November 30, 2001

Colleagues:

The document that follows was originally designed to be printed in landscape orientation, letter size paper, maximum printable area, at 100% size (printing characteristics found in “Page Setup” in “File” menu). I intended to give one of these 19 page outlines to each student. We are each on a strict Xerox “clicks” budget at my school now though, so I decided to save some clicks by printing the document in portrait orientation, letter size paper, maximum printable area, reduced to 75% size, which prints out in 10 pages. One other advantage of this portrait orientation is that the outline can be read without turning your binder sideways. This size is still readable, but only just. If you don’t have to conserve clicks and want to print at full size, but don’t know how to manipulate this file into that shape, you can email me and I will send you my full size version (gzak@pacificcoast.net). I have set the headers to not appear on the first page of this document, so you may want to adjust that parameter if you tweak this and use it.

This is the outline I am using at Reynolds Secondary School in Victoria for my first whack at the new PMa12 course. We are a semestered 8-12 school. Typically our first semester has about 88 or 89 useable class periods and our second semester has about 84 or 85 before the government exams (not counting early dismissals for parent teacher interviews, FSA tests, accreditation surveys, assemblies, course selection classes, suicide awareness classes, careers day, earthquake drills, fire drills, false alarms, assemblies, report card distribution, yearbook distribution, textbook distribution, textbook collection, fees collection, locker allocation, locker inspection, locker cleanout, semester turnaround day, or the first 2 days of school in September as instructional time for mathematic). Math classes meet once each day for 80 minutes on Monday to Thursday and for 60 minutes on Friday. I stick the Problem Set problems in towards the end of the course since they constitute a good way to review. I give only a part of a period to discussion of each and I start with about 6 or 7 weeks left in the course (except for Math Mouse, which I did immediately after the Transformation Chapter 1.) This first time through I did the chapters in the order: 1, 2, 3, 4, 5, 9, 6, 7, 8, feeling that I wanted the statistics chapter closer to the provincial exam.

It appears that I will have time to finish this semester, even including about five class periods for review. In general I do one row of the outline per day. I will obviously have to double up on some rows in second semester.

Feel free to transmogrify any aspect of this outline.

Enjoy!

Gary Zak

Credits:

The format and some of the contents were created by Gary Zak. Most of the content came from the efforts of Wendy Swonell, Linda Rajotte, and Dave Travers, gleefully expropriated by Gary Zak, who is very gratefully in their debt.

Date	Title & Topics	Assignment	Score	√

Principles of Math 12 - Outline of Assignments

The chart that follows outlines the **minimum** assignments that you should do to get to the level of mathematical understanding that the Ministry of Education says you should have by the end of PMa12. These are the assignments that I will count for your letter grades. There is much, much more in the text than these minimums, however. I strongly urge you, if you have the time in class or at home to at least *read* all the "extra bits" that are in all the math textbooks but the teachers never get time to cover "officially" in class, especially if you intend to major in Math or Sciences in University.

Do not start the problems until you have understood the ideas from having listened in class and read the text, including the examples. Your job is to understand the math ideas involved there. You should do the problems to see how well you understood the ideas. Ask for the teacher's help when an example is unclear, not just when you are stuck on a question.

I do not "mark" your assignments - you do from the back of the book or from the "Solutions Binder" or the "Selected Solutions" on the computers. You also put tick marks when you are right and "X's" when you are wrong and you do your corrections - don't erase - best to leave the original error there in case you have to ask in class about it the next day. You only hand in the assignment when it is totally complete. I simply monitor whether you are doing the assignments. I give a "5" for "well done", i.e. meeting all the checklist requirements listed below. You get a "0" for not handing one in. You get a "4, 3, 2, or 1" if some part or parts of the checklist are not followed and I don't want to keep handing it back.

Assignments are due the period following the lesson date. In many cases you will need to ask questions the following period about the previous period's assignment. Therefore there will be no late penalty. However, if you leave the completion of your assignments for more than a couple of days, you will just keep falling further and further behind and get discouraged and fail and lose the chance to make big bucks as an adult mathematician. Use the "√" section to keep track of completed work. Enter your assignment mark and test scores too, so you will have a record of marks from which you can calculate your grade at any time. Grading is 10% on assignments, 90% on tests.

Checklist for getting full marks on assignments:

first and last name in top right hand corner of top page?	full description (assignment, page, and question numbers) at top?
done readably on non-ripped looseleaf paper?	question numbers in margins? two columns maximum?
all pages in order? stapled together neatly?	multi-step questions in style of examples in text or your notes?
sketches shown for graphing calculator questions?	no significant erasures?
all questions marked with a tick, cross, or question mark?	all questions finally corrected and completed?

