

DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – WINTER 2019

MA0130 (A3): Mathematics Grade 12 Equivalent (Pre-Calculus 30-1) 5 (6-0-0) HS
6 hours / Week for 15 weeks (90 hours)

INSTRUCTOR: Reddy Ganta **PHONE:** (780) 539-2810 or 2850

OFFICE: A205 or J220 **E-MAIL:** rganta@gprc.ab.ca

OFFICE HOURS: TBA

CALENDAR DESCRIPTION:

MA0130 - Mathematics Grade 12 Equivalent (Pre-Calculus 30-1) 5 (6-0-0) HS

This course explores polynomials, radical, rational, exponential, and logarithmic functions, transforming and combinations of functions, trigonometry (including the unit circle, graphs, identities and equations), and permutations and combinations.

PREREQUISITE(S)/COREQUISITE:

MA0120 or MA0132 or equivalent, or equivalent math placement test score, or 60% or better in Math 20-1 or Math 30-2 or equivalent within the previous two years.

REQUIRED TEXT/RESOURCE MATERIALS:

Pre-Calculus 12 Work Text, (Pearson)

Non-Graphing scientific calculator, graph papers

Computer/Internet Access

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. Students are encouraged to actively participate in classroom lessons. Several related problems are assigned daily to reinforce new ideas and skills.

COURSE OBJECTIVES:

The Course introduces students to:

- Polynomial functions
- Sketch graphs of polynomial functions using the zeros of functions
- Write polynomial functions to model situation
- Sketch the graph of a radical function
- Sketch the graph of a rational function
- Write an equation to reflect a given translation, reflection, or stretch
- Sketch the graph of a composition function
- Determine the equation of a composition function
- Solve exponential and logarithmic equations
- Evaluate common and natural logarithmic using a calculator
- Determine exact values of trigonometric ratios for special angles on the unit circle
- Use transformation to plot the graphs of more complex sine and cosine functions
- Solve application questions involving sinusoidal functions
- Use the Binomial Theorem to expand a binomial or to find a specific terms in the expansion of a binomial where the exponent n is a natural number

LEARNING OUTCOMES:

As a result of taking this course, students will gain the ability to:

Unit 1

Polynomial Functions

- Divide polynomials with long division and synthetic division
- Write division statements for polynomials
- Factor polynomials
- Use the Remainder Theorem to determine the remainder when a polynomial is divided by a binomial
- Use the Factor Theorem to find factors
- Sketch the graph of polynomial functions using the zeros of a function to plot x-intercepts, the constant term as y-intercept, and the leading coefficient as the end behavior for a graph
- Write polynomial functions to model situations

Unit 2 Radical and Rational Functions

- Sketch the graph of a radical function where the radicand is a linear function
- Sketch the graph of a radical function where the radicand is a quadratic function
- Compare the domain and range of a radical function to the domain and range of the radicand function
- Sketch the graph of a rational function
- Determine whether a rational function will have vertical asymptote or a hole for a non-permissible value
- Write a polynomial functions to model situations

Unit 3 Transformations

- Given the graph of any function, be able to sketch the graph of a related function using translations (horizontal and vertical), stretches (about x and y -axis), and reflections in (x -axis or the y -axis)
- Using $y = f(x)$ and $y = af(b(x - h)) + k$ be able to sketch the graph of a related function using translations (horizontal and vertical), stretches (about x and y -axis), and reflections in (x -axis or the y -axis)
- Write an equation to reflect a given translation, reflection, or stretch
- Identify combinations of transformations to graph or write an equation
- Graph and find equations for inverse relations

Unit 4 Combining Functions

- Combine functions graphically to sketch graphs of functions that are the sum, difference, product or quotient to two functions
- Combine functions algebraically to write equations of functions that are the sum, difference, product or quotient to other functions
- Determine the domain and range for combined functions
- Determine the value of a composition of functions at a point
- Determine the equation of a composition function
- Sketch the graph of a composition function
- Identify restrictions for composition functions

