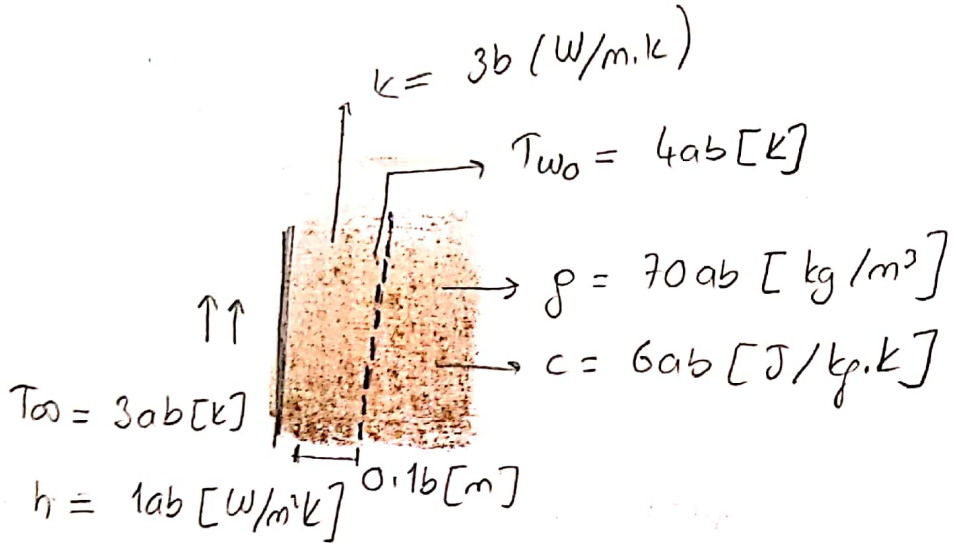

$$T(x,0) = T_i = T_{w0} = 4ab\ [k]$$

$$-k \left.\frac{\partial T}{\partial x}\right|_{x=0} = h\,[T_\infty - T(0,t)]$$

$$\eta = x/(4\alpha t)^{1/2} \qquad \alpha = \frac{k}{\rho c} = \frac{3b}{70ab \times 6ab}$$

Case 3 for semi-infinite solids:

$$\frac{T(x,t)-T_i}{T_\infty - T_i} = \operatorname{erfc}\left(\frac{x}{2\sqrt{\alpha t}}\right) - \left[\exp\left(\frac{hx}{k} + \frac{h^2 \alpha t}{k^2}\right)\right]\left[\operatorname{erfc}\left(\frac{x}{2\sqrt{\alpha t}} + \frac{h\sqrt{\alpha t}}{k}\right)\right]$$

where. $\operatorname{erfc} w = 1 - \operatorname{erf} w$

$T(\underbrace{0.1b\ [m]}_{x}, \underbrace{3b \times 60\ sec.}_{t})$ → we need to find

Using the formula,

$$\frac{T-4ab}{3ab-4ab} = \operatorname{erfc}\left(\frac{0.1b}{2\sqrt{\frac{3b \times 3b \times 60}{70ab \times 6ab}}}\right)$$

$$- \exp\left(\frac{1ab \times 0.1b}{3b} + \frac{(1ab)^2 \times (3b)^2 \times 60}{70ab \times 6ab \times (3b)^2}\right)$$

$$\times \operatorname{erfc}\left(\frac{0.1b}{2\sqrt{\frac{(3b)^2 \times 60}{70ab \times 6ab}}} + \frac{1ab\sqrt{\frac{3b^2 \times 60}{70ab \times 6ab}}}{3b}\right)$$

Let $a = 7 \quad b = 1$

$$\frac{T-471}{371-471} = \operatorname{erfc}\left(\frac{0.11}{0.2204}\right) - \exp\left(\frac{171 \times 0.11}{31} + \frac{(171)^2 \times 60}{7071 \times 671}\right)$$

$$\times \operatorname{erfc}\left(\frac{0.11}{0.2204} + \frac{171 \times 0.1102}{31}\right)$$

$$\frac{T-471}{371-471} = \operatorname{erfc}(0.499) - \exp(0.975) \times \operatorname{erfc}(1.107)$$

$$\frac{T-471}{371-471} = [1 - \operatorname{erf}(0.499)] - \exp(0.975) \times [1 - \operatorname{erf}(1.107)]$$

Using Appendix B:

$w = 0.499 \rightarrow erf(0.499) \approx 0.5203$

$w = 1.107 \rightarrow erf(1.107) \approx 0.88$

Then,

$$\frac{T - 471}{-100} = (1 - 0.5203) - 2.6511 \times (1 - 0.88)$$

$$\frac{T - 471}{-100} = 0.161$$

T @ 0.11m after 31 x 60 sec:

$$T = 471 - 16.1 = 454.9 \ [k]$$