A blackbody of surface area 10 cm^2 is heated to $127°C$ and is suspended in a room at temperature $27°C$. Calculate the initial rate of loss of heat from the body to the room.

For a blackbody at temperature T, rate of emission is $\boxed{u = \sigma A T^4}$ $(\because e = 1$ for blackbody in eg. $u = e\sigma A T^4)$

Also, when kept in a room at temperature T_0, rate of absorption is $\boxed{u_0 = \sigma A T_0^4}$

Hence, net rate of loss of heat is $u - u_0 = \sigma A \left(T^4 - T_0^4\right)$

Here, $A = 10\,cm^2 = 10 \times 10^{-4}\,m^2$

$T = 400\,K$, $T_0 = 300\,K$

$u - u_0 = (5.67 \times 10^{-8}\,Wm^{-2}K^{-4})(10 \times 10^{-4}\,m^2)[(400)^4 - (300)^4]\,K^4$

$\boxed{u - u_0 = 0.99\,W}$