MATH 40 APPLIED – Sinusoidal Data
Regression Practice

1. From the data below plot the data, then calculate and graph a regression to determine a sinusoidal fit to the data (plot at least one series manually on graph paper). Find what the equation predicts for March and Sept. Compare that with the given historical data. Do you think that the sinusoidal equation may be useful to predict temperature for some applications (example: the gas company!) How many days per year do you think the mean maximum is below 0 C. What is the median (average) temperature for Winnipeg?

Winnipeg Weather Data: Historical over 100 years

Month	Month Nbr	Max Temp	Min Temp	Mean Temp
Jan	1	-12	-23	-17
Feb	2	-9	-20	-14
Mar	3	-1	-11	-6
Apr	4	10	-1	4
May	5	19	5	12
Jun	6	23	10	17
Jul	7	26	13	20
Aug	8	25	12	18
Sep	9	19	6	12
Oct	10	11	0	6
Nov	11	0	-8	-4
Dec	12	-9	-18	-14

2. More Winnipeg Weather. Now see how the sinusoidal regression curve fits this data. Does it fit as well? Is it still useful?

Month	Month Nbr	Sun Shine [Hrs]	Wind Speed [km/h]
Jan	1	120	18
Feb	2	140	17
Mar	3	178	18
Apr	4	232	20
May	5	277	19
Jun	6	291	17
Jul	7	322	15
Aug	8	286	15
Sep	9	189	18
Oct	10	150	19
Nov	11	95	18
Dec	12	99	17

3. Tides at Minas Basin, Nova Scotia. The highest tides in the world. 50 feet from Min to Max. In the table below is the table data for the Minas Basin for 9 Apr 2003 The data is given in hours Atlantic Standard Time vs meters of tide level.

Hr	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Ht	3.3	3.6	4.7	6.3	8.1	9.6	10.5	10.6	9.8	8.2	6.3	4.6	3.4	3.1	3.7	5.1	6.8	8.4	9.7	10.2	9.9	8.8	7.1	5.4

a. perform a regression on the data and determine the equation (to 3 decimal digits). Only use 6 data points Write the equation below. How does it compare with someone using a different six points?

b. a large trawler draws 4 meters of water. During approx how many hours of the day will the boat be sitting on the floor of the basin?

c. what is the water depth at 14:36?

Remember: 17:12 is 17 h+ 12/60 of an hour = 17.2 hrs in decimal form!

d. does your regression look correct? What does the period of the data look like just from inspecting the data?

4. Convert the following times into decimal time on the 24 hour clock:

1:30 PM=

09:12 AM=

11:54 PM=

4:15 PM=