

## Assignment #3B – Somebody Give Me a Sine!

[15 marks]

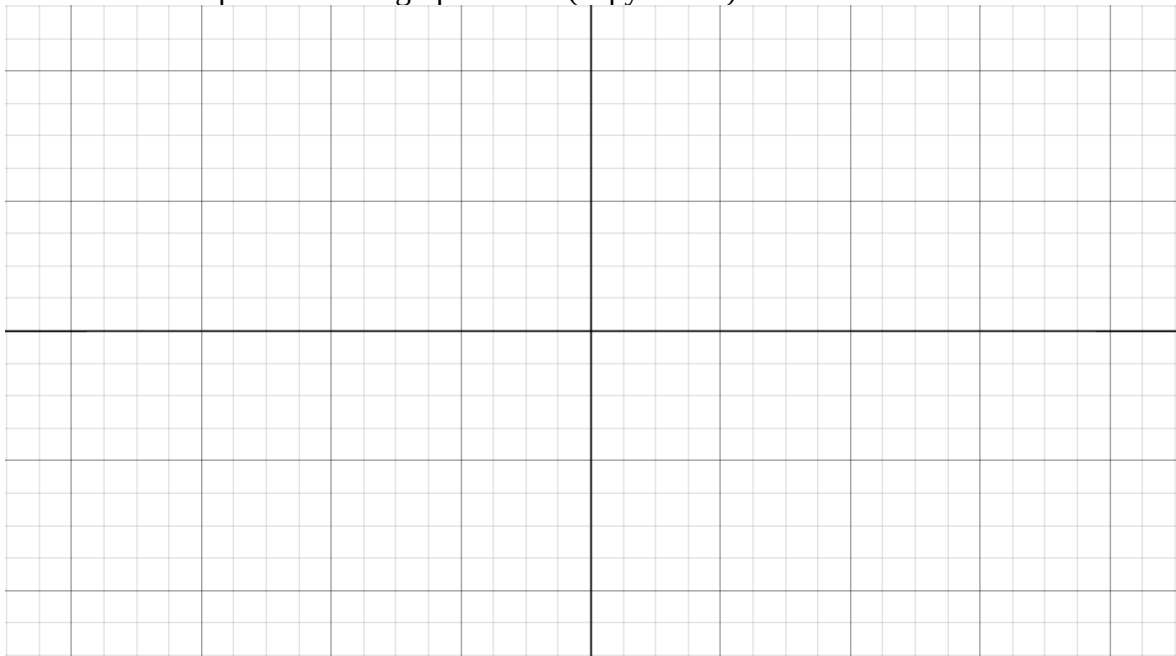
### Assignment Objective

- Complete 3 of 4 Questions. [5 marks: K/U – 1, ATIPS – 3, C – 1]

If you complete all four questions, you will be give the “best of” marks.

1. State the key features and graph two cycles of the function \_\_\_\_\_.

2. Determine the equation of the graph shown (copy below):



3. A weight hangs from a spring attached the ceiling. At rest, the spring is \_\_\_\_\_ long. A student pulls the weight down, stretching the spring to \_\_\_\_\_, and lets go. The spring retracts to a length of 1cm in \_\_\_\_\_ seconds. The length of the spring, over time, can be modelled with a sinusoidal function.

- Sketch the graph of the length of spring versus time for at least two cycles from its release.
- Determine a model that relates the length of the spring,  $L$ , in cm, to the time passed,  $t$ , in seconds.
- What is the length of the spring \_\_\_\_\_ seconds from now?
- For what length of the time is the spring longer than \_\_\_\_\_ cm?

MCT 4C  
Mr. Kempe

Name: \_\_\_\_\_  
Due: \_\_\_\_\_

4. The moon goes through phases, from new (0% illuminated) to full (100% illuminated) and back again. Use information from the time and date - moon - Owen Sound webpage to answer the following questions.
  - a. Create a table of values relating the **number of days since the last new moon** (May 16th) and the **percent of the moon that is illuminated** for one cycle of the moon phase. Your first point (May 16th, new moon) would be **(0,0)**.
  - b. Input your data in Desmos and use Desmos to determine a model for the phases of the moon. Record your equation on your assignment paper.
  - c. About how many days is the moon cycle?
  - d. What percent of the moon will be illuminated in 100 days?
  - e. For how many days of the moon cycle is the moon at least 80% illuminated?