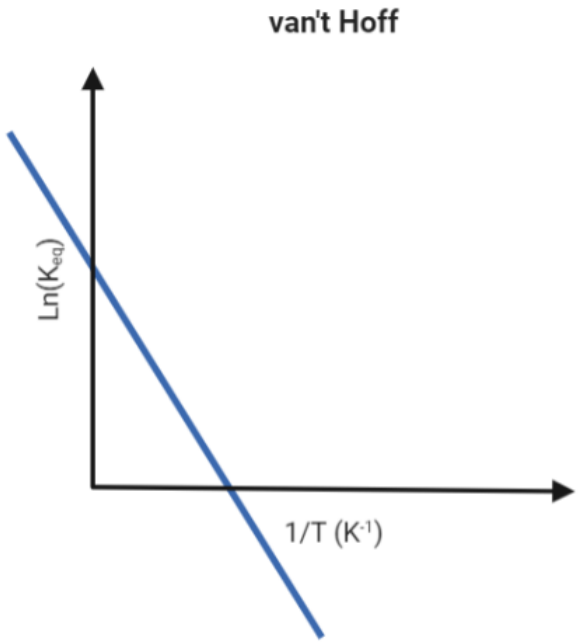
Van't Hoff Practice

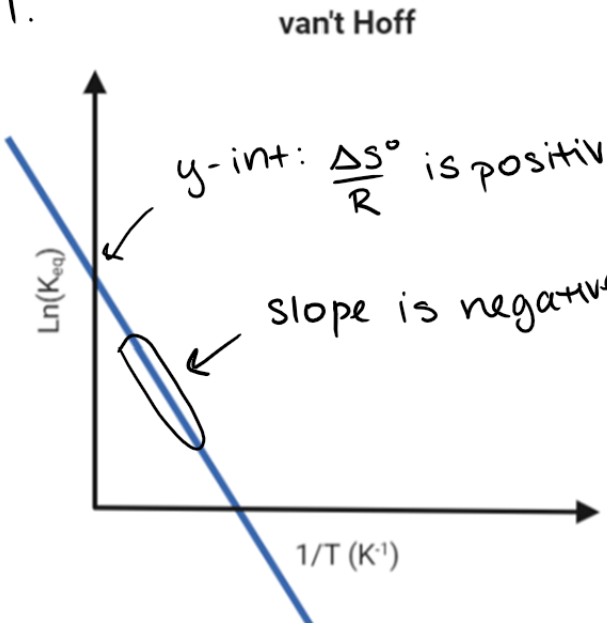
1. Given the following van't Hoff plot
    a. Is $\Delta S°$ positive or negative?
    b. Is $\Delta H°$ positive or negative?



2. Given the following: $\Delta S° = -30$ J/mol, $\Delta H° = -8$ kJ/mol. At T = 200K, find the equilibrium constant Keq.

ANSWERS

1.



y-int: $\frac{\Delta S^\circ}{R}$ is positive → ΔS° is positive

slope is negative = $-\frac{\Delta H^\circ}{R}$ so ΔH° is positive

2. $\Delta S^\circ = -30$ J/mol

$\Delta H^\circ = -8000$ J/mol

$T = 200$

$$\ln(K_{eq}) = -\frac{\Delta H^\circ}{R}\left(\frac{1}{T}\right) + \frac{\Delta S^\circ}{R}$$

$$\ln(K_{eq}) = \frac{8000}{8.314}\left(\frac{1}{200}\right) + \frac{-30}{8.314}$$

$$\ln(K_{eq}) = 1.203$$

$$K_{eq} = e^{1.203}$$

$$K_{eq} = 3.33$$