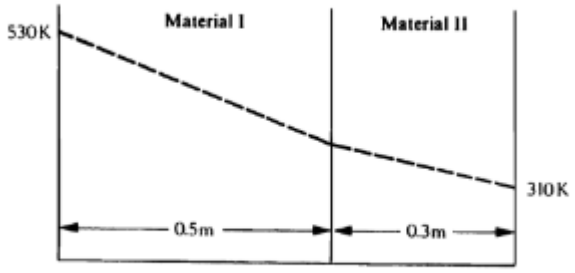
(1)

6.3 At steady state, the temperature profile in a laminated system appears thus:



Determine the thermal conductivity of II if the steady-state heat flux is 12.6 × 1)
the conductivity of I is 52 W m^{-1} K^{-1}.

$q := 12.6 \cdot 10^3 \cdot \frac{W}{m^2}$ $k_1 := 52 \cdot \frac{W}{m \cdot K}$ $L_1 := 0.5 \cdot m$ $L_2 := 0.3 \cdot m$

$T_0 := 530 \cdot K$ $T_2 := 310 \cdot K$

Ohm's Law: q*R= ΔT where Ri=Li/ki

$$T_1 := T_0 - q \cdot \frac{L_1}{k_1} = 408.846\ K$$

$$R_2 := \frac{(T_1 - T_2)}{q} = 0.008\ \frac{s^3 \cdot K}{kg}$$

$$k_2 := \frac{L_2}{R_2} = 38.241\ \frac{1}{m \cdot K} \cdot W$$