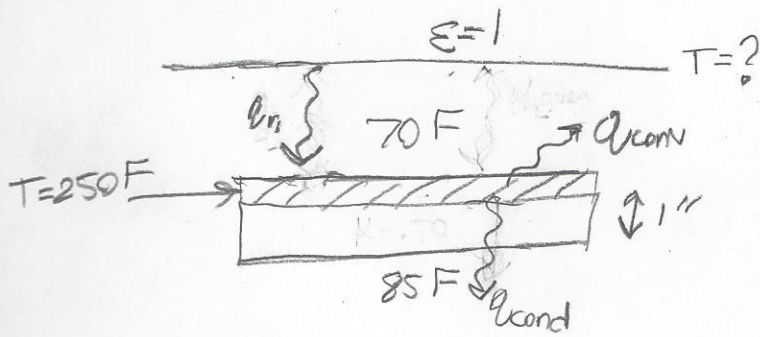


HW 8

①



$$k_{pan} = 0.50 \frac{\text{BTU}}{\text{hr ft F}}$$

$$A_1 = 1 \text{ ft}^2$$

$$h = 2 \frac{\text{BTU}}{\text{hr ft}^2 \text{ F}} \quad \epsilon = 0.60$$

input

$$q_{cond} + q_{conv} = q_{r1}$$

$$q_{cond} = \frac{\Delta T}{R} \quad R = \frac{1/12}{0.50(1 \text{ ft}^2)} = 0.167$$

$$\frac{250 - 85}{0.167} = 990$$

$$q_{conv} = h(T_s - T_{\infty}) = 2(250 - 70) = 360$$

$$q_{r1} = \sigma F_{12} A_1 (T_1^4 - T_2^4) \quad q_{r1} = 0.1714 \times 10^{-8} (0.6)(1)(730^4 - T_1^4)$$

$$F_{12} = \left[\frac{1}{1} + \frac{1}{0.6} - 1 \right]^{-1} = 0.6 \quad q_{r1} = \sigma F_{12} A_1 (T_1^4 - T_2^4)$$

$$990 + 360 = 0.1714 \times 10^{-8} (0.6)(1)(730^4 - T_1^4)$$

$$T = 1007 \text{ R}$$

$$T = 547.1^\circ \text{ F}$$