Abbreviations you could get on an assignment:

N.C.Y.	no credit yet - find out what I'm giving you a chance to fix, fix it, and hand it in again for credit
S.A.W.	show all work - for questions that have more than one step I expect you to show how you got your answer. If you used a calculator, fine, but show me what you did on the calculator by labelling the numbers you write down. If you used a graphing calculator, show a sketch and window sizes, and label the curves.
M.C.R.	mark, correct, and resubmit
N.F.	not finished - I may just give you a low mark or I may hand it back and give you a chance to finish it
S.N.	section number - you didn't note what chapter and section it is

Date	Title & Topics	Assignment	Score	√
Chapter 1: A Functions Toolkit				
1.1	**Some Functions and Their Graphs** **review**: • terms: function; domain; range • how to graph functions on a graphing calculator • types of functions -- see notes	**Read**: pages 4 - 10 and go over the examples carefully **Do:** pages 10 - 12 # 1-5, 7, 8, 10 (use tables of values in #10 to get some surprising results!), Study Guide: page 20 #1, 2**: also** Do master 1.1		
1.2	**Translating Graphs of Functions** **know:** vertical $y = f(x) + k$ and horizontal $y = f(x - k)$ translations	**Read:** pages 16 – 20 and go over the examples carefully **Do:** pages 20 – 23, #1, 3, 5, 9, 11 – 14: Study Guide page 21, #3 – 6		
1.3	**Reflecting Graphs of Functions** **know:** • reflections in y axis: $y = f(-x)$; in x axis: $y = -f(x)$; across the line $y = x$: interchange x and y, $f^{-1}(x)$ notation; asymptotes	**Read:** pages 25 – 31 and go over the examples carefully **Do:** pages 31 – 33, #1 – 4, 8 – 11, 13 – 16: Study Guide pages 21 – 22, #7 - 10		
1.4	**Stretching Graphs of Functions** **know:** • vertical: $y = kf(x)$, $0 < k < 1$ produces vertical compression, and $k > 1$ produces vertical expansion • horizontal: $y = f(kx)$, $k > 1$ produces horizontal compression, $0 < k < 1$ produces horizontal expansion	**Read:** pages 35 – 40 and go over the examples carefully **Do:** pages 41 – 44, #1 – 4, 8, 9, 12, 13, 15, 16: Study Guide pages 22 – 23, #12 - 15		
1.5	**Combining Translations and Expansions or Compressions** **review:** • all transformations: $y = a\,f[b(x - c)] + d$ - $a > 1$ is a vertical expansion; $0 < a < 1$ is a vertical compression - $b > 1$ is a horizontal compression; $0 < b < 1$ is a horizontal expansion - $a < 0$ reflects graph across x-axis; $b < 0$ reflects graph across y-axis - shift to right "c" units if $c > 0$: shift to left "c" units if $c < 0$ - shift up "d" units if $d > 0$: shift down "d" units if $d < 0$	**Read:** pages 45 – 50 and go over the examples carefully **Do:** pages 51 – 52, #2 – 6, 9, 10: Study Guide page 23, #16 - 20		
1.6	**Graphing** $y = \lvert f(x) \rvert$ **and** $y = \dfrac{1}{f(x)}$ **know:** • abolute value and reciprocal function tools	**Read:** pages 54 – 57 and go over the examples carefully **Do:** pages 57 – 59, #1 – 3, 4 – 8 (pick one from each), 11: Study Guide pages 23 – 24, #21 - 24		
	Review	**Do:** page 63, #1 – 6: Study Guide page 15, #1 – 3, page 16, #1 – 11, pages 17 and 18, #1 – 12, pages 25 – 28, #1 - 16		
	Test on Chapter 1			
Chapter 2: Exponential Functions and Logarithms				
2.1	**Introduction to Exponential Functions** **know**: • examples using $y = Ab^x$	**Read**: pages 66 - 68 and go over the examples carefully **Do:** page 70 # 1, 2, 3, 7, 8, 10: Study Guide: page 35 #1-3		
2.2	**Defining a Logarithm** **know**: • a logarithm is an exponent • $\log_a x = y$ means that $x = a^y$ • use logs to find an exponent	**Read:** pages 74-77 and go over the examples carefully **Do**: pages 77-78 # 1, 4, 6, 7: Study Guide page 35 #4 - 6		

