

Homework Assignment # 5

Exercises: Strauss pp. 228: 3, 5, 6.

1. A solid sphere and solid cube are made out of the same material and have the same volume. Both are heated in an oven and then removed. Which will cool down faster? How much faster?

2. *True or false:* A solid hemisphere will vibrate twice as fast as a solid sphere of the same radius. Assume that the vibrations are governed by the scalar wave equation subject to homogeneous Dirichlet boundary conditions. Explain and justify your answer.

Hint: Slice the sphere from the north to south pole, not along the equator.

Due: Thursday, April 21

Text: Walter A. Strauss, *Partial Differential Equations: an Introduction*, John Wiley & Sons, New York, 1992.

Second Midterm: Thursday, April 28

Will cover three-dimensional heat, wave and Laplace equations, and basic numerics for heat and wave equations.

You will be allowed to use one 8" \times 11" sheet of notes.

Tables will be supplied as needed.