1 Set Theory

1. The Universal Set $\mathcal{U}$
2. Union
3. Intersection
4. Set Difference
5. Relative Difference

Absolute Value Function

Logarithms

Encoding and Decoding Functions (4.2)

Onto Functions (4.2.2)

One-to-One Functions (4.2.3)

One-to-One Functions (4.2.3)

$f(x)$, must be *One-to-One* and *Onto*

Exponential and Logarithmic Functions (4.3)

The Laws of Logarithms

-
- $log_b(x^y) = y \times log_b(x)$
-
-

Comparing the size of Functions (4.4)

Using O-notations

Power Notation (4.4.2)

Section 8 Exercises

- $8^{\frac{1}{3}}$ Recall $a^{\frac{b}{c}} = a^{\frac{b}{c}}$
-
-

2 Mathematics for Computing: Onsite Tutorial two

Today's Class

- Chapter 3: Logic
  -
  -

- Chapter 4: Functions
  - Inverse of a Function
  - One-to-One and Onto
  - Special Functions

3 Chapter 3: Logic

2003 Question 3
Let p, q be the following propositions:

- p : this apple is red,
- q : this apple is ripe.

Express the following statements in words as simply as you can:

- (i) $p \to q$
- (ii) $p \wedge \neg q$.

Express the following statements symbolically:

- (iii) This apple is neither red nor ripe.
- (iv) If this apple is not red it is not ripe.

3.1 Logical Operations

- Logical "AND" ($\wedge$)
- Logical "OR" ($\vee$)
- Logical "NOT"

Logic Networks

- AND Gates
- OR Gates
- NOT Gates

Chapter 4: Functions

3.2 Arrow Diagrams

- Domain
- Co-Domain
- Range

3.3 Boolean Functions and ordered $n-$tuples

- Ordered Triples
- Boolean Fucntions
-

The Asbolute Value, Floor and Ceiling Functions

- The Absolute Value Function
- Floor
- Ceiling
-
-
-

Power functions and Polynomials

Consider the function f: Z-¿ Z defined by f(n) = 3n-1. Does this function have the onto property?

$$ax^2 + bx + c$$

Summer 2003 Question 4

x
f(x)
g(x)

Functions

- Domain of a Function
- Range of a function
- Inverse of a function
- one-one (surjective)
- onto (bijective)

The complement rule in Probability
$P(C') = 1 - P(C)$
If the probability of C is 70% then the probability of C' is 30%

4 Matrices

What are the dimensions of the following matrix

$$\begin{pmatrix} a_1 & a_2 \\ b_1 & b_2 \end{pmatrix} \begin{pmatrix} c_1 & d_1 \\ c_2 & d_2 \end{pmatrix} = \begin{pmatrix} (a_1 \times c_1) + (a_2 \times c_2) & (a_1 \times d_1) + (a_2 \times d_2) \\ (b_1 \times c_1) + (b_2 \times c_2) & (b_1 \times d_1) + (b_2 \times d_2) \end{pmatrix}$$

$$\begin{pmatrix} 1 & 3 \\ 0 & 2 \end{pmatrix} \begin{pmatrix} 1 & 2 \\ 4 & 1 \end{pmatrix} = \begin{pmatrix} (1 \times 1) + (3 \times 4) & (1 \times 2) + (3 \times 1) \\ (0 \times 4) + (2 \times 4) & (0 \times 2) + (2 \times 1) \end{pmatrix} = \begin{pmatrix} 14 & 5 \\ 8 & 2 \end{pmatrix}$$

$$\left(\begin{pmatrix} 1 & 2 \\ 4 & 1 \end{pmatrix} \begin{matrix} 1 & 3 \\ 0 & 2 \end{matrix} \right) = ?$$