Date	Title & Topics	Assignment	Score	√
2.3	**The Laws of Logarithms** **review**: • laws of exponents: $[x^0 = 1], [x^a \cdot x^b = x^{a+b}], [x^a \div x^b = \frac{x^a}{x^b} = x^{a-b}], [(x^a)^b = x^{ab}],$ $[x^{-a} = \frac{1}{x^a}], [\left(\frac{x}{y}\right)^{-a} = \left(\frac{y}{x}\right)^a]$ • how to change radical form to exponential form: $\sqrt[b]{x^a} = x^{\frac{a}{b}}$ **know:** • laws of logs: $[\log_b 1 = 0], [\log_x x = 1], [\log_b b^a = a], [\log ab = \log a + \log b],$ $[\log \frac{a}{b} = \log a - \log b], [\log a^n = n \log a]$ • Rule for "Change of Base": $\log_b a = \frac{\log_x a}{\log_x b}$ • helpful log rules: $[\log_b a = \frac{1}{\log_a b}], [b^{\log_b a} = a]$ • how to change equations from logarithm form to exponential form and vice versa: if $\log_b a = c$, then $b^c = a$ • the restrictions on a logarithm statement: in $\log_b a$, remember $a > 0$ and $b > 0$, $b \neq 1$	**Read**: pages 79-83 and go over the examples carefully **Do**: pages 83-85 # 6, 7, 9, 11, 12, 14, 17, 18: Study Guide page 35 #7-8		
2.4	**Modelling Real Situations Using Exponential Functions: Part I** **know:** • how to use logs to solve problems in the real world	**Read:** pages 86-92 and go over the examples carefully **Do**: pages 92-94 #1, 3, 4, 5, 9, 10: Study Guide pages 35-36 #9-11		
2.5	**Modelling Real Situations Using Exponential Functions: Part II**	**Read**: pages 95-97 and go over the examples carefully **Do**: pages 98-101 # 2, 4, 7, 10, 11, 13, 15, 18: Study Guide page 36 # 12-13		
2.6	**Analyzing the Graphs of Exponential Functions** **know**: • properties of exponential functions and their graphs	**Read:** pages 104-109 and go over the examples carefully **Do**: pages 109-112 # 1, 2, 3, 9, 10, 12, 14, 15: Study Guide page 36 # 14, 15		
2.7	**Geometric Sequences and Exponential Functions** **know**: • in a geometric sequence: $t_n = ar^{n-1}$	**Read**: 113-115 and go over the examples carefully **Do**: pages 115-117 #2, 3, 5, 6, 7, 9, 10: Study Guide page 36 # 16-17		
2.8	**Geometric Series and Exponential Functions** **know**: • $S_n = \frac{a(r^{n-1})}{r-1}$	**Read:** pages 121-124 and go over the examples carefully **Do:** pages 124-126 # 1, 3, 4, 6, 7, 9: Study Guide page 36 # 18-20		
2.9	**Infinite Geometric Series** **know**: • $S = \frac{a}{1-r}, \lvert r \rvert < 1$ • sigma notation: $\sum_{k=1}^{n} x^k$	**Read**: pages 127-129; 132 and go over the examples carefully **Do**: pages 130-131 #2, 4 - 6; page 132 1 to 5: Study Guide page 37 #21-23		
2.10	**Logarithmic Functions** **know**: • properties of logarithmic functions and their graphs	**Read:** pages 133-137; 141-143 and go over the examples carefully **Do**: pages 138-140 #1, 2, 4, 7, 8, 11, 12, 13, 16; page 141 #1-4: Study Guide page 37 #24-26		

