

2020~2021 Quad 3 MCR3U Module 5 Written Assignment

Ms. Law

Due Date: March 25, 2021

End Date: 11:59 pm, March 25, 2021

This assignment will be approximately 8% of your final mark. You can see the breakdown under Grades on Brightspace.

For each part, Application is 10 marks, Communication is 10 marks, and Thinking is 10 marks

* Please see the Rubric on Brightspace for expectations on this assignment.

* Half-marks will not be awarded. (Whole numbers only)

Instructions:

- 1) You may type your answers for this assignment. Please remember to save your file as a pdf before submitting. Do not type your answers directly onto Brightspace.
- 2) If you hand-write your answers, please submit the photographs as .jpg, .jpeg, or as a pdf. File sizes that are too large can lead to a crash on Brightspace. I was not able to read someone's submission before due to a crash when I tried to annotate on top of their work. Their file size was more than 3MB.
- 3) If you choose to do online research or discuss with other students regarding the assignment, note them down in the declaration form. The declaration **MUST** be submitted with the solutions for the assignment to be marked.
- 4) Even if you work with other students, you **MUST** write your solution in your own style. Plagiarizing from your peers will lead to all of you receiving a mark of zero. This is not group work, so one person cannot write the solutions for everyone else.
- 5) If you choose to hand-write your answers, after you have written down your solutions, take good pictures of the pages. Please check your photographs to make sure that they are easily visible to anyone.
- 6) Go to the Assignment button on Brightspace and:
 - a) share a link to your completed DESMOS graph
 - b) upload the photos for your handwritten work or upload the pdf file of your typed work
 - c) you may type your answers for this assignment, however, please note that if you type up math solutions as well, it is expected that they must be typed formally if you want to earn full marks
- 7) You can re-upload your assignment multiple times until the end date.

Declaration:

Student name: _____ Student number: _____

I declare that the following assignment is of my own work. Any extra resource used and other students I worked with are listed here.

Extra resource used:

Name of classmates I worked with:

Modelling Periodic Functions

For this assignment, we will explore the use of technology to model a periodic function and its limits.

The data you are using is from the following webpage from Fisheries and Oceans Canada:

[Sandy Cove - Tides, Currents, and Water Levels](#)

Instructions:

Step 1: Go to the Google Sheet shared by your teacher to access the tide data of Sandy Cove, Nova Scotia, for the first 13 days of May.

Step 2: We are going to plot water level (metres) versus time (hours). Copy and paste these two columns onto DESMOS. You do not need to type the data onto DESMOS yourself.

Step 3: Generate a sinusoidal model for the data. What do you notice?

Step 4: On DESMOS, make a new table of values for the first 12 days of May and generate a sinusoidal model for the data. What do you notice?

Step 5: On DESMOS, make a new table of values for the first 11 days of May and generate a sinusoidal model for the data. What do you notice?

Step 6: Keep decreasing the amount of data used to create the sinusoidal model. When do you see a model that has a R^2 value that is greater than 0.9? Does this model seem to work for the first 13 days of May? Justify your choice.

Step 7: Let's try to find a model that describes the first 13 days of May by hand. Using what we have learnt in class, what is the equation of your model?

Step 8: Let's say we want to find out when the water level is 3.3 m on Day 0, within a 24-hour period.

- Use your model from Step 6 to estimate the time in hour and minutes. (Read from the graph.)
- Use your model from Step 7 to calculate the time by hand. (Not reading from the graph.)
- Are your answers the same? If not, why do you think they are different?

Step 9: If we were to plot every single day of the month, what would happen to the equation of the resulting model? Will using more points increase the accuracy of the model?