

Foundations of Mathematics 12

Set Theory and Logic

Introduction:

Sets can be important in mathematics. They can be used to show relationships of numbers or objects. Using set theory is one of the key concepts that will lead to an understanding of probability as well as the mathematics of gambling. This guide will introduce you to the concepts around set theory and logic. The Unit Project on investing will provide a more in depth experience in gambling.

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:

set, element, universal set, subset, complement, empty set, disjoint, finite set, infinite set, mutually exclusive, intersection, union, Principle of Inclusion and Exclusion, conditional statement, hypothesis, conclusion, counterexample, converse, biconditional

Expectations:

- 1) Using Venn diagrams, create a picture based dictionary of set theory terms for this section of the textbook.
 - Complete the Investigate/Explore the Math activities on pages 146-7, 159 & 162-3
 - Read and take notes on pages 146→154, 159 & 160, and 162→171
 - Complete **only** Check/Further Your Understanding problems on pages 154, 160, 172

- 2) Construct a word problem with answers that can apply multiple (more than one) concepts in the field of Set Theory.
 - Complete the Investigate the Math activities on page 179-180
 - Read and take notes on pages 179→190
 - Complete **only** the Check Your Understanding problems on page 191

- 3) Analyze a puzzle or board game and describe how **conditional statements** and **counterexamples** can be used to find a solution/win.
- Complete the Learn about the Math activities on pages 195-7
 - Complete the Investigate the Math activities on page 208
 - Read and take notes on pages 195→203, 208→214
 - Complete the Check Your Understanding problems on pages 203-4, 214
 - Choose one puzzle or board game that you like, and in a few paragraphs explain how you can solve/win using conditional statements and counterexamples. (examples: Sudoku, chess, cribbage, Yatze, ...)
- 4) 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)
- #4, 5, 7, 9, 10, 11, 12, 16, and 17 on pages 155→158
 - #4, 6, 7, 8, 11, 12, 13, 14, and 16 on pages 172→175
 - # 4, 5, 6, 7, 9, 10, 11, and 13 on pages 191→194
 - #5, 6, 8, 9, 11, 12, 14 and 16 on pages 204→207
 - #5, 6, 7, 8, 9, and 12 on pages 215→216

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.