



DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – WINTER 2013

MA0130 – 5(6-0-0) HS 90 HOURS

INSTRUCTOR: Joelle Reynolds **PHONE:** 780-539-2204
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OFFICE HOURS: Weds 8:30 - 12 pm, or by appointment in office or via computer

PREREQUISITE(S)/COREQUISITE:

MA0120 or equivalent, or equivalent math placement test score.

REQUIRED TEXT/RESOURCE MATERIALS:

- Student Notes and Problems – Math 30 (Pure) Workbook (Rao) Castle Rock Research Corp.
- Student Notes and Problems – Math 30 (Pure) Solution Manual (Rao) Castle Rock Research Corp.
- *Non-graphing* scientific calculator (Texas Instruments TI-30XIIS preferred, but not essential)
- Graph paper (a blue post-it note graph pad is ideal, sold in the GPRC Bookstore)
- Binder, loose leaf and dividers to organize handouts and notes provided

CALENDAR DESCRIPTION:

MA 0130 – Mathematics Grade 12 Equivalent (Pure)

This course explores transformations, exponents and logarithms, sequences, series, trigonometry (including the unit circle, graphs, identities and equations), quadratic relations, conics, permutations and combinations, probability and statistics.

CREDIT/CONTACT HOURS:

5 (6-0-0) 90 contact hours

DELIVERY MODE:

Students are guided through the workbook, additional notes and examples are provided as necessary. First, background concepts and rules are reviewed; then investigative work is done leading to new concepts, laws and formulas. Several related problems are assigned daily to reinforce new ideas and skills.

OBJECTIVES:

Unit 1 Transformations

- Review
- Graph polynomial, linear, quadratic, rational, absolute value, radical and cubic functions.
- Understand function notation and write an inverse function.
- Given the graph of any function, be able to plot the graph of a related function using translations (horizontal and vertical), stretches (about the x or y -axis), and reflections (in x -axis, in y -axis, in line $y=x$).
- Identify transformation(s) from an equation.
- Write an equation to reflect a given translation, reflection, or stretch.
- Identify and perform combinations of transformations on functions.

Complete an assignment at the end of this unit worth 3% of the final grade.

Unit 2 Exponents and Logarithms

- Use the laws of exponents and laws of logarithms to simplify expressions.
- Define logarithmic relationships and be able to interconvert exponential and logarithmic relations.
- Evaluate logarithms to find exact values.
- Evaluate common and natural logarithms using a calculator.
- Plot graphs of exponential & logarithmic functions.
- Identify transformations of exponential & logarithmic functions.
- Solve exponential & logarithmic equations.

Complete an assignment in the middle of this unit worth 3% of the final grade.

- Define **geometric sequence**, common ratio, and general term. Also, be able to identify a geometric sequence.
- Determine the general term as well as specific terms of a geometric sequence.
- Determine the sum of a given geometric sequence to a desired number of terms.
- Expand and evaluate expressions written in Sigma notation.
- Solve related problems
- Develop a model for exponential growth or decay and solve related problems.
- Determine the doubling period, half-life or any other time period for exponential growth or decay, and solve related problems.
- Solve problems based on logarithmic formulas, including Richter, decibel, and pH scales.

Complete an assignment at the end of this unit worth 2% of the total grade.

Complete an exam worth 12% of the final grade

Unit 3 Trigonometry

- Define the primary and reciprocal trigonometric ratios of an angle.
- Define principal and coterminal angles, and state relationship between them.
- Define radian measure of an angle; be able to convert radians to degrees and vice-versa.
- Given one trigonometric ratio of an angle, determine the other 5 ratios.
- Determine reference angle and apply the CAST rule.
- Determine exact values of trigonometric ratios for special angles on the unit circle.

Complete an assignment in the middle of this unit worth 2% of the total grade.

- Solve first and second degree trigonometric equations giving specific and general solutions.
- Verify an identity is true for a specific value of the variable.
- Prove trigonometric identities for all defined values of the variable.
- Apply sum and differences identities as well as double angle identities.

Complete an assignment in the middle of this unit worth 3% of the total grade.

- Define period and amplitude of a periodic function.
- Plot graphs of the basic sine, cosine and tangent functions.
- Determine the period and the amplitude of a periodic function from a given graph, and be able to write the equation of a sinusoidal function given its graph.
- Use transformations to plot the graphs of more complex sine and cosine functions.
- Solve application questions involving sinusoidal functions

Complete an assignment at the end of this unit worth 3% of the total grade.

