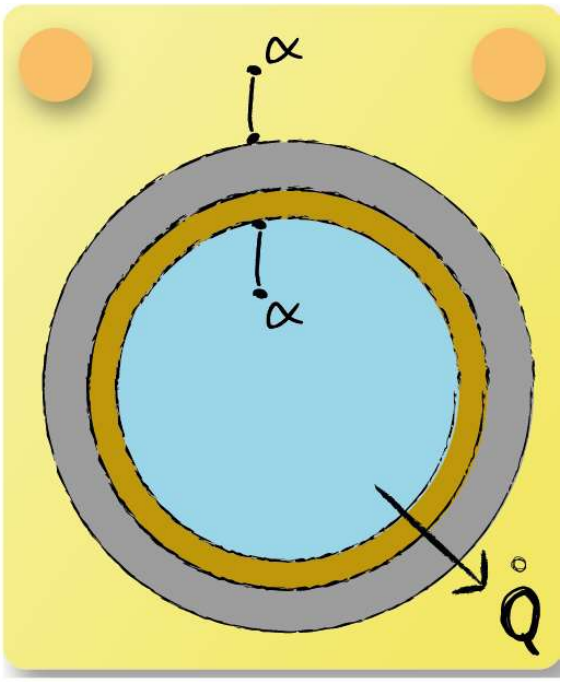
Lecture 8 - Question 2



Which of the following statements is/are **not** true when performing steady-state heat transfer calculations with on a multi-layer pipe wall?

$A_{in} = A_{out}$
$\dot{q}''_{in} = \dot{q}''_{out}$

$A_{in} = A_{out}$ states that the cross section remains constant. But along r the perimeter of a multi-layer pipe wall will increase and so will the cross section area. Thus this statement is not true.

$\dot{Q}_{in} = \dot{Q}_{out}$ states that the heat entering the multi-layer pipe wall equals the heat leaving the system. Since there is steady-state heat transfer this should be fulfilled in order to satisfy the energy equation. This statement is true.

$\dot{q}''_{in} = \dot{q}''_{out}$ states that the area related heat transfer rates entering and leaving the system are equal to each other. As described above the heat fluxes entering and leaving do equal each other. But as the cross sectional area is not constant along r, nor will the area related heat transfer rates be. This statement is thus not true.