Disinfection Problem

The following is actual data for a virus exposed to an experimental disinfectant. Estimate the contact time required to obtain a reduction of the 1/25,000 of the original number of virus.

Time,second	5	10	15
N/N_0	1/16	1/244	1/3,827

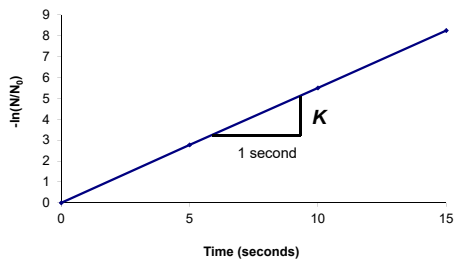$$\ln\left(\frac{N}{N_0}\right) = -kt$$

Disinfection Problem

Plot the data with $-ln(N/N_0)$ on the y axis and time on the x axis. The data for the plot are as follows:

Time,second	5	10	15
N/N_0	1/16	1/244	1/3,827
$-ln(N/N_0)$	2.77	5.50	8.25

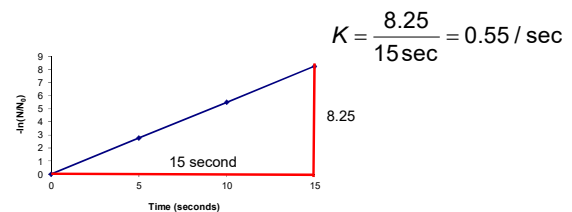## Disinfection Problem

The data are plotted below:

Disinfection Problem

The slope of the line is the disinfection constant:

$$K = \frac{8.25}{15\,sec} = 0.55\,/\,sec$$

Disinfection Problem

The time required for a reduction of 1/25,000 is:

$$t = \frac{-\ln\left(\dfrac{N}{N_0}\right)}{k} = \frac{-\ln\left(\dfrac{1}{25,000}\right)}{0.55\,/\,s} = 18.41\,sec\,onds$$

t = 18.41 seconds   or   19 seconds