Problems for Infinite Spatial Domains
and the Fourier Transform

18.303 Linear Partial Differential Equations

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1   Problem 1

Do problem 10.4.3 in Haberman (p 469). The answer for (a) is in the back - please show how to get that answer. After doing parts (a), (b), solve the same PDE on the semi-infinite rod $\{x \geq 0\}$ with an insulated BC at $x = 0$:

$$\frac{\partial u}{\partial x} = 0 \qquad \text{at} \qquad x = 0$$

and the IC

$$u(x, 0) = \delta(x - 1), \qquad x > 0.$$

We also assume u is bounded as $x \to \infty$.

2   Problem 2

Do problem 10.6.4 in Haberman (p 499-500), both (a) and (b). The answer for (a) is in the back - please show how to get that answer. You may find sections 10.5 and 10.6 in Haberman useful as reference reading.