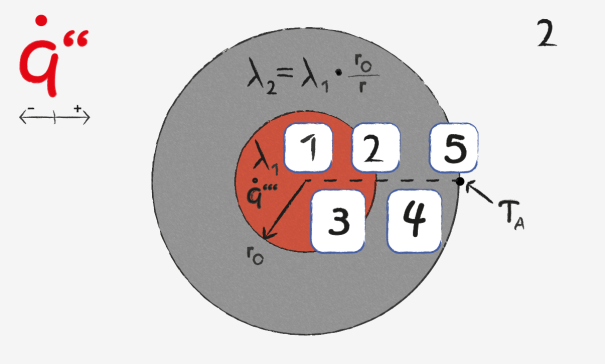
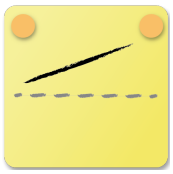
Axial Heat Flux: Task 2



The image describes a cylindrical body of infinite expansion. The inner compartment has a heat source. The conductivity of the outer material reduces with the radius in the same manner as the area increases.

1 

Due to symmetry reasons, the specific heat flux at the pipe's center is zero.

2 

The volumetric heat source causes the specific heat flux to increase linearly.

3 

The transition is marked by a kink in specific heat flux, since from there on increasing area causes the specific heat flux to decrease.

4 

Linear increase of area goes along with decrease of specific heat flux proportional to $\frac{1}{r}$. Thermal conductivity is not of interest for the heat flux profile.

5 

To fulfill the energy balance in a steady case, the specific heat flux is still positive at the boundary, indicating a flux from inside to outside.