Zain Kossous

Assignment #1:
A short summary about the conductive heat transfer and solving the same exercise with L= 0.4 m, A= 20 m2, DeltaT= 25, and k=0.78 W/m K using both simple method and using the resistance concept

What is conductive heat transfer?
Conductive heat transfer is the transfer of heat energy through a material when there is a difference in temperature.
It takes place in all phases of solid, liquid, and gas.
It is represented by $\dot{Q}$
Heat transfer through a wall is proportional to its area. It is also proportional to the difference in temperature and the conductivity. However, it is inversely proportional to thickness of the wall.
Conductivity of a material is its willingness to transfer heat.

L= 0.4 m, A= 20 m2, DeltaT= 25, and k=0.78 W/m K

Method 1:

$$\dot{Q} = kA.\frac{\Delta T}{L}$$

$$\dot{Q} = 0.78\frac{W}{mK} \times 20m^2 \times \frac{25\ K}{0.4m}$$
$$= 975W$$

Method 2:

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78\times20} = 0.0256\frac{℃}{W}$$

$$\dot{Q} = \frac{\Delta T}{R_{wall}} = \frac{25K}{0.0256\frac{K}{W}} = 976.6\ W$$