Pure Math 30 Course Outline

Peace River High School 2011-2012(semester-1)

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General Objectives

(As per Alberta Program of Studies)

Upon completion of this course, students should:

- Be confident in their mathematical knowledge in order to maintain and expand previously developed skills and to engage in problem solving.
- Understand, use and interpret various mathematical concepts and processes.
- Communicate mathematically in order to explain, illustrate, reason and make connections.
- Select and use appropriate technologies as tools to solve problems.
- Have a positive attitude towards mathematics. This will help students appreciate and value mathematics as a discipline that contributes to the betterment of society.
- Develop skills and concepts necessary for further studies in mathematics.

Course Materials

- Textbook- Mathematics 12 Western Canadian Edition.
- Graphing calculator; every student is asked to buy a **Texas Instrument TI-83+ Graphing Calculator**. This is the calculator that will be used for demonstrations and exercises in this course.
- Binder with lined paper
- Notebook (to list the important points/formulas)
- Straight edge
- 0.5 cm. graph paper
- Pencils and erasers

General Expectations; Requirements for Success in Pure Math 30

- **Attendance** is one of the most important factors for academic success. It is expected that you come to class every day on time with the materials you require for class. **All notes, handouts and assignments missed due to absence are your responsibility**. Please make arrangements with your teacher or with a classmate to obtain missed materials.

- If you miss a test due to an excused absence, you may write the test in class on your first day back. A note from your parents and/or guardians excusing the absence will be required.

- **All exercises and assignment** are due at the **beginning of class**; **on or before the due date**.

- Class time will frequently be given to work on assignments. It is expected that you will stay on task during these times. Mature and considerate behaviour is expected in class.

- Math questions **will not** be answered in the 10 minutes immediately preceding an exam. Students are given sufficient notice of exam dates and have ample time to ask earlier.

Course Content

Unit 1: Transformations

- Describe how various translations of functions affect graphs & their related equations
- Describe how various stretches of function affect graphs & their related equations
- Describe how reflections of functions in both axes & in the line y = x affects graphs & their related equations
- Using the graph and/or equation of *f(x)*, describe & sketch $\frac{1}{f(x)}$
- Describe & perform single transformations & combinations of transformations on functions & relations

Unit 2: Conics

- Classify conic sections according to shape
- Classify conic sections according to a given equations in general or standard form
- Convert a given conic equation from general $\Leftrightarrow$ standard form

Unit 3: Exponents, Logarithms & Geometric Growth

Solve exponential equations having bases that are powers of one another

- Use laws of exponents & logarithms to solve & verify equations & identities & to simplify expressions
- Graph & analyze an exponential function, using technology
- Model, graph & apply exponential functions to solve problems
- Change functions from exponential form $\Leftrightarrow$ logarithmic form
- Use logarithms to model practical problems
- Explain the relationship between the laws of logarithms & laws of exponents
- Graph & analyze logarithmic functions with & without technology
- Derive & apply expressions to represent general terms & sums for geometric growth & to solve problems
- Connect geometric sequences to exponential functions over natural numbers

Unit 4: Trigonometric Functions

- Distinguish between degree & radian measure, and solve problems using both
- Determine the exact & approximate values of trigonometric ratios for any multiples of $0°$, $30°$, $45°$, $60°$, $90°$ & $0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$
- Solve first & second degree trigonometric equations over the domain $0^o \le \theta < 360^o$ both algebraically and graphically
- Describe sine, cosine & tangent as circular functions, with reference to the unit circle & an angle in standard position
- Draw, sketch & analyze the graphs of primary & secondary trigonometric functions for amplitude, period, domain, range, asymptotes & behavior under transformations
- Use sine & cosine functions to model & solve problems

Unit 5: Trigonometry Equations & Identities

Solve first & second degree trigonometric equations over the domain $0^o \leq \theta < 360^o$ both algebraically and graphically