Unit 5 Exponential and Logarithmic Functions

- Plot graphs of exponential and logarithmic functions and describe their characteristics
- Apply transformations to the equations and graphs of exponential and logarithmic functions
- Evaluate logarithms to find exact values
- Use the laws of exponents and laws of logarithms to simplify expressions

- Define logarithmic relationships and be able to interconvert and exponential and logarithmic relations

Unit 6 **Trigonometry**

- Define the primary and reciprocal trigonometric ratios of an angle
- Define principal and conterminal angles, and state the 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 five ratios
- Determine the reference angle and apply the CAST rule
- Determine the exact values of trigonometric ratios for special angle on the unit circle

Unit 7 **Trigonometric Equations and Identities**

- Solve first and second degree trigonometric equations giving specific and general situations
- Verify the identity is true for a specific value of the variable
- Prove trigonometric identities for all defined values of the variable
- Apply sum and difference identities as well as the double angle identities
- Define period and amplitude of a periodic function
- Plot graphs of the basic sine, cosine, and tangent functions
- Determine the period, and 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

Unit 8 **Permutations and Combinations**

- Apply the fundamental counting principle to determine the number of different ways to perform multi-step operations
- Use factorial notation to demine permutations and combinations, or to solve for n or r
- 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
- Determine 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

TRANSFERABILITY:

Grade 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.

This course is listed in the Alberta Transfer Guide as equivalent to math 30-1.

** Although 50% (D) is considered a pass for this course, it is strongly recommended that you achieve a mark of at least 65% to be successful at the next level.

EVALUATION CRITERIA:

Your final mark is determined by:

4 section tests	45 %
Midterm	20 %
Final Exam	35 %

All tests and exam **must** be written at the scheduled time unless **prior** arrangements have been made with the instructor. A missed test (exam) will result in a score of **zero** on that test (exam). Only in very specific cases may student be given an opportunity to make up a missed exam (student will be presented with a different version of the exam). Doctor, lawyer or police documentation may be required. The final exam is 3 hours long and is scheduled by the registrar's office during GPRC Exam weeks. Do not book vacation in this time period.

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

Course Schedule/ Tentative Timeline

Test #	% Towards the final exam	Chapter Title	Tentative Exam dates
1	9%	Polynomial Functions Radical and Rational Functions	Wednesday January 23
2	9%	Transformation of Functions Combining of Functions	Tuesday February 12
	20%	MIDTERM	Tuesday February 26
3	18%	Exponential and Logarithmic Functions Trigonometry (Chapter 6)	Monday March 25
4	9%	Trigonometric Equations 7 Identities Permutation and Combinations	Wednesday April 10
Final Exam	35%	FINAL EXAM - 3 HOURS	To be announced Apr. 15 - 27

STUDENT RESPONSIBILITIES:

In addition to the *Student Rights and Responsibilities* at

<https://www.gprc.ab.ca/files/forms/documents/studentRightsandResponsibilities.pdf>, the following guidelines will maintain an effective learning environment for everyone:

1. Regular attendance and class participation is expected of all students and is crucial to good performance in the course. Your success in math is directly linked to your attendance.
2. Students are expected to be punctual. Arrive on time for classes and remain for the duration of scheduled classes.
3. No unspecified electronic devices will be permitted during exams.
4. Be respectful of others regarding food or beverages in the classroom. Clean up your eating area and dispose of garbage.
5. Complete daily homework. **At least 1.5 hours** of study per day outside class time is required
6. Behaviors that interfere with learning are not acceptable.
7. Take responsibility for your learning. Students are expected to notify the instructor of any extenuating circumstances.

ELECTRONIC DEVICES:

Students are expected to turn off cell phones during class time or in labs. No unspecified electronic devices will be allowed in exams.

STATEMENT ON PLAGIARISM AND CHEATING

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Admission Guide at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at www.gprc.ab.ca/about/administration/policies/**

**Note: All Academic and Administrative policies are available on the same page.

STUDENT PRINTING POLICY:

Please refer to the College website (Home > Tuition and Fees) for the printing policy which limits the free use of paper; extra charges will applied if the limit is exceeded.