Date	Title & Topics	Assignment	Score	√
2.11	**Revisiting Exponential Equations** **know**: • how to solve exponential equations: you don't need logs if you can get the same bases. For example: $\left(3^2\right)^{3x-2} = \left(3^{-1}\right)^{x+1} \rightarrow 9^{3x-2} = \left(\frac{1}{3}\right)^{x+1} \rightarrow 3^{6x-4} = 3^{-x-1} \rightarrow$ $6x - 4 = -x - 1 \rightarrow 7x = 3 \rightarrow x = \frac{3}{7}$ • how to solve logarithmic equations. Four examples: (a) $\log_3(x+1) + \log_3(x-1) = 1 \rightarrow \log_3(x+1)(x-1) = 1 \rightarrow$ $3^1 = (x+1)(x-1) \rightarrow 3 = x^2 - 1 \rightarrow 4 = x^2 \rightarrow x = 2$ ($x \neq -2$ because then $x + 1$ and $x - 1$ are negative) (b) $\log_5(n+9) - \log_5(n-1) = 1 \rightarrow \log_5\left(\frac{n+9}{n-1}\right) = 1 \rightarrow$ $5^1 = \frac{n+9}{n-1}$ (use laws of logs) $\rightarrow 5(n-1) = n+9 \rightarrow$ $5n - 5 = n + 9 \rightarrow 4n = 14 \rightarrow n = \frac{7}{2}$ (c) $3^x = 10 \rightarrow x \log 3 = \log 10 \rightarrow x = \frac{\log 10}{\log 3} \rightarrow x = 2.0959$ (using calculator) (d) $7^{2x-3} = 5^{x+1} \rightarrow (2x-3)\log 7 = (x+1)\log 5 \rightarrow$ $2x\log 7 - 3\log 7 = x\log 5 + \log 5 \rightarrow$ $2x\log 7 - x\log 5 = 3\log 7 + \log 5 \rightarrow$ $x(2\log 7 - \log 5) = 3\log 7 + \log 5 \rightarrow$ $x = \frac{3\log 7 + \log 5}{2\log 7 - \log 5} \longrightarrow x = \frac{\log 7^3 + \log 5}{\log 7^2 - \log 5} \longrightarrow x = \frac{\log(7^3 \times 5)}{\log(7^2 \div 5)}$ = 3.26289 (using calculator)	**Read**: pages 146-148 and go over the examples carefully **Do**: page 149 #1, 2, 5, 6, 8: Study Guide page 37 # 27-29		
2.12	**Logarithmic Equations and Identities** **know**: • how to use log laws to solve equations and identities (see section 2.11)	**Read**: pages 150-152 and go over the examples carefully **Do:** pages 152-153 #1 – 4, 7, 8: Study Guide page 37 #30-31		
	Review	**Do:** page 155 # 1-10: Study Guide page 30 # 1-3, 32-33 # 1- 16, 38-40 # 1-21		
	Test on Chapter 2			
Chapter 3: Trigonometric Functions of Angles, and Chapter 4: Trigonometric Functions of Real Numbers				
3.1	**Introduction to Periodic Functions** **know**: • examples of periodic functions	**Read**: pages 158-160 and go over the examples carefully **Do:** page162 # 8: Study Guide: page 47 #1, 2		
3.2	**Radian Measure** **know**: • definition of radian: the measure of an angle which is subtended at the centre of a circle by an arc equal in length to the radius ofthe circle. 1 radian = $\frac{180^\circ}{\pi} = 57.3^\circ$ • how to use $\pi r = 180^\circ$ to convert radians to degrees and vice versa • how to use $a = r\theta$ (in radians) a is arc length , r is radius • how to use a calculator to convert from radians to degrees and vice versa. • how to convert common angles from degrees to radians $360^\circ = 2\pi$ radians ≈ 6.28 radians $270^\circ = \frac{3\pi}{2}$ radians ≈ 4.71 radians $180^\circ = \pi$ radians ≈ 3.14 radians $120^\circ = \frac{2\pi}{3}$ radians ≈ 2.09 radians $90^\circ = \frac{\pi}{2}$ radians ≈ 1.57 radians $60^\circ = \frac{\pi}{3}$ radians ≈ 1.05 radians $45^\circ = \frac{\pi}{4}$ radians ≈ 0.79 radians $30^\circ = \frac{\pi}{6}$ radians ≈ 0.52 radians	**Read**: pages 163-166 and go over the examples carefully **Do**: pages 167-8 # 1 – 15: Study Guide page 48 #3-7		

