CHM 152/54 Graphing Bonus (8 BONUS points) FAll 2009

Name:_____

Due September 10 **at the begining of class**.

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 value of k and report its value along with its **proper units**.

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

Key Equations:

Order in [A]	**Rate Law***	**Integrated Rate Law** (in **y = mx + b** form)	**Linear Graph ___ 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).