Foundations of Mathematics 12
Exponential & Logarithmic Functions

Introduction:

Exponential functions are often used by scientists who are studying the natural growth of a material or organism. The graph of an exponential function displays this growth quite well. On the other hand, a logarithmic function can be used to translate the growth pattern of an object into a straight line. Completing the material in this guide will demonstrate how exponential and logarithmic functions are related.

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:

Exponential function, exponential growth function, exponential decay function, logarithmic function

Expectations:

1) Using the graph of an **exponential function**, describe the characteristics that the exponential function displays. (intercepts, end behaviour, domain, range, **asymptote**)
    - Complete the Explore the Math activities on pages 436-438
    - Read and take notes on pages 436→438
    - Complete **only** Further Your Understanding problems on page 439

2) Using an equation of an **exponential function**, explain how the characteristics of the function (domain, range, intercepts, end behaviour, **asymptotes**) can be found without a graph.
    - Complete the Investigate the Math activities on pages 440-441
    - Read and take notes on pages 440→448
    - Complete **only** the Check Your Understanding problems on pages 448→449

3) Research a real world situation in either the field of finance or science where you can demonstrate the use of **exponential growth** or **decay functions** in a visual presentation.
    - Read and take notes on pages 454→460
    - Complete **only** Check Your Understanding problems on page 461

4) Using both graphs and equations, outline how the **exponential** and **logarithmic functions** are both different and similar in their structure.
   - Complete & **correct** the Investigate the Math activities on pages 474-476
   - Read and take notes on pages 474→481
   - Complete **only** the Check Your Understanding problems on pages 482-483

5) Create an example of your own design to demonstrate how **logarithmic functions** can be used to display real life data..
   - Complete the Investigate the Math activities on pages 488-489
   - Read and take notes on pages 488→494
   - Complete **only** the Check Your Understanding problems on pages 494-495

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)
   - #5, 7, 8, 10, 11, 13, 14, and 18 on pages 449→452
   - #3, 5, 6, 8, 12, 14, 15, and 16 on pages 461→466
   - #4, 5, 6, 8, 10, 12, 13, and 14 on pages 483→486
   - #3, 4, 6, 7, 8, and 11 on pages 495→499

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.