Date	Title & Topics	Assignment	Score	√
3.3	**Angles in Standard Position** **know**: • standard position; coterminal angles; reference angles; positive and negative angles	**Read**: pages 170 - 173 and go over the examples carefully **Do**: pages 173-175 # 1 – 13: Study Guide page 48 #8-10		
3.4	**The Sine and Cosine Functions of an Angle in Standard Position** **know**: • sine and cosine of angles in standard position in a unit circle and in any circle	**Read**: pages 176-179 and go over the examples carefully **Do**: pages 179-180 #1 - 11, 16-18: Study Guide pages 48-49 #11-14		
3.5	**Sine and Cosine Functions of Special Angles** **know**: • the sines and cosines of the special angles **Angle** | $45°$ or $\frac{\pi}{4}$ | $30°$ or $\frac{\pi}{6}$ | $60°$ or $\frac{\pi}{3}$ **Sine** | $\frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$ | $\frac{1}{2}$ | $\frac{\sqrt{3}}{2}$ **Cosine** | $\frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$ | $\frac{\sqrt{3}}{2}$ | $\frac{1}{2}$ **Tangent** | 1 | $\frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$ | $\sqrt{3}$	**Read:** pages 184-187 and go over the examples carefully **Do:** pages 188-189 # 1-4, 6, 7*, 8, 10a: Study Guide page 49 # 15-17		
3.6 **4.1**	**Graphing the Sine and Cosine Functions of an Angle** **The Functions $y = \sin x$ and $y = \cos x$** **know**: properties of the standard sine and cosine functions	**Read**: pages 193-195 and go over the examples carefully **Read**: pages 226-232 and go over the examples carefully **Do**: pages 187-8 # 10 – 16: Study Guide page 49 #18, 19 **Do:** pages 232-5 #1, 6, 13: Study Guide page 60 #1, 2		
4.2	**Graphing $y = a\sin(x - c) + d$ and $y = a\cos(x - c) + d$** **review**: • transformations (chapter 1) **know:** • in $y = a\sin(x-c) + d$ or $y = a\cos(x-c) + d$ that: • a is amplitude (vertical expansion or compression and reflection about the x axis) • $a = \frac{\max - \min}{2}$ • c is phase shift (translate left or right) • d is vertical displacement (translate up or down)	**Read**: pages 237-244 and go over the examples carefully **Do**: pages 245-248 #1-26: Study Guide page 60 #3, 4		
4.3	**Graphing $y = a\sin b(x - c) + d$ and $y = a\cos b(x - c) + d$** **know**: • in $y = a\sin b(x - c) + d$ or $y = a\cos b(x - c) + d$ that: •b is used to figure out the period (horizontal expansion or compression) • the period is $\frac{2\pi}{b}$ • summary: in $y = \boldsymbol{a}\sin \boldsymbol{b}(x - \boldsymbol{c}) + \boldsymbol{d}$, $\boldsymbol{a}$ is amplitude, $\frac{2\pi}{\boldsymbol{b}}$ is period, $\boldsymbol{c}$ is phase shift, and $\boldsymbol{d}$ is vertical displacement	**Read**: pages 249-253 and go over the examples carefully **Do**: pages 254-257 # 1-19: Study Guide pages 60-61 #6, 7		
4.4	**Graphing $y = \sin \frac{2\pi}{\boldsymbol{p}}x$ and $y = \cos \frac{2\pi}{\boldsymbol{p}}x$** **know**: • how to change period • the period for $y = \sin 2\pi x$ and $y = \cos 2\pi x$ is 1 • the period for $y = \sin \frac{2\pi}{p}x$ and $y = \cos \frac{2\pi}{p}x$ is p • summary: in $y = \boldsymbol{a}\sin \frac{2\pi}{\boldsymbol{p}}(x - \boldsymbol{c}) + \boldsymbol{d}$, $\boldsymbol{a}$ is amplitude, $\boldsymbol{p}$ is period, $\boldsymbol{c}$ is phase shift, and $\boldsymbol{d}$ is vertical displacement	**Read**: pages 260-265 and go over the examples carefully **Do**: pages 265-267 # 1-16, 26*: Study Guide page 61 #8-11		

Date	Title & Topics	Assignment	Score	√
3.7	**The Tangent Functions of an Angle** **know**: • tangent function in a unit circle or any circle • $\tan\theta = \frac{\sin\theta}{\cos\theta}$	**Read**: pages 205-208 and go over the examples carefully **Do**: pages 209-210 #1-11: Study Guide pages 49-50 #20-23		
3.8 **4.6**	**Graphing the Tangent Function** **The Function *y* = tan*x*** **know**: • properties of the standard tangent function • differences between tangent function and the sine and cosine • **summary:** Graphs of sine, cosine and tangent functions	**Read**: pages 212-213 and go over the examples carefully **Read:** pages 284-286 and go over the examples carefully **Do**: pages 214 # 6: Study Guide page 50 # 24-26 **Do:** pages 287-89 #1-13: Study Guide page 62 #14, 15		
3.9 **4.7**	**Reciprocal Trigonometric Functions** **The Functions *y* =csc *x*, *y* = sec *x*, *y* = cot *x*** **know:** • reciprocal functions and their graphs • properties of reciprocal functions	**Read:** pages 216-218 and go over the examples carefully **Read:** pages 290-291 and go over the examples carefully **Do:** pages 218-219 #1-3: Study Guide page 50 #27-29 **Do:** page 291 # 1-8: Study Guide page 62 #16, 17		
4.5	**Modelling Real Situations Using Trigonometric Functions**	**Read**: pages 272 - 275 and go over the examples carefully **Do**: pages 276-279 #1-7: Study Guide page 61-62 #12, 13		
	Review	**Do:** page 220 #3; page 223 #15; page 293 #1-5; pages 294-5 #8-11, Study Guide pages 41-42 #1-3; page 42 #1, 11, pages 44-45 #1-17; pages 51-54 #1-18, page 55 # 1-3; page 56 #1-5, 7-11, pages 57-8 #1-11; page 63-64 #1-14		
	Tests on Chapters 3 and 4			

Chapter 5: Trigonometric Equations and Identities				
5.1	**Solving Trigonometric Equations using Graphing Technology** **know**: • what are trigonometric equations • how to solve trigonometric equations graphically • how to express general solutions	**Read:** pages 298-301and go over the examples carefully **Do**: page302-304 #1-17: Study Guide page 69 #1, 2		
5.2	**Solving Trigonometric Equations without Using Graphing Technology** **review**: • sine, cosine and tangents of special angles	**Read**: pages 308-312 and go over the examples carefully **Do**: pages 313-4 # 1 -9, 11-14: Study Guide page 69 #3 - 6		

