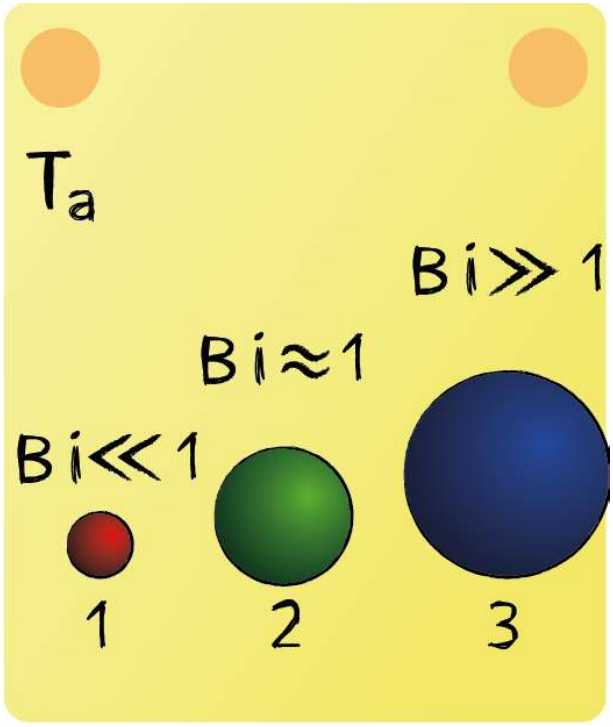
Lecture 10 - Question 3



Consider three spheres cooling down. For sphere 1 Bi $<<$ 1, for sphere 2 Bi $\approx$ 1 and for sphere 3 Bi $>>$ 3. The center temperature is denoted by $T_{\mathrm{r=0}}$ and the surface temperature by $T_{\mathrm{r=R}}$ for all the three spheres. Which answer is correct?

The difference between $T_{\mathrm{r=0}}$ and $T_{\mathrm{r=R}}$ is the smallest for sphere **1** and the biggest for sphere **3**.
For sphere 1 it is known that $Bi << 1$, implying that the temperatures inside the body will not vary significantly and thus the difference between $T_{\mathrm{r=0}}$ and $T_{\mathrm{r=R}}$ is the smallest for this sphere.
For sphere 3 it is known that $Bi >> 1$, implying that the temperatures inside the body will vary significantly and thus the difference between $T_{\mathrm{r=0}}$ and $T_{\mathrm{r=R}}$ is the biggest for this sphere.