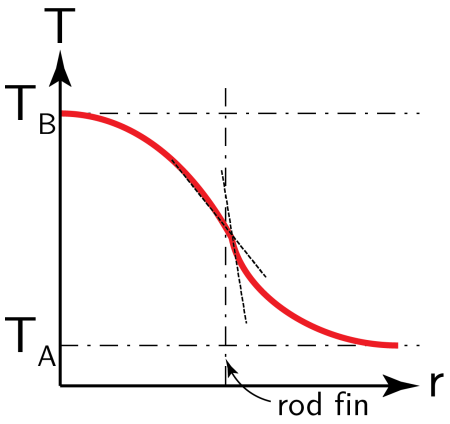
Fins - Temperature 2

Air flows around a rod-fin with a free-stream temperature of T_A, while the temperature at the center of the fin is T_B. Finite heat flux is transferred to the environment and there is no heat source in the fin. Pick the correct temperature profile in the radial direction for $\mathrm{Bi} = 1$**.**



Since $\mathrm{Bi} = 1$, the conductive resistance inside the body is equal to the convective resistance outside. Therefore the decrease in temperature should be of the same order for the in- and outside. At the intersection, the gradient should be steeper outside the body because air has a smaller thermal conductivity. Furthermore, when moving away from the center of the rod-fin, the temperature eventually approaches the ambient temperature with a horizontal slope.