Homework 6 (MATH 5400-01)   **Name (Print):**

Due date: Friday, Oct. 19, 2012

1. Solve this problem ($r = |\mathbf{x}|$):

$$u_{tt} = c^2 \Delta u, \qquad\qquad \mathbf{x} \in R_3,\, t > 0$$
$$u(\mathbf{x},0) = r, \quad u_t(\mathbf{x},0) = 1, \quad \mathbf{x} \in R_3$$

2. Solve this problem by specifying Kirchhoff's formula:

$$u_{tt} = c^2 \Delta u, \qquad\qquad \mathbf{x} \in R_3,\, t > 0$$
$$u(\mathbf{x},0) = \delta(\mathbf{x}), \quad u_t(\mathbf{x},0) = 1, \quad \mathbf{x} \in R_3$$

Hint: use $z\, \delta'(z) = -\delta(z)$ to simplify the solution.