	Sine Function	Cosine Function	Tangent Function
Period	2π	2π	π
y max.	1	1	∞
y min.	-1	-1	∞
Amplitude	1	1	None
Domain	Any angle	Any angle	Any Angle except: $\ldots,\frac{-3\pi}{2},\frac{-\pi}{2},\frac{\pi}{2},\frac{3\pi}{2},\ldots$
Range	$-1 \le y \le 1$	$-1 \le y \le 1$	All real numbers
x – intercepts	$\ldots,-\pi,0,\pi,2\pi,3\pi,\ldots$	$\ldots,\frac{-\pi}{2},\frac{\pi}{2},\frac{3\pi}{2},\frac{5\pi}{2},\ldots$	$\ldots,-2\pi,-\pi,0,\pi,2\pi,\ldots$
y - intercepts	0	1	0

Date	Title & Topics	Assignment	Score	√
5.3	**Trigonometric Identities** **know**: • $\sin x = \sin\left(\frac{\pi}{2} - x\right)$ for $x = \frac{\pi}{4}$ only • $\sin x = \cos\left(\frac{\pi}{2} - x\right)$ for all acute x • $\sin(-x) = -\sin x$ (Odd-Even Identity) • $\cos(-x) = \cos x$ (Odd-Even Identity) • $\tan x = \frac{\sin x}{\cos x}$ (Quotient Identity) • $\sin^2 x + \cos^2 x = 1$ (Pythagorean Identity) • $\tan^2 x + 1 = \sec^2 x$	**Read:** pages 315-318 and go over the examples carefully **Do**: pages 319-321 # 4, 8a, 9, 14, 16, 17: Study Guide page 69 #7-9		
5.4	**Verifying and Proving Trigonometric Identities** **know these "tricks":** • to prove identities algebraically: 1. Start with the most complicated side (terms; double angles). 2. Look for familiar identities (ex: 1 - sin2x = cos2x). Suspect Pythagoras whenever you see sin2x or cos2x) 3. Keep an eye on where you are going (look at the function involved). 4. Use common denominators when necessary. Very often it is extremely useful to represent a "mixed numeral" as an "improper fraction": eg. $3 + \frac{\cos x}{\sin x} = \frac{3\sin x + \cos x}{\sin x}$ eg. $3 - \frac{\cos x}{\sin x} = \frac{3\sin x - \cos x}{\sin x}$ 5. Sometimes adding/subtracting fractions helps: a quick technique is: $\frac{a}{b} \pm \frac{c}{d} = \frac{ad \pm bc}{bd}$ 6. Use conjugates when necessary. Note the "Difference of Squares" structures: $(1 + \sin x)(1 - \sin x) = 1 - \sin^2 x$ 7. If you have $-\sin^2 x - \cos^2 x$ and you need $\sin^2 x + \cos^2 x$, then factor the negative one out: $-\sin^2 x - \cos^2 x = (-1)(\sin^2 x + \cos^2 x)$ 8. If you don't see what you want, put it there (legally, of course). 9. If all else fails, change all to sine and cosine (last resort).	**Read**: pages 322-325 and go over the examples carefully **Do**: pages 326-327 #1 -4 7-17: Study Guide page 70 #10		
5.5	**Sum and Difference Identities** **know**: • sum and difference identities	**Read**: pages 329-333 and go over the examples carefully **Do:** pages 333-336 # 1-5, 7-18: Study Guide page 70 # 11-14		
5.6	**Identities for sin 2x and cos2x** **know**: • $\sin^2 x = 2\sin x \cos x$ (Note: $\sin^2 x \neq 2\sin x$ nor does $\sin^2 x \neq \sin x^2$) • $\cos 2x = \cos^2 x - \sin^2 x$ $= 2\cos^2 x - 1$ (because $\sin^2 x + \cos^2 x = 1$) $= 1 - 2\sin^2 x$	**Read**: pages 338-342 and go over the examples carefully **Do**: pages 342-345 # 1-25: Study Guide page 70 #15-17		
	Review	**Do:** page 349 # 1-12; page 351 #13-20: Study Guide page 65 #1-3; page 66 #1, 2, 4, 9, 10; page 67 #1-10; pages 71-72 #1-12		
	Test on Chapter 5			
Chapter 6: Permutations and Combinations				
6.1	**The Fundamental Counting Principle** **know:** • if one item can be selected in *m* ways, and for each way a second item can be selected in *n* ways, then the two items can be selected in *mn* ways.	**Read**: pages 354 - 356 and go over the examples carefully **Do:** pages 356 - 359 #1 - 9, 11, 13 - 17		
6.2	**Permutations Involving Different Objects** **know:** • factorial notation • the number of permutations of *n* different objects taken *r* at a time is: ${}_n p_r = \frac{n!}{(n-r)!}$.	**Read**: pages 360-363 and go over the examples carefully **Do:** pages 364 - 365 #1, 2, 4 - 7, 9 - 14, 18, 19, *21		

