Heated sphere

Find the temperature of a metallic sphere near flat black-body plate heated to T_0.

The heat radiation absorbed by the crossection of the sphere should equal to the radiation from the surface of the sphere.

$$\sigma T_0^4\, \pi a^2 = \sigma T^4\, 4\pi a^2 \qquad \Rightarrow \qquad T = \frac{T_0}{\sqrt[4]{4}}$$