Student: _____ Class: _____ Date: _____

Using Functions in Models and Decision Making: Cyclical Functions

V.B Student Activity Sheet 4: Length of Daylight

Turn to page 10 in Unit 5 in your book. Read the information to yourself so we can discuss it.
Which City would you expect to have more daylight during the summer, Houston or Philadelphia? Why?

1. Make a scatter plot of the length of daylight by day number for Houston on the blank grid provided for the group. To make the graph easier, make January 1= Day 1 and December 31 = Day 365. In addition, graph the length of daylight in terms of minutes.

2. Connect the points on your paper scatterplot with a smooth curve to represent the regression model.

3. Use your calculator to generate a sinusoidal regression model. Record the equation in the summary table.

4. Find the maximum minutes and minimum minutes
(Max – Min) ÷2
Where do you find this number in the regression model?

5. Take 2π/365 (2π is the rotation around the sun), (365 = number of days in a year. Where do you see this number in the equation?

6. Take 12 hours times 60 minutes. Where do you see this in your equation?

Date	Day Number	Houston	
		HH:MM	Min.
Jan. 1	1	10:17	617
Feb. 1	32	10:48	648
March 1	60	11:34	694
Apr. 1	91	12:29	749
May 1	121	13:20	800
June 1	152	13:57	837
July 1	182	14:01	841
Aug. 1	213	13:33	813
Sept. 1	244	12:45	765
Oct. 1	274	11:52	712
Nov. 1	305	11:00	660
Dec. 1	335	10:23	623

Source: U.S. Naval Observatory, www.usno.navy.mil

Date	Day Number	Philadelphia	
		HH:MM	Min.
Jan. 1	1	9:23	563
Feb. 1	32	10:11	611
March 1	60	11:19	679
Apr. 1	91	12:41	761
May 1	121	13:56	836
June 1	152	14:46	886
July 1	182	14:57	897
Aug. 1	213	14:15	855
Sept. 1	244	13:03	783
Oct. 1	274	11:46	706
Nov. 1	305	10:28	628
Dec. 1	335	9:33	573

Source: U.S. Naval Observatory, www.usno.navy.mil

Follow these instructions carefully. Chosen Latitude _____

1. Complete the table at right.
a) Figure out the day number for each date.

b) Copy the number of hours of daylight from the printout for each date.

c) Convert the number of hours in decimal form to number of minutes. Round up to the next whole minute. For example: To convert 13.78 hours of daylight, multiply 13.78 by 60 to get 826.8, which rounds to 827 min.

DATE	DAY NUMBER	HOURS DAYLIGHT	MINUTES DAYLIGHT
Jan 1			
Feb 1			
Mar 1			
Apr 1			
May 1			
Jun 1			
Jul 1			
Aug 1			
Sep 1			
Oct 1			
Nov 1			
Dec 1			

2. Calculate the regression model for the information.

3. Find your Max and min in terms of minutes

(Max-Min) /2 Does this match with your "a"? If not why do you think it doesn't match?

4. Google your latitude on the web and find a city that has your latitude. There is a great list at wikipedia.

5. Find your opposite in the class. Write their name and which city they had.