

$$\ln(A_t) = -kt + \ln(A_0)$$

Same time units!

(38b)

$$k = 0.271 \frac{1}{\text{sec}}$$

$$\frac{1}{M^0 \cdot \text{sec}}$$

$$\ln A_t = -kt + \ln A_0$$

$$\ln A_t = -0.271(\text{sec}) + \ln(0.05)$$

$$\frac{1}{\text{sec}} \quad \frac{\text{sec}}{1}$$

$$t_{1/2} = \frac{0.693}{0.271}$$

$$e^{\ln(A_t)} = e^{-4.38}$$

$$(A_t) = 0.0125 \text{ M}$$

Feb 4-8:07 AM

$$\ln A_t = -kt + \ln A_0$$

$$\ln \frac{1}{2} A_0 = -kt_{1/2} + \ln A_0$$

$$\ln \frac{1}{2} A_0 - \ln A_0 = -kt_{1/2}$$

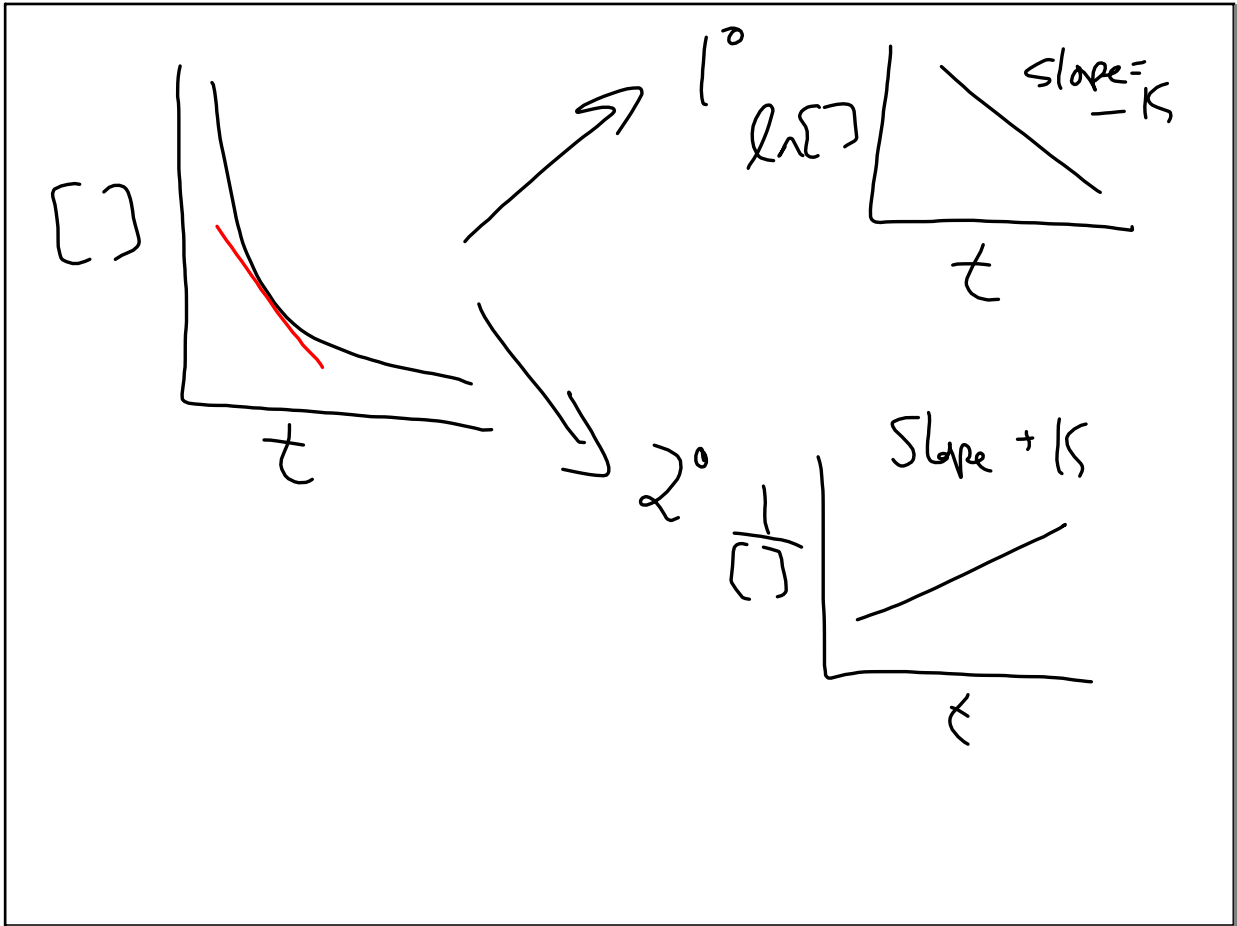
$$\ln \frac{\cancel{1/2} A_0}{\cancel{A_0}} = -kt_{1/2}$$

