

The Arrhenius equation is used to determine the activation energy ( $E_a$ ) from experimental data

$$k = Ae^{\frac{-E_a}{RT}}$$

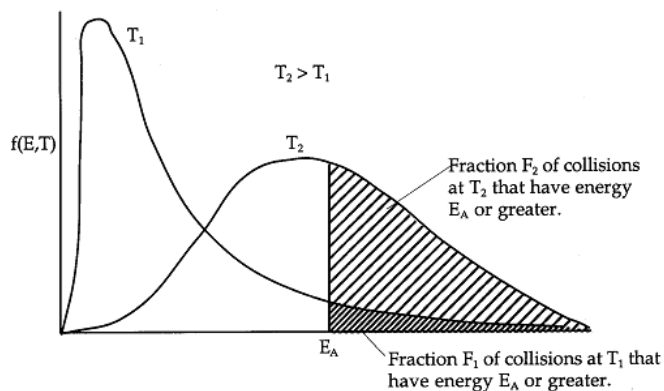
- Graphical Form

$$\ln k = \ln A - \frac{E_a}{R} \left( \frac{1}{T} \right)$$

- Two point form

$$\ln \frac{k_2}{k_1} = \frac{-E_a}{R} \left( \frac{1}{T_2} - \frac{1}{T_1} \right)$$

### The Boltzmann Plot



Example: A reaction triples its rate when the temperature increases from 25 °C to 37 °C. What is the activation energy?

Example: A reaction has  $E_a = 75 \text{ kJ/mol}$ . If  $k = 1.50 \times 10^{-3}$  at 25 °C, what is  $k$  at 50 °C?