FLINN SCIENTIFIC

Name_____

Data Tables and Graph

Standard Solutions Data Table

Standard	[Red No. 3] $\times 10^{-5}$ Moles/L	Absorbance, *A*
1	0.00	
2	0.17	
3	0.33	
4	0.67	
5	1.00	

Sample 1

Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*
20		220		420		620	
40		240		440		640	
60		260		460		660	
80		280		480		680	
100		300		500		700	
120		320		520		720	
140		340		540		740	
160		360		560		760	
180		380		580		780	
200		400		600		800	

Sample 2

Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*
20		220		420		620	
40		240		440		640	
60		260		460		660	
80		280		480		680	
100		300		500		700	
120		320		520		720	
140		340		540		740	
160		360		560		760	
180		380		580		780	
200		400		600		800	

Sample 3

Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*
20		220		420		620	
40		240		440		640	
60		260		460		660	
80		280		480		680	
100		300		500		700	
120		320		520		720	
140		340		540		740	
160		360		560		760	
180		380		580		780	
200		400		600		800	

Sample 4

Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*
20		220		420		620	
40		240		440		640	
60		260		460		660	
80		280		480		680	
100		300		500		700	
120		320		520		720	
140		340		540		740	
160		360		560		760	
180		380		580		780	
200		400		600		800	

Sample 5

Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*
20		220		420		620	
40		240		440		640	
60		260		460		660	
80		280		480		680	
100		300		500		700	
120		320		520		720	
140		340		540		740	
160		360		560		760	
180		380		580		780	
200		400		600		800	

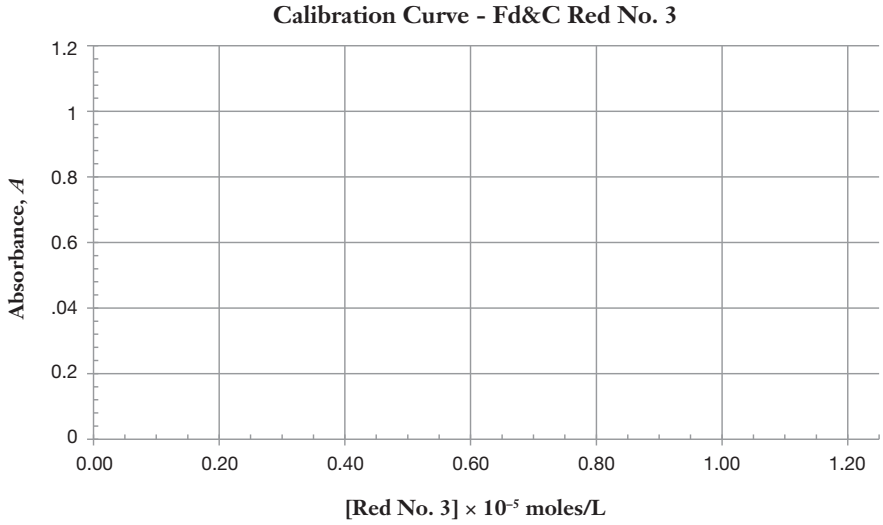
Sample 6

Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*	Time (sec)	Absorbance, *A*
20		220		420		620	
40		240		440		640	
60		260		460		660	
80		280		480		680	
100		300		500		700	
120		320		520		720	
140		340		540		740	
160		360		560		760	
180		380		580		780	
200		400		600		800	

Post-Laboratory Review Questions

1. Calibration Curve

   Plot the molar concentration of Red Dye No. 3 versus absorbance as below, and draw the best-fitting straight line through the data points. Include the origin (zero absorbance for zero concentration) as a valid point.



2. Calculate the initial concentration of Red Dye No. 3 in each trial. This is the concentration at time = 0.
3. Set up a spreadsheet table for each trial. Label the columns: Time, Absorbance, [Red No. 3], *ln*([Red No. 3]), 1/[Red No. 3]). *Note:* [ ] means concentration in mol/L.
4. Calculate the data for each cell. *Note:* Use the measured absorbance of the solution during the trial, then multiply this value by the slope of your calibration curve to determine the concentration of the Red Dye No. 3, [Red No. 3].
5. Prepare three graphs for each trial:
   - [Red No. 3] vs. time
   - *ln*[Red No. 3] vs. time
   - 1/[Red No. 3] vs. time
6. From a visual inspection of these plots, select the best linear relationship to establish *a*, the order of the reaction with respect to the dye.
7. Using the plots that give linear relationships, determine the rate constant for each trial.
8. By comparing the slopes of the lines for trials 1, 5 and 6, determine *b*, the order of the reaction with respect to hypochlorite.