$$\ln \frac{1}{2} = -kt_{1/2}$$

$$-0.693 = -kt_{1/2}$$

$$t_{1/2} = \frac{0.693}{k}$$

Feb 4-8:23 AM



Feb 4-8:26 AM

$$\textcircled{1} \ln[A_t] = -kt + \ln[A_0] \quad \text{1}^\circ$$

$$\textcircled{2} \frac{1}{[A_t]} = kt + \frac{1}{[A_0]} \quad \text{2}^\circ$$

$$\textcircled{1} t_{1/2} = \frac{0.693}{k}$$

$$A_t = \frac{1}{2}[A_0] \quad \text{Half Life}$$

$$\frac{1}{\frac{1}{2}} \times \frac{2}{1} = 2$$

$$\frac{1}{\frac{1}{2}A_0} = kt_{1/2} + \frac{1}{A_0}$$

$$\frac{2}{A_0} = kt_{1/2} + \frac{1}{A_0}$$

$$\frac{2}{A_0} - \frac{1}{A_0} = kt_{1/2}$$

$$\frac{1}{A_0} = kt_{1/2}$$

$$t_{1/2} = \frac{1}{k[A_0]} \quad \text{2}^\circ$$

Feb 4-8:28 AM

$$K = A e^{-E_a/RT}$$

$$\ln K = \ln A e^{-E_a/RT}$$

$$\ln k = \ln A + \ln e^{-E_a/RT}$$

$$\ln K_1 = \ln A + \frac{-E_a}{RT_1}$$

$R = 8.314 \text{ J/mole K}$
 $R = 0.08206 \frac{\text{L atm}}{\text{mole} \cdot \text{K}}$

Feb 4-8:38 AM

$$\left[\begin{array}{l} T_1, K_1 \\ \ln K_1 = \ln A - \frac{E_a}{RT_1} \end{array} \right] \rightarrow \left[\begin{array}{l} T_2, K_2 \\ \ln K_2 = \ln A - \frac{E_a}{RT_2} \end{array} \right]$$

$$\ln K_1 - \ln K_2 = \left[\ln A - \frac{E_a}{RT_1} \right] - \left[\ln A - \frac{E_a}{RT_2} \right]$$

$$\ln \frac{K_1}{K_2} = \frac{-E_a}{RT_1} + \frac{E_a}{RT_2}$$

$$\ln \frac{K_1}{K_2} = -\frac{E_a}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$$

$$\ln \frac{K_1}{K_2} = \frac{E_a}{R} \left(\frac{1}{T_2} - \frac{1}{T_1} \right)$$

$R = 8.314 \text{ J/mole K}$
 $8.314 \times 10^{-3} \text{ kJ/mole K}$

Same units Kelvin

Feb 4-8:42 AM

$$14 \mid 39 + \cancel{50}$$

55

Feb 4-8:47 AM