Complete an exam worth 12% of the total grade.

Unit 4 Permutations and Combinations

- Apply the fundamental counting principle to determine the number of different ways to perform multi-step operations.
- Define permutations of n objects and factorials.
- Determine the number of permutations of n different objects when all, or part, are used at a time.
- Determine the number of permutations of n objects when some of them are identical.
- Define combinations of n objects.
- Determine the number of different combinations when r objects are selected from n different objects.
- Apply the principle of combinations to different situations, and solve related problems.
- Explain Pascal's triangle and how it is related to combinations and the Binomial Theorem.
- Use the Binomial Theorem to expand a binomial or to find a specific term in the expansion of a binomial where the exponent n is a natural number.
- Use permutations, combinations, or the fundamental counting principle to solve probability problems.

Complete an assignment at the end of this unit worth 3% of the final grade.

Unit 5 Statistics and Probability Distribution

- Define the measures of central tendency (mean, mode, median) and determine the value for each of them for a set of data.
- Define the measures of dispersion (range, standard deviation).
- Calculate standard deviation for a population and apply to analyse given data.
- Define and display a probability distribution.
- Determine the probability for a binomial experiment.
- Define z -score, and calculate z -score for a given set of data, and apply to solve related problems.
- Explain normal distribution and standard normal curve.
- Use area under the standard normal curve and z -scores to solve related problems.

Complete an assignment at the end of this unit worth 3% of the final grade.

Unit 6 Conic Sections

- Identify the parts of a double-napped cone.
- Given information on how a plane intersects a cone, determine whether the conic formed is a circle, ellipse, parabola, hyperbola, or a degenerate of one of these.
- Explain how the values for A and C in the general form of the equation of a conic section determine the shape of the conic.
- Identify the appropriate conic section from an equation given in general form.
- Given an equation in standard form, identify the conic.
- Determine the series of transformations necessary to transform the graph of one conic to the graph of another or the equation of one conic to the equation of another.
- Determine the equation of a conic given an original equation and a series of transformations.
- Write an equation of a conic given specific characteristics.
- Convert a given equation of a conic section from general to standard form and vice-versa.
- Graph conic sections from equations in standard form, and state the domain, range and defining characteristics of the graph
- Solve application problems that model conic sections

Complete an assignment at the end of this unit worth 2% of the final grade.

Complete an exam worth 12% of the total grade.

Write a Cumulative Final Exam worth 40% of the final grade.

TRANSFERABILITY:

This course is listed in the Alberta Transfer Guide. It is accepted at colleges and universities in Alberta as equivalent to Math 30 Pure.

**** Grades of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

GRADING CRITERIA:

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A⁺	4.0	90 – 100	EXCELLENT
A	4.0	85 – 89	
A⁻	3.7	80 – 84	FIRST CLASS STANDING
B⁺	3.3	77 – 79	
B	3.0	73 – 76	GOOD
B⁻	2.7	70 – 72	
C⁺	2.3	67 – 69	SATISFACTORY
C	2.0	63 – 66	
C⁻	1.7	60 – 62	
D⁺	1.3	55 – 59	MINIMAL PASS
D	1.0	50 – 54	
F	0.0	0 – 49	FAIL
WF	0.0	0	FAIL (withdrawal after the deadline)

EVALUATION:

Unit Assignments: 9 assignments

(Assignments 3, 4 and 9 are worth 2% each. All others are worth 3% each) 24%

Exams: 3 Section Exams at 12% each 36%

Final Exam: Cumulative 40%

STUDENT RESPONSIBILITIES:

MA0130 is a prerequisite for many post-secondary programs. In taking this course, the primary goal is that students will develop their understanding of and ability to use mathematics. However, students in this course are also learning how to prepare for the demands and expectations of post-secondary education. Please read and ensure you understand the following expectations before we begin:

Assignments must be submitted on time

Assignments are due at the beginning of class on the specified dates.

Exams must be written on the days announced in class

If an emergency prevents attendance on an exam day, students must contact me **immediately** via phone or email, and may be asked to provide documentation to justify their absence. Students will then be scheduled to write *an alternate version* of the exam at the earliest possible opportunity.

Classes will start on time

Students are asked to remain in class for the duration of the class. Late students may be required to wait to enter to avoid disturbing the class in progress.

Complete Daily Homework

At least **one hour** of study per day outside of class time.

Please stow your phones

Cell phone use is a distraction to you, your classmates and the instructor. Cellphone calculators will not be permitted during exams.

