

$$\rightarrow T(r) = T_{\infty} + q_0 \frac{(b-a)}{h} + \frac{q_0 b^2}{2k_0} - \frac{q_0 ab}{k_0} - \frac{q_0}{2k_0} r^2 +$$

$$\frac{q_0 a}{k_0} r$$

$r=b$ so,

Fourier law $Q = \int_a^b q(r) dV \rightarrow dV = 2\pi r^2 dr$

$$Q = \int_a^b \left(q_0 \frac{b^2}{r^2} \right) (2\pi r^2) dr = 2\pi q_0 b^2 \int_a^b dr = 2\pi q_0 b^2 (b-a)$$

$r=b \rightarrow Q = 2\pi q_0 b^2 (b-a) \rightarrow (W/m^2) \cdot m^2 \cdot m \rightarrow (W) \text{ Part (b) } \checkmark$

Part (b) $C_1 = T_{\infty} + \frac{q_0(b-a)}{h} + \frac{q_0 b^2}{2k_0} - \frac{q_0 ab}{k_0}$

$T_{\infty} \rightarrow (K)$
 $\frac{q_0(b-a)}{h} \rightarrow \frac{(W/m^2) \cdot m}{(W/m^2) \cdot K} \rightarrow (K)$

$\frac{q_0 b^2}{2k_0} \rightarrow \frac{(W/m^2) \cdot m^2}{W/m \cdot K} \rightarrow (K)$

$\frac{q_0 ab}{k_0} \rightarrow \frac{(W/m^2) \cdot m^2}{W/m \cdot K} \rightarrow (K)$

Part (c) if $q_0 = 0$ then

$$T(r) = T_{\infty} + 0 + 0 - 0 - 0 + 0 \text{ AND}$$

$Q = 0$ yes - no heat generation & internal heat source, the hemisphere will reach ambient temp, so no heat transfer.