Applied Math IV: Example Sheet 3

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1. For a laterally insulated and 2-m-long rod, if $k = 10^{-4}\text{m}^2/\text{s}$ and $T(x,0) = 50x^2$, $T(0,t) = 0$, $T(2,t) = 200$:

   (a) Find the solution of $T(x,t)$.

   (b) Calculate the time needed for the center of the rod ($x = 1$) to reach 75.

2. The initial temperature distribution in a $2\text{m}\times 2\text{m}$ rectangular slab is 100°C. Find $T(x,t)$ if all sides are maintained at 0°C and $k = 10^{-4}\text{m}^2/\text{s}$.