DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – WINTER 2015

MA 0130 Mathematics Grade 12 Equivalent (Pre-Calculus 30-1) 5(6-0-0) 90 Hours

INSTRUCTOR:	Joelle Reynolds	**PHONE:**	780-539-2204
OFFICE:	C305	**EMAIL:**	jreynolds@gprc.ab.ca
OFFICE HOURS:	T/R 1 – 2:20 pm		

PREREQUISITE:

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 My Worktext, (Pearson)

Pre-Calculus 12 MathXL, Single Student Access (Pearson)

Non-graphing scientific calculator, graph paper

Computer/Internet Access

CALENDAR DESCRIPTION:

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

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

OBJECTIVES:
After completing MA0130, students will be able to:

Unit 1   Polynomial Functions

- Divide polynomials with long division and synthetic division.
- Write division statements for polynomials.
- Factor polynomials.
- Use the Remainder Theorems 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 the y – intercept and the leading coefficient as the end behaviour 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 a vertical asymptote or a hole for a non-permissible value.
- Determine whether a rational function will have horizontal or oblique asymptotes.

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 the *x* or *y*-axis), and reflections
  (in *x*-axis or the *y*-axis*).
- Given *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 the *x* or *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   Exponents and Logarithms

- Plot graphs of exponential & logarithmic functions and describe their characteristics.
- Apply transformations to the equations and graphs of exponential & 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 exponential and logarithmic relations.

- Solve exponential & logarithmic equations.
- Evaluate common and natural logarithms using a calculator.
- Solve problems by modelling situations with exponential and logarithmic equations.

Units 6 and 7   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.
- 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.
- 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.

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 determine permuations 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.
- 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.

TRANSFERABILITY:

This course is listed in the Alberta Transfer Guide. It is accepted at colleges and universities in Alberta as equivalent to Math 30-1

** 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:

Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
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:

Assignments (8 @ 2.5%)	20%
Section Exams (4 @5%)	20%
Midterm Exam	20%
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:

1. Regular attendance and participation is required.
2. Check Moodle as well as GPRC email on a regular basis.
3. Assignments must be submitted on time.
4. Exams must be written on the days announced in class.
5. If an emergency prevents attendance on an exam day, students must contact me as soon as possible via phone or email, and may be asked to provide documentation to justify their absence.
6. No unspecified electronic devices will be permitted during exams.
7. Complete daily homework. **At least** 1 hour of study per day outside of class time is required.
8. Behaviors that interfere with learning are not acceptable.
9. Take responsibility for your learning.
10. Communicate all requests regarding appointments, etc via email.

STATEMENT ON PLAGIARISