

$$a) \dot{Q} = \dot{m} C$$

$$\dot{Q}_H = \dot{m}_H C_H = (0.1)(4200) = 420 \frac{W}{K}$$

$$\dot{Q}_C = \dot{m}_C C_C = (0.05)(4200) = 210 \frac{W}{K}$$

$$b) \dot{Q} = \dot{Q}_H (T_{H,i} - T_{H,o}) = \dot{Q}_C (T_{C,o} - T_{C,i})$$

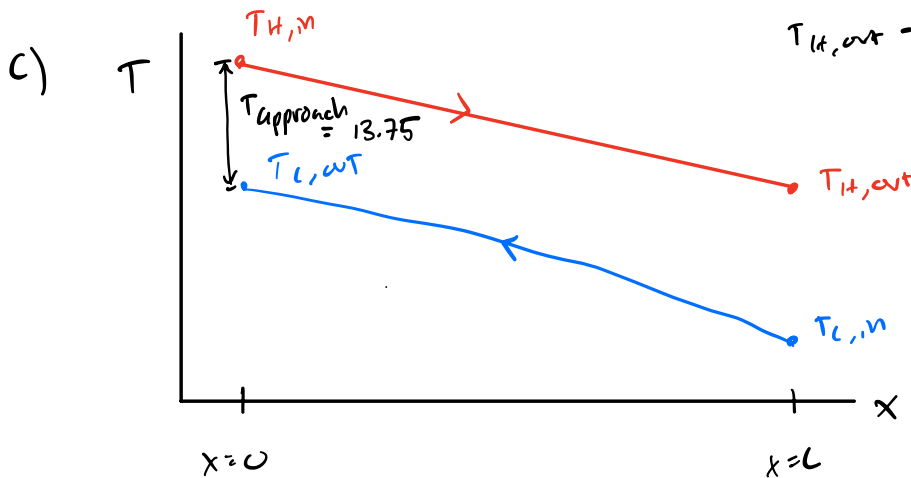
$$\dot{Q} = (420)(320 - 305) = 6300 \text{ W}$$

$$6300 = (210)(T_{C,o} - 280)$$

$$\frac{6300}{210} + 280 = T_{C,o} = 306.25$$

$$T_{H,i} - T_{C,o} = 13.75$$

$$T_{H,o} - T_{C,i} = 25$$



d) Find conductance UA

$$\ln \left(\frac{T_{H,o} - T_{C,i}}{T_{H,i} - T_{C,o}} \right) = -UA \left(\frac{1}{\dot{Q}_H} - \frac{1}{\dot{Q}_C} \right)$$

$$UA = \frac{\ln \left(\frac{305 - 280}{320 - 306.25} \right)}{\frac{1}{420} - \frac{1}{210}} = 251.09$$