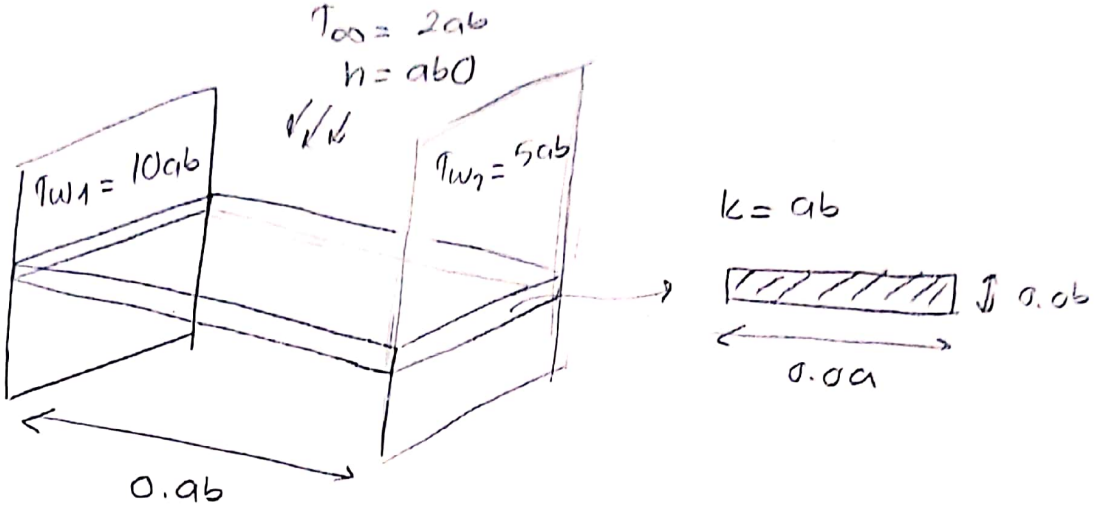

$A_c = 0.0b \times 0.0a$

$P = 2 \times (0.0a + 0.0b)$

$\theta(x) = T(x) - T_\infty$ and $\frac{d\theta}{dx} = \frac{dT}{dx}$

$\theta(x) = C_1 e^{mx} + C_2 e^{-mx}$; $m = \frac{hP}{kA_c} = \frac{(ab0) \times 2 \times (0.0a + 0.0b)}{ab\,(0.0b \times 0.0a)}$

$= \frac{20 \times (0.0a + 0.0b)}{(0.0b \times 0.0a)}$

@ $x = 0$

$\theta(0) = T_{w1} - T_\infty = \theta_b = 10ab - 2ab = 8ab$

@ $x = L$ $\theta(L) = T_{w2} - T_\infty = \theta_L = 5ab - 2ab = 3ab$

$$\frac{\theta}{\theta_b} = \frac{(\theta_L/\theta_b)\sinh(mx) + \sinh(m(L-x))}{\sinh(mL)}$$

$$q_f = \sqrt{hPkA_c}\;\theta_b\;\frac{\cosh(mL) - \theta_L/\theta_b}{\sinh(mL)}$$

$$\sinh x = \frac{e^x - e^{-x}}{2} \qquad \cosh x = \frac{e^x + e^{-x}}{2}$$

$$\frac{\theta}{8ab} = \frac{(8ab/3ab)\ \frac{e^{mx} - e^{-mx}}{2} + \frac{e^{m(L-x)} - e^{-m(L-x)}}{2}}{\frac{e^{mL} - e^{-mL}}{2}}$$

where $L = 0.ab$ and $m = \frac{20 \times (0.0a + 0.0b)}{(0.0b \times 0.0a)}$

$h = ab0$

$$qf = \sqrt{ab \times 10 \times 2 \times (0.0a + 0.0b)\ (0.0b \times 0.0a)} \times 8ab$$

$$\times \frac{\frac{e^{mL} + e^{-mL}}{2} - \frac{3ab}{8ab}}{\frac{e^{mL} - e^{-mL}}{2}}$$