Exercises in Statistical Mechanics

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This exercises pool is intended for a graduate course in "statistical mechanics". Some of the problems are original, while other were assembled from various undocumented sources. In particular some problems originate from exams that were written by B. Horovitz (BGU), S. Fishman (Technion), and D. Cohen (BGU).

═══ [Exercise 6070]
Landauer formula for 1D conductance

$1D$ design with passage coefficient $|t^2|$ is attached to electromotive force φ by leads which are an ideal $1D$ conductors, as described in the following drawing. Show that the conductance of the sample G,which is defined through the equation $I = G\varphi$ (I = current, φ =electromagnetic force) is given by the Landauer formula.

$$G = \frac{e^2}{2\pi}|t^2|$$

(low temperatures).