Foundations of Mathematics 12
Sinusoidal Functions

Introduction:

Any object that bounces, rotates, or moves with a wave type motion is said to have a sinusoidal pattern. The engine of a car, electricity passing through your house, and radio signals being received by your mp3 player are all examples of sinusoidal waves. It can be very useful to understand the patterns to sinusoidal waves as they can be used to predict a future event in the cycle that will allow the person the ability to adjust for this event. In a car, this is called giving the car a tune up. Completing the material in this guide will help you understand the patterns for sine and cosine graphs.

Note Taking:

Note taking is an important skill in any math course. When taking notes you want to focus on important terms, normally in **Bold** or in the margin of this textbook, formulas which are treated the same way, at least one of the examples shown with the your turn section completed, and the In Summary box at the end of the sections. Notes are made for your benefit not mine, so make sure you can understand what you have written. You will be able to use these notes if you choose to do an interview.

Resources Needed:

Foundations of Mathematics 12 text or Internet text access

Key Terms:

radian, periodic function, midline, amplitude, period, sinusoidal function, frequency

Expectations:

1) Describe how the values of **Sine** and **Cosine** change as the angle increases from 0° to 180°
   - Complete the Getting Started activities on pages 512-513
   - Complete the What do You Think problems on page 513

2) Create an example of your own design where you can describe how an angle measured in degrees can be related to an angle measured in **radians**.
   - Complete the Investigate the Math activities on page 514
   - Read and take notes on pages 514→519
   - Complete **only** the Check Your Understanding problems on page 519

3) Using the graphs of both the **Sine function** and **Cosine function**, explain the similarities and differences between these two graphs.
   - Complete the Explore the Math activities on pages 521→522
   - Read and take notes on pages 521→523
   - Complete the Further Your Understanding problems #1, 3, 4 on page 524

4) Create a visual presentation of a **sinusoidal** graph which can be used to explain the properties of **amplitude**, **midline**, **period**, and **range**.
    - Complete the Investigate the Math activities on pages 527-528
    - Read and take notes on pages 527→535
    - Complete **only** the Check Your Understanding problems on pages 536-537

5) Create a word problem of your own design where you can demonstrate how both the equation and graph of a **sinusoidal** function can be extracted from the information given in the problem.
    - Complete the Investigate the Math activities on pages 546-547
    - Read and take notes on pages 546→557
    - Complete **only** the Check Your Understanding problems on page 558

6) Solve the Practising problems listed below: (you need to choose the questions that will best demonstrate your understanding of the expectations. The questions listed below are only a suggestion)
    - #3, 4, 5, 7, 8, 9, and 12 on pages 519→520
    - #5, 6, 7, 8, and 8 on pages 524→525
    - #4, 5, 6, 8, 9, 10, 12, 13, and 17 on pages 537→542
    - #5→9, 12, 13, 14, 15, 17, 19, and 22 on pages 558→561

Evaluation:

At the end of each learning guide, you have an option of how you would like to be evaluated. The only exception is the Unit Tests which are mandatory. You can choose to demonstrate your knowledge of the expectations with an interview, PowerPoint presentation, poster, video, brochure, … etc. The other option is a quiz. It is up to you how the evaluation will take place and be warned some methods take more time than others.