Date	Title & Topics	Assignment	Score	√
6.3	**Permutations Involving Identical Objects** **know:** • the number of permutations of *n* objects taken *n* at a time, if there are *a* alike of one kind, *b* alike of another kind, *c* alike of another kind, and so on, is: $\frac{n!}{a!b!c!\ldots}$ • pathway problems	**Read**: pages 366-368 and go over the examples carefully **Do:** pages 368 - 370 # 1 - 7, 9 - 12, *13, *14		
6.4	**Combinations** **know:** • the number of combinations of *n* different objects taken *r* at a time is: ${}_nC_r = \frac{n!}{r!(n-r)!}$	**Read**: pages 371-374 and go over the examples carefully **Do:** pages 374 - 378 # 1 - 7, 9 - 15, 17, 24		
6.5	**Pascal's Triangle** **know:** • revisit Pathway problems - look again at page 370 Ex. 12 and 13	**Read**: pages 382-383 and go over the examples carefully **Do:** pages 384 - 387 # 1 - 3, *4, 5 - 7, 10, 12, 13, *15, *16, *17, *19		
6.6	**The Binomial Theorem** **know:** • Example: $(a+b)^4 = {}_4C_O a^4 + {}_4C_1 a^3 b + {}_4C_2 a^2 b^2 + {}_4C_3 ab^3 + {}_4C_4 b^4$ • $(k+1)^{th}$ term in expansion of $(a+b)^n$: $t_{k+1} = {}_nC_k a^{n-k} b^k$	**Read**: pages 391-395 and go over the examples carefully **Do:** Page 396 # 2 - 6, *7, *9		
	Review	**Do:** Page 397 # 1 - 7		
	Test on Chapter 6			
Chapter 7: Probability				
7.1	**Experimental and Theoretical Probability** **know:** • if an experiment has n equally likely outcomes of which r outcomes are favourable to event A, then the probability of event A is: $P(A) = \frac{r}{n}$	**Read**: pages 402-405 and go over the examples carefully **Do:** pages 405 - 407 # 1 - 9, 11, 13*		
7.2	**Related Events** **know:** • the list of all possible outcomes of an experiment is the "sample space". • for any event A, $P(A) + P(\overline{A}) = 1$ • Venn diagrarns	**Read**: pages 410-413 and go over the examples carefully **Do:** pages 414 - 416 # 1 - 12, 13*, 14		
7.3	**The Event A or B** **know:** • two events A and B that cannot occur at the same time are "mutually exclusive events". They have no common outcomes (disjoint sets). In probability notation, we would write: P(A or B) = P(A) + P(B) and P(A and B) = 0 • two events A and B that are not mutually exclusive have some common outcomes. In probability notation we would write: P(A or B) = P(A) + P(B) - P(A and B) • use of symbols for intersection and union, i.e. $\cap$ and $\cup$ respectively	**Read**: pages 420-422 and go over the examples carefully **Do**: pages 423 - 424 # 1 - 8, 10, 11*, 12*		
7.4	**The Event A and B** **know:** • P(A and B) = the probability that event A occurs on the first trial and event B occurs on a second trial. • conditional probability: P(A | B) = the probability that event B occurs given that event A has occurred. • dependent events versus independent events (not to be confused with mutually exclusive events) • for dependent events: P(A and B) = P(A) X P(B | A) • for independent events P(B | A) = P(B)	**Read**: pages 425-428 and go over the examples carefully **Do**: pages 429 - 433 # 1 - 9, 11 - 17, 26, 29*, 30*		
7.5	**Problems Involving Conditional Probability** **know:** • $P(B) = P(A \text{ and } B) + P(\overline{A} \text{ and } B)$ • $P(B) = P(A) \times P(B \mid A) + P(\overline{A}) \times P(B \mid \overline{A})$ • the advantage of probability tree diagrarns • Baye 's Law: $P(A \mid B) = \frac{P(A) \times P(B \mid A)}{P(B)}$	**Read**: pages 436-438 and go over the examples carefully **Do**: pages 439 - 440 #1 - 3, 5 - 9		
7.6	**Using Permutations and Combinations to Calculate Probabilities**	**Read**: pages 441-444 and go over the examples carefully **Do**: pages 444 - 447 #1, 3 - 11		

