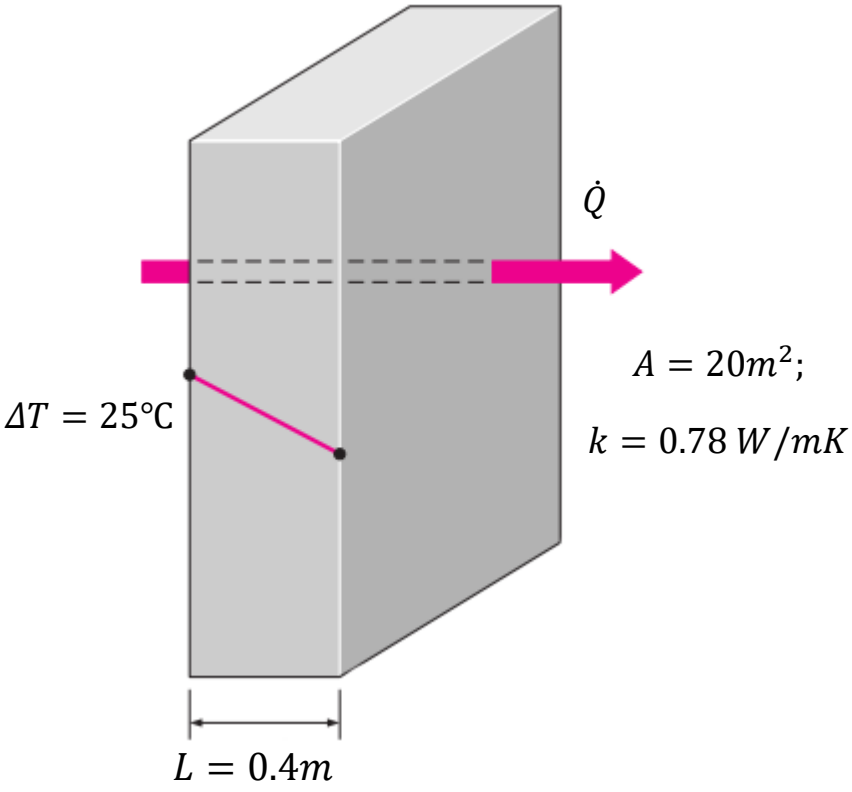
Conductive Heat Transfer Summary:

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

Conductive heat transfer through a wall is proportional to the wall area, the difference of temperature between 2 sides of the wall and the wall conductivity. It is however, inversely proportional to the wall thickness.

Exercise:



Simple Method:

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

Resistance Concept:

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 \times 20} = 0.02564\ ℃/W$$

$$\dot{Q} = \frac{\Delta T}{R_{Wall}} = \frac{25}{0.02564} \approx 975\ W$$