CHM 152/54 Graphing Bonus (8 BONUS points) Spring 2012

Name:_____

Due February 1st **at the begining of class**.

This exercise is designed to help you learn the computer graphing skills needed for this class and more importantly for lab.

In an acidic solution, sucrose hydrolyzes (reacts with water) to form glucose and fructose. The following rate data was collected at 25°C.

t (min)	[sucrose]
0.0	0.584
20.0	0.549
60.0	0.483
100.0	0.427
160.0	0.350
220.0	0.291
440.0	0.146
660.0	0.073

a. Prepare and *label* **THREE** SEPARATE **COMPUTER** produced graphs to determine whether the reaction is zero-order, first-order, or second-order. Only original computer generated graphs will be accepted. **Each** graph must be properly labeled (Title and each axis with units). **No photocopies.**

b. Choose the appropriate graph and determine the numerical value of k and ***report its value along with its proper units***.

**Computers with the program Graphical Analysis or Excel and are available in the library or the Graphical Analysis program itself is available on a CD in the chemistry stockroom at no cost. Other graphing programs may also be used.

Key Equations:

Order in [A]	**Rate Law***	**Integrated Rate Law** (in **y = mx + b** form)	**Linear Graph Plot___ vs t**	**Slope of Line Equals**	**Half life Equations**
0	rate = k	$[A]_t = -kt + [A]_0$	$[A]_t$	-k	$t_{1/2} = [A]_0/2k$
1	rate = k[A]	$\ln[A]_t = -kt + \ln[A]_0$	$\ln[A]_t$	-k	$t_{1/2} = 0.693/k$
2	rate = $k[A]^2$	$1/[A]_t = kt + 1/[A]_0$	$1/[A]_t$	k	$t_{1/2} = 1/k[A]_0$

*Since the units of rate are concentration/time, the units of k (the rate constant) must dimensionally agree. So for each order, k will have different units and these units can tell one which equation to use. [ ] means the concentration of the enclosed species in Molarity (M).