**Outline for ICM**

**Unit 1: Review of functions**

a) Lines

 Slope

 Midpoint

 Point slope equation of a line

Textbook: Ch 13 Coordinate Geometry

 Ch 16 Linear Models

 b) Exponent review

 Laws of exponents

 Simplifing expressions with positive and negative exponents

 c) Polynomials (with positive and negative exponents)

 Graphs

 Asymptotes

 Positive/Negative

 Increasing/Decreasing

 Max/Min

Textbook: Ch 19 unfamiliar functions

**Unit 2: Calculus**

 a) Limits

 Using graphs

 Using tables

 Not algebraically

 b) Derivatives

 Using definition-examples only

 Power rule

 Tangent line at a point

 Normal at a point

 Texbook: Ch 20

 c) Applications of derivatives

 Optimization

 Texbook: Ch 21

**Unit3: Statistics**

 a) Descriptive statistics

 Frequency Tables/relative frequency

 Cumulative frequency graphs

 Box and whisker/IQR

 Standard deviation

 Texbook: Ch 6

 b) Normal Distributions

 Empirical rule

 Normalcdf and invnorm

 z-scores

 Textbook: Ch 10

 c) Two variable Statistics

 Linear regression

 Correlation coefficient

 Chi-square test

 Textbook: Ch 11

**Unit 4: Sets and Venn Diagrams**

 a) Sets and set notation

 intersection

 Union

 Compliment

 Texbook : Ch 7

 b) Venn diagrams

 Applications

 Texbook: Mathematical ideas

**Unit 5: Probability(???)**

 Addition property

 Multiplication Property

 Conditional

 Independent events

 Textbook: Ch 9

**Unit 6: Logic**

 a) Truth tables

 And

 Or

 Either or

 If then

 IFF

 Demorgan’s Laws

 Textbook: Ch 8 and Mathematical ideas

 b) Arguments

 Euler

 Truth tables

 Common argument forms

**Unit 7: Graph Theory**

 a) Scheduling

 EST

 Critical path

 b) Circuits and Paths

 Euler

 Hamiliton-Brute force, Nearest Neighbor, Cheapest Lint

 Spanning Trees-Minimal Spanning Tree

 Texbook : Excursions and modern mathematices

**Unit 8: Election theory**

a) Voting

 Plurality

 Majority

 Borda

 Plurality with elimination

 Pairwise

b) Weighted Voting

c) Apportionment

Textbook: Excursions in Modern Mathematics

**Unit 9: Fair Division**

 a) Continuous

 Divider/Chooser

 Lone Divider

 b) Discrete

 Method of sealed bids

 Method of markers

Textbook: Excursions in Modern Mathematics