Heat Conduction: Task 22
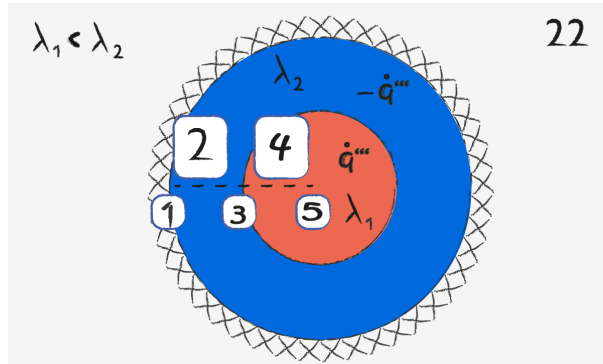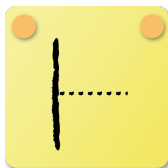

The image desrcibes a cylindrical body of infinite expansion with homogenous heat loss in the outer part and heat production in the inner part. The outer wall is adiabatic.
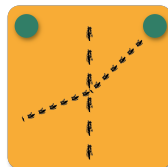
1

On an adiabatic wall there is no heat transport so the temperature gradient is zero.

2

Due to the constantly decreasing heatflux ,the temperature gradient decreases constantly from right to left and to meet the condition on the adiabatic wall (no heat transport), the temperature gradient must be zero there.

3

λ_1 is smaller than λ_2 which means the temperature gradient in 1 is steeper than in 2

4

To meet the condition on the right side, the temperature gradient is zero. Due to the constantly increasing heatflux (heat source), the temperature gradient increases constantly with the radius.

5

Due to symmetry reasons, the temperature gradient in the center is zero.