$T_1 = 283°C = 556K$ $k_1 = 4.45 \times 10^{-5}$ $dm^3\ mol^{-1}\ s^{-1}$.

$T_2 = 302°C = 575K$ $k_2 = 1.37 \times 10^{-4}$ $dm^3\ mol^{-1}\ s^{-1}$.

$k = Ae^{-Ea/RT}$.

$\frac{k}{A} = e^{-Ea/RT}$.

$\ln \frac{k}{A} = \frac{-Ea}{RT}$.

$\ln k - \ln A = \frac{-Ea}{RT}$.

$\ln k_1 - \ln A = \frac{-Ea}{RT_1}$ (1)

$\ln k_2 - \ln A = \frac{-Ea}{RT_2}$. (2).

(1) − (2). $\ln k_1 - \ln A - \ln k_2 + \ln A = \frac{-Ea}{RT_1} + \frac{Ea}{RT_2}$.

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

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

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

$\left(\frac{RT_1T_2}{T_2 - T_1}\right) \ln \frac{k_2}{k_1} = Ea$.

$8.31446\ J\ K^{-1}\ mol^{-1} \times \frac{556\ K \times 575\ K}{(575\ K - 556\ K)} \ln \frac{1.37 \times 10^{-4}}{4.45 \times 10^{-5}} = Ea$.

$8.31446\ J K^{-1}\ mol^{-1} \times \frac{556K \times 575\ K}{19\ K} \ln \frac{1.37}{0.645} = Ea = 157\ kJ\ mol^{-1}$.

(1) $\ln k_1 - \ln A = \frac{-Ea}{RT}$

$\ln k_1 + \frac{Ea}{RT} = \ln A$.

-10.02 ← 4sf because taking ln. 34.0.

$\ln 4.45 \times 10^{-5} + \frac{157 \times 10^3\ J\ mol^{-1}}{8.31446\ J K^{-1} mol^{-1} \times 556\ K} = \ln A$.

$= 24.0$ ← 3sf

$A = e^{24.01} = 2.7 \times 10^{10}\ dm^3\ mol^{-1}\ s^{-1}$. ← 2sf because exponential.