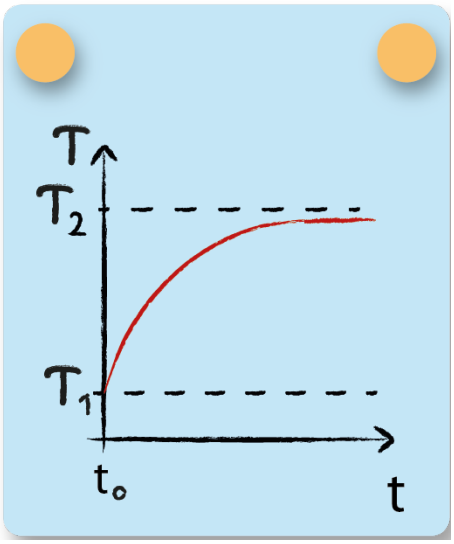
Temperature Profile Transient 2

A sphere with the radius R with an initial homogeneous temperature T_1 is suddenly (at t_0) heated up in a very large basin with a constant basin temperature T_2. At a finite time $t > t_0$ the sphere's temperature is already increased. Due to the high thermal conductivity, the temperature in the sphere is homogeneous at all times. Choose the diagram with the correct solution for the temporal evolution of the sphere's temperature.



The sphere is being heated due to convection. Initially, the rate of heat transfer is the largest due to the relatively big difference between the temperature of the sphere and the ambient temperature. For this reason, the slope will be the steepest at the beginning.

As the sphere heats up, the temperature difference decreases and so does the slope, until the sphere will eventually reach its equilibrium temperature T_2.