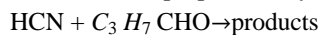


■ **Home work 2: due Friday, April 17 in class.**

the reaction of propionaldehyde and hydrocyanic acid



is irreversible. The following data was reported

t/min	HCN(t) / (mol/liter)	C ₃ H ₇ CHO(t) / (mol/liter)
2.78	0.099	0.0566
5.33	0.906	0.0482
8.17	0.083	0.0406
15.23	0.0706	0.0282
19.8	0.0653	0.0229

1. (30 points) Perform calculations to test whether this is a first order reaction
2. (30 points) Perform calculations to test whether this is a second order reaction.
3. (30 points) Determine the rate constant.
4. (10 points) Plot the evolution of the HCN when the initial concentrations are $\text{HCN}(0)=0.2$ mole/liter and $\text{C}_3\text{H}_7\text{CHO}(0)=.4$ liter
5. (40 points) Calculate at what time the concentration of HCN will be half that you started with (the initial concentration is given at 4.). Derive a formula for the time it takes to halve the amount of HCN.
6. (10 points) Without doing any calculation state what the curve for $\text{C}_3\text{H}_7\text{CHO}(t)$ should look like for the parameters given at 3.
7. Explain how would you estimate the time at which the reaction is completed if you are given the rate constant and you know that the reaction is irreversible and of second order. Does this time depend on the initial composition?

If you do not use *Mathematica* do not make a plot but explain what calculations you need to make so that you can make the plot.