Take responsibility for your learning

Your instructor will monitor and periodically update you with your progress, but it is ultimately the student's responsibility to direct and manage their own learning. It is your job to recognize when you require additional support and to seek those supports out.

Participation

Students will be asked for feedback, to answer and to ask questions in class.

STATEMENT ON PLAGIARISM AND CHEATING:

Please refer to pages 49-50 of the College calendar regarding plagiarism, cheating and the resultant penalties. These are serious issues and will be dealt with severely.

This schedule is tentative, and may change at any point in the course at the discretion of the instructor.

MA 0130 Tentative Schedule

January 2013

Mon	Tue	Wed	Thu	Fri
7	8 Course Outline Lesson 1 Review	9	10 Lesson 2 Translations	11 Lesson 3 Reflections and Stretches
14 Lesson 4 Combined Transformations Part 1	15 Lesson 5 Combined Transformations Part 2	16	17 Assignment 1 Due Lesson 1 Review of Exponents	18 Lesson 2 Logarithms
21 Lesson 3 Special Cases and Base Conversion Lesson 4 Using the Calculator to Evaluate Logs	22 Lesson 5 Simplifying Logarithmic Expressions	23	24 Lesson 6 Solving Exponential and Log Equations	25 Lesson 7 Exponential and Logarithmic Graphs
28 Lesson 8 Applications	29 Assignment 2 Due Lesson 1 Intro to Geometric S & S Lesson 2 Geometric Series	30	31 Lesson 3 Sigma Notation	1 Assignment 3 Due Lesson 4 Applications

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MA 0130 Tentative Schedule

February 2013

Mon	Tue	Wed	Thu	Fri
4 Study Class for Section 1 Exam	5 Section 1 Exam	6	7 Lesson 1 Angles in Standard Position	8 Lesson 2 Radian Measure
11 Lesson 3 Conversion and Arc Length Lesson 4 Trig Ratios for Angles in Standard Position	12 Lesson 5 Unit Circle Parts 1 Special Angles Lesson 6 Unit Circle Part 2 Sin and Cos Lesson 7 Unit Circle Part 3 Tan	13	14 Lesson 8 Reciprocal Ratios	15 Assignment 4 Due Lesson 9 Solving Trig Equations with the Unit Circle
18 Family Day No Classes	19 Winter Break No Classes	20	21 Winter Break No Classes	22 Winter Break No Classes
25 Lesson 10 Solving Trig Equations with a Calculator	26 Lesson 11 Proving Identities Part 1	27	28 Lesson 12 Proving Identities Part 2	1 Lesson 13 Sum, Difference and Double Angle Identities

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MA 0130 Tentative Schedule

March 2013

Mon	Tue	Wed	Thu	Fri
4 Assignment 5 Due Lesson 14 Graphing Sine and Cosine Functions	5 Lesson 15 Amplitude Lesson 16 Vertical Displacement	6	7 Lesson 17 Phase Shift Lesson 18 Change in period	8 Lesson 19 Combined Transformations for Sinusoidal Functions
11 Assignment 6 Due Lesson 20 Modelling Problems using Sinusoidal Functions	12 Review for Section 2 Exam	13	14 Section 2 Exam	15 Lesson 1 Fundamental Counting Principle Lesson 2 Factorial Notation
18 Lesson 3 Classifying Problems	19 Lesson 4 Perms of n objects Lesson 5 Perms of n objects taken r at a time Lesson 6 Perms with restrictions Part 1	20	21 Lesson 7 Perms with restrictions Part 2	22 Lesson 8 Coms of n objects taken r at a time
25 Lesson 9 Binomial Expansion and Pascal's Triangle	26 Assignment 7 Due Lesson 1 Mean Median Mode Lesson 2 Probability Distributions and the Normal Curve	27	28 Lesson 3 Z scores	29 GOOD FRIDAY

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MA 0130 Tentative Schedule

April 2013

Mon	Tue	Wed	Thu	Fri
Lesson 4 Area, Probability and Percent 1	Lesson 5 Applications 2	3	Assignment 8 Due Lesson 1 Sections of Conics Lesson 2 Equations of Conics – the Circle 4	Lesson 3 Equations of Conics – The Ellipse Lesson 4 Equations of Conics –The Hyperbola 5
Lesson 5 Equations of Conics – The Parabola 8	Lesson 6 Applications Assignment 9 Due 9	10	Review for Section 3 Exam 11	Section 3 Exam 12
Course Review 15	Course Review 16	17	Exams 18	Exams 19
Exams 21	Exams 22	Exams 23	24	25

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