Date	Title & Topics	Assignment	Score	√
7.7	**Using the Binomial Theorern to Calculate Probabilities** **know:** • probability of x successes is: $P(x) = {}_nC_x p^x q^{n-x}$ where $q = 1 - p$	**Read**: pages 451-456 and go over the examples carefully **Do**: pages 457 - 459 # 3 - 9, 11		
	Review	**Do**: Page 460 # 5 - 8		
	Test on Chapter 7			
Chapter 8: Statistics				
8.1 **8.2**	**What is a Distribution?** **Mean and Standard Deviation of a Data Set** **know:** • properties of a Binomial Distribution	**Read**: pages 466-470 and go over the examples carefully **Read**: pages 473-476 and go over the examples carefully **Do**: Page 471 #1, 3 **Do**: Page 477 - 478 #1 - 4, 6, 7		
8.3	**Mean and Standard Deviation for a Binomial Distribution** **know:** • $\mu = np,\ \ \sigma = \sqrt{npq},\ \ q = 1 - p$	**Read**: pages 479-482 and go over the examples carefully **Do**: Page 483 #1, 3, 4, 5ab * additional questions TBA		
8.4	**Normal Distributions** **know:** • properties of a "Normal Distribution" • 68-95-99 rule • pathway problems	**Read**: pages 485-488 and go over the examples carefully **Do**: pages 488~89 # 1 - 3, 5		
8.5	**The Standard Normal Distribution** **know:** • properties of the "Standard Normal Distribution"	**Read**: pages 490-492 and go over the examples carefully **Do**: pages 492-493 # 1 - 7		
8.6	**Modelling Real Situations Using Normal Distributions** **know:** • $z = \frac{x - \mu}{\sigma}$	**Read**: pages 497-500 and go over the examples carefully **Do**: pages 501-503 # 1 - 6, 8, 11, 12		
8.7	**The Normal Approximation to a Binomial Distribution** **know:** • continuity correction	**Read**: pages 507-509 and go over the examples carefully **Do**: pages 510-511 # 1 - 5, 7, 8		
8.8	**Confidence Intervals** • **know:** • how to work from a sample proportion, $\hat{p}$, to a population proportion, p and also in the other direction: $\hat{p} - z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}} < p < \hat{p} + z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$ and $p - z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}} < \hat{p} < p + z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$, given that the "margin of error" is $\pm z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$, and the "standard error" is $\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$	**Read**: pages 1-10 of the "Confidence Interval Supplement" handout and go over the examples carefully **Do**: Confidence Interval Supplement handout pages 11-13 #1-12 (even #'s)		
	Review	**Do:** Selections from page 513 and study guide pages 96-97		
	Test on Chapter 8			
Chapter 9: Conic Sections				
9.1	**What are Conic Sections?** **know**: • a conic section results when a plane intersects a cone • circle, ellipse, parabola, hyperbola	**Read**: pages 518-521 and go over the examples carefully **Do:** page 522 #1-6		
9.2	**Graphing Circles and Rectangular Hyperbolas** **know**: • how to graph circles and rectangular hyperbolas on your graphing calculator • standard equations of a circle and rectangular hyperbola with centre (0, 0)	**Read:** pages 525-531 and go over the examples carefully **Do**: pages 532-3 #1-5, 7-10: Study Guide page 106 #2, 3		

Date	Title & Topics	Assignment	Score	√
9.3	**Stretching Graphs of Conic Sections** **review**: • transformations (Chapter 1) **know:** • an ellipse is a circle which is expanded or compressed • a hyperbola is a rectangular hyperbola which is expanded or compressed • how to classify the equations of conics as circles, ellipses, etc. • standard equations of conics centred at (0, 0) • standard form versus general form of a conic	**Read**: pages 534-41 and go over the examples carefully **Do**: pages 542-544 # 1-15: Study Guide page 106 #4, 5		
9.4	**Translating Graphs of Conic Sections** **review**: • transformations (chapter 1) **know:** • standard equations of conic sections centred at (h, k)	**Read:** pages 545-547 and go over the examples carefully **Do**: pages 548-549 #1 -8: Study Guide pages 106-7 #6-9		
9.5	**Graphing Second Degree Equations in General Form** **know:** • the most general form: $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ • we use: $\boldsymbol{Ax^2 + Cy^2 + Dx + Ey + F = 0}$ • circle: $A = C$; ellipse $A \neq C$ and $AC > 0$; hyperbola $AC < 0$; rectangular hyperbola $A = -C$; parabola A or $B = 0$	**Read**: pages 550-554 and go over the examples carefully **Do**: pages 555-557 # 1-18: Study Guide page 107-8 # 10-12		
9.6	**Converting Equations from General to Standard Form**	**Read**: pages 561-562 and go over the examples carefully **Do**: pages 563 # 1-3: Study Guide page 108 #13-15		
	Review	**Do:** page 568 # 1-7; page 571 # 19-21, Study Guide page 101 #1-3, page 102 # 1-11, pages 103-4 # 1-8, pages 109-110 # 1-11		
	Test on Chapter 9			
	Review for Provincial Exam	**Do:** A billion review questions and thousands of practice exams.		