a. From the Clausius-Clapeyron relation and the ideal gas law, the liquid-vapor saturation pressure as a function of temperature is well approximated by:

\[ P_s(T) = P_\star e^{-\frac{L}{RT}}, \]

where \( L \) is the molar latent heat of vaporization, \( R = 8.315 \) J/K·mol is the molar gas constant, and \( T \) is the absolute temperature. For the water-steam phase transition at \( T = 25 \) C (298 K) one measures \( P_\star = 0.0317 \) bar with \( L = 4.27 \times 10^4 \) J/mol. From these values find \( P_\star \).

b. Suppose the temperature is 30 C and the relative humidity is 80%. What is the actual water vapor partial pressure? (Recall that the relative humidity is the ratio of the actual water vapor pressure to the saturation pressure.)

c. For the situation described in part b, what is the dew point (i.e. the condensation temperature)?