submission week **1**

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1 Write a short summary about the conductive heat transfer.

Conductive heat transfer takes place when there is a temperature gradient in a solid or stationary fluid medium. Heat flows from more energetic to less energetic molecules until a thermal equilibrium is reached.

Conductive heat transfer can be expressed with **Fourier's Law**:

$$\dot{Q} = -kA\frac{dT}{dx} \qquad (W)$$

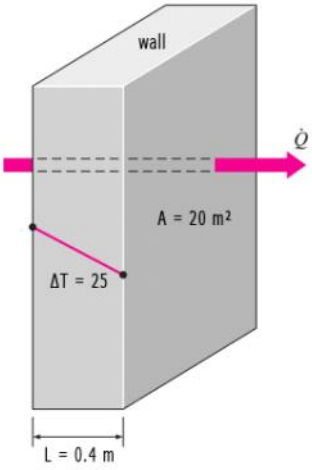
The Fourier's Law can be applied to calculate the rate of heat conduction transfer through the wall of a house.

$$\dot{Q}_{cond,\,wall} = kA\frac{T_1 - T_2}{L} \qquad (W)$$

Conclusions:

- It is proportional to the average thermal conductivity, the wall area, and the temperature difference;
- It is inversely proportional to the wall thickness;
- Once the rate of heat conduction is available, the temperature T(x) at any location x can be determined;
- Under steady conditions, the temperature distribution in a plane wall is a straight line: dT/dx = constant.

2 Find the rate of heat trasfer through the wall if k=0.78 W/m C (using both simple method and using the resistance concept)



$$\dot{Q} = kA\frac{\Delta T}{L} = 0.78 * 20 * \frac{25}{0.4} = 975\ W$$

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 * 20} = 0.0256\ °C/W$$

$$\dot{Q} = \frac{\Delta T}{R_{Wall}} = \frac{25}{0.0256} = 976.56\ W$$