- Determine the general solutions to trigonometric equations where the domain is the set of real numbers
- Verify trigonometric identities numerically for any particular cases, algebraically for general cases & graphically
- Use sum, difference & double angle identities for sine & cosine to verify & simplify trigonometric expressions

Unit 6: Permutations & Combinations

Use fundamental counting principle to determine the number of ways to perform multi-step operations

- Determine the number of linear permutations of *n* objects taken *r* at a time & use this to solve problems
- Determine the number of combinations of *n* distinguishable objects taken *r* at a time & use this to solve problems
- Determine the number of pathways in a simple given pathway problem
- Determine the number of pathways in a given compound pathway problem
- Solve problems using the binomial theorem, where the exponent *n* belongs to the set of natural numbers
- Solve probability problems using either permutations & combinations or the fundamental counting principle

Unit 7: Statistics

Find the population standard deviation of a data set, using technology

- Solve probability problems, using binomial distribution
- Use z-scores to solve problems related to the normal distribution

Course Review

Tentative Schedule	**Dates subject to change**

Unit		**Dates**
Transformations of Functions		Sep.2nd – Sep 19th
Conic Sections		Sep 20th – Oct 4th
Exponents, Logarithms and Geo. Series		Oct 5th – Oct 27th
Trigonometry		Oct 28th – Nov 23rd
Permutations and Combinations		Nov 24th – Dec 12th
Statistics		Dec 13th- Dec 21st
Final Exam Review		Last few days of class

★ Alberta Program of Studies will be followed for each topic throughout the course.

Evaluation

Evaluation (per unit)		**Course Evaluation**	
		Transformations of Functions	13%
Class Performance /Quizzes	25%	Conic Sections	10%
Assignments	25%	Exponents, Logarithms, Geo. Series	19%
Units Tests	50%	Trigonometry	22%
		Permutations and Combinations	17%
		Statistics	9%
		Midterm	10%
		Total	100%

Evaluation consists of two major components: term work, worth 50% of the final grade and the diploma exam, worth 50% of the final grade. The term work consists of the weighted average of the six units (as listed above in the course outline.)

Class performance and Assignments:

Besides a daily demonstration of a willingness to participate in class activities and exercises, the student who attends regularly and shows a consistent, conscientious effort towards the course material will do well here. Assignments and/or projects may be given weekly and due on the assigned date.

Quizzes and Unit Tests:

Quizzes will occur about twice a chapter and may not always be announced. Unit tests will pertain to the current and may include past units.

Midterm and Diploma Exams:

The midterm exam is scheduled for first week of November 2011 (Tentative date: 7-11-2010) and will cover the material taught up to that date. The diploma exam serves as the final exam in the course and is scheduled as follows:

Diploma Examinations:

Please note the format for the diploma examinations

Pure Mathematics 30 Wednesday, January 25th, 2012

9:00 – 11:00 am 33 Multiple Choice- worth 82%
7 Numerical Responses – worth 18%

Diploma Examination Content	% Emphasis
Transformations of Functions	15
Conic Sections	12
Exponents, Logarithms, Geo. Series	20
Trigonometry	24
Permutations and Combinations	19
Statistics	10

Teaching Techniques

The instructional strategies will include lecture, question and answer discussions, small group work, investigative group work and some individual tutoring. Students will be expected to do assignments almost every class. Some of the assignments will be done entirely within the set time limits of the 84-minute classes but most will be started in class and finished for homework.
Weekly quizzes will concentrate primarily on the material covered in the past five classes and secondarily on the material from the current unit. Unit exams will cover material primarily from the current unit and secondarily from prior units. The midterm exam will cover material from the beginning of the semester. Projects will cover one or more topics from the course. Continuous review will be encouraged with some longer term assignments and some test questions from previous units.

Extra help is available before school, during lunch and after school hours.
(Note: Please sign up for extra help at least a day in advance)

If you have any questions regarding the information contained in this course outline, please do not hesitate to contact myself at the school.

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