theta) = (\theta - \pi/2) \sin \theta.$$

PROBLEM 2 (3 Points): Consider the following functions defined for $0 < x < 1$:

(a) $f(x) = e^{-x}$

(b) $f(x) = -2x^2$

(c) $f(x) = x^3$

(i) sketch each;

(ii) extend each to $-1 < x < 0$, as an odd function of x ;

(ii) extend each to $-1 < x < 0$, as an even function of x .

Note: You must give BOTH the equation and the sketch of each EXTENDED odd and even functions.

Note 1: To receive full credit, *all steps must be neatly shown*. Writing down the final results will receive no credit.

Note 2: Homeworks must be turned in at the start of due-date class. Late homeworks will be graded but *will receive zero credit*.