Problem 302A

Air ($R = 280\ m^2/s^2\ K°$, $\gamma = 1.4$) at a temperature of $30°C$ flows down a duct at a velocity of $30\ m/s$. The flow then proceeds through a compressor into a smaller duct where it travels at $200\ m/s$. If the rate of work done on the air by the compressor per unit mass of the air flowing through it is $1\ kW\ s/kg$ what is the temperature of the air in the duct downstream of the compressor ?
(Note: $1\ watt = 1\ kg\ m^2/s^3$; $1\ kW = 1000\ watts$)