



ST STEPHEN'S SCHOOL

YEAR 12 DISCRETE MATHEMATICS PROGRAMME 2009

Textbooks: Discrete Mathematics - A. J. Sadler

Teachers: Mr Adeline, Mrs Stanley, Mrs Bartels

WEEK	Curriculum Council Objectives	Assessments and Exercises
	Term 1	
0 B 26 January Australia Day Academic Staff start Secondary students start 30 January	General Aims of the course Discrete Mathematics aims to equip students with some useful applied mathematical tools, and to foster an ability to solve problems and carry out mathematical investigations. These skills should prove to be highly useful to students after they leave school.	Introduction to the course Administrative Tasks General Information Introduction to Data Analysis
1 A 2 February School Photos	DATA ANALYSIS 2.1 Determine and use the mean and median of sets of data and examine the effect of change of scale and origin on each. Examine the effect of outliers.	S 6A - 6D
2 B 9 February	2.2 Determine and use measures of dispersion (range, IQR, variance, standard deviation) of sets of data and examine the effect of change of scale and origin on each. Examine the effect of outliers. 2.3 Construct & interpret boxplots, noting their use in comparison of centres & spreads of data.	S 6E - 6F Investigation #1 (Out 11 February)
3 A 16 February House Swimming Carnival	2.4 Determine and use the correlation coefficient as a measure of linear association for bivariate data and examine the effect of change of scale and origin. Examine the effect of outliers. 2.5 Appreciate that correlation does not imply causality.	S 6G - 6I Investigation #1 In-Class Validation 18 February
4B 23 February Swimming Camp 26 & 27 Feb Yr 12 Leadership Training (A/S)	2.6 Draw and interpret tables and graphs of bivariate data. Determine and use the least squares regression line and residuals	S 6J Revision Questions O.T. Lee

WEEK	Curriculum Council Objectives	Assessments and Exercises
5 A 2 March Labour Day	GROWTH & DECAY 4.1 Investigate recursively-defined sequences, including an informal treatment of arithmetic and geometric sequences and the Fibonacci sequence. 4.2 Calculate the terms of a sequence given by a difference equation or the recursive formula.	S 1A -1D Test #1 (Data Analysis) 4 March Investigation #2 Take Home
6 B 9 March	4.3 Graph growth and decay data obtained from a difference equation or recursive formula.	S 1E - 1F
7A 16 March Easter Service 20 March Good Friday 21 March	4.4 Determine the n th term and the sum to n terms of a geometric sequence and of an arithmetic sequence.	S 7A – 7B Investigation #2 In-Class Validation 18 March
8B 23 March Secondary Interschool Swimming Carnival	4.5 Determine the sum to infinity of a convergent geometric series. 4.6 Solve growth and decay problems using geometric series.	S 7C - 7D Revision Questions O.T. Lee
9A 30 March Year 12 Parent Teacher Interviews	PROBLEM SOLVING 1.1 Explore patterns and derive formulae. 1.2 Carry out systematic trial and error tests of conjectures. 1.3 Adjust conjectures in the light of counter-examples.	Problem Solving Mason & Trend Test #2 (Growth & Decay) 1 April
10B 6 April House X-Country Good Friday 10 April	1.4 Present results in an orderly and appropriate way. 1.5 Attempt justification of generalisations and results.	
SCHOOL HOLIDAYS		

WEEK	Curriculum Council Objectives	Assessments and Exercises
	Term 2	
1 A 27 April ANZAC Day Staff Return Year 12 Retreat 29 April – 1 May		
2 B 4 May	OPTIMISATION 3.1 Solve simultaneous linear inequalities graphically and/or algebraically. 3.2 Model a variety of optimisation problems as linear programs, and solve graphically.	S 10A -10D Problem Solving Test #1
3 A 11 May NAPLAN	3.3 Use graphical and numerical means to optimise a situation in which a simple functional relationship exists.	S 5A - 5B Issue Revision Assignment (2008 Sem 1 exam)
4 B 18 May Secondary State X-Country	2.7 Determine trend, seasonal and residual components of time series data using moving averages. 2.8 Use trend, seasonal and residual components to describe time series data and to make predictions.	S 9A S 9B Revision Questions O.T. Lee
5 A 25 May Staff Retreat 29 May – 30 May	Revision of topics for exams	Revision Assignment Due
6 B 1 June Foundation Day Holiday	Year 11 & 12 Exams: 2 June – 12 June	
7 A 8 June	Year 11 & 12 Exams: 2 June – 12 June	

8 B 15 June	2.9 Use set notation, and the set operations of union, intersection and complementation.	S 4A – 4D Exam Review
9 A 22 June	2.10 Use Venn diagrams to illustrate set concepts, and to solve problems in probability including those involving compound, conditional and complementary events.	S 2A - 2C
10 B 29 June	2.11 Display sets of equally likely outcomes systematically in trees or lists and use them to solve problems in probability including those involving compound, conditional and complementary events. 2.12 Use two-way tables to solve problems Concepts in probability including those involving compound, conditional and complementary events	S 8A S 8B Test #3 (Optimisation)
SCHOOL HOLIDAYS		

WEEK	Curriculum Council Objectives	Assessments and Exercises
	Term 3	
1 A 20 July Secondary students start 22 July	OPTIMISATION 3.4 Represent information from a variety of real problems in the form of a network. 3.5 Develop systematic methods to determine the shortest path between two vertices of a simple network.	S 3A - 3B Investigation #3 Take Home
2 B 27 July Secondary House Athletics Carnival 31 July	3.6 Determine the minimal spanning tree for any network 3.7 Determine the maximal flow for a simple network with one source and one sink.	S 3C S 3D
3 A 3 August	3.8 Construct a project network. Interpret a project network with arcs as activities.	S 3E Investigation #3 In-Class Validation 5 August
4 B 10 August	3.9 Determine the critical path and minimum completion time of a project with fixed activity times.	S 11A - 11B Revision Questions O.T. Lee
5 A 17 August	PROBLEM SOLVING 1.1 Explore patterns and derive formulae. 1.2 Carry out systematic trial and error tests of conjectures.	Past TEE problem Solving Booklet Test #4 (Optimisation) 19 August
6 B 24 August	1.3 Adjust conjectures in the light of counter-examples. 1.3 Present results in an orderly and appropriate way. 1.5 Attempt justification of generalisations and results.	
7 A 31 August St Stephen's Day 5 September	GROWTH & DECAY 4.9 Construct and use tables to calculate repayments, balance owing and number of repayments on loans and investments. This includes the recognition of patterns to extend the table.	S 12A – 12B Problem Solving Test #2 2 September Issue Revision Assignment

8 B 7 September Athletics Excursion 11 September	4.10 Construct and use tables to compare simple, compound and reducible interest in borrowing and investing money.	S 12B Review Topics Allocation
9 A 14 September Secondary Interschool Athletics Carnival 19 September	4.7 Examine and use exponential functions of the form $y = ka^{\pm x}$ to solve continuous growth and decay problems. 4.8 Determine functional relationships for growth and decay data using graphical methods.	S12C Revision Questions O.T. Lee Test #5 (Growth & Decay) 16 September
10 B 21 September	EXAMINATION REVISION Topics Review and Presentation	Revision Assignment due
	SCHOOL HOLIDAYS	

	Term 4	
1A 12 October	Mock TEE	
2B 19 October Graduation Day 22 October	Revision TEE Seminars	
3A 26 October	Home Study	
4B 2 November	TEE begins	

DISCRETE MATHEMATICS ASSESSMENT STRUCTURE 2009**Tests****35%**

Test	1	2	3	4	5
Weighting	7%	7%	7%	7%	7%

Examinations**40%**

Semester One	15%
Mock TEE	25%

Extended pieces of work**25%**

Problem Solving (2)	8% (4% each)
Investigations (3)	12% (4% each)
Revision Assignments (2)	3% (1% & 2%) – Effort
Topics Review (1)	2% (documentation 1% & presentation 1%)

General Information

- 1 Tests will generally be 50 minutes in duration. Students will be notified of the length of each test and the day they will take it the week prior to the actual test. **Please note that students are strongly advised to look closely at their program so that they are prepared for any scheduled assessments placed in the program.**
- 2 Problem-solving assessments will usually be within class time.
- 3 Assignments will be generally designed to revise previous work, but may include current work. Validation will occur where necessary.
- 4 Investigations will usually be given within class time. However, if it is considered desirable to give the investigation as an out-of-class activity a validation will be given during class time on the day the work is due. If a significant discrepancy exists between the validation mark and the work submitted by the student, the final mark awarded will take this into account. Students are encouraged to use whatever resources that are available to them as long as the work submitted is the student's **own work** and reflects their mastery of the task set.
- 5 Students are advised of the importance of reading and noting carefully the contents in the paper issued by the Curriculum Council entitled *Discrete Mathematics (Year 12) - E502*. This paper will be given to you with your course program on the scheduled seminar day.

Problem solving: Includes practise with problem solving strategies and then a question or two with application of the strategy revised. These are to be graded and recorded to give a mark for each semester.

Strategies diagrams
 models
 tables
 lists
 backwards
 guess and check
 patterns and rules
 Venn diagrams
 Simplifying a problem in steps etc

Investigations

Three investigations are marked on the program they will be worth a total of 12%. These investigations may not be conducted exactly in the week notified but will be in that week or soon thereafter. Students will be notified the date of these ahead of time. In most cases, students will be given material to consider over a period of days before the assessment based on the material. Normally, marks will be allocated weighed in favour of that part of the assessment that is done in class.

Assignment

Two revision assignments will be set prior to the examinations revising the course. This assignment will be worth 3% of the course.

Students should ensure that they understand the School and Mathematics Department policies on assessments. A doctor's certificate is required if a student is absent from any scheduled assessment. If assessments are late they will attract a penalty. It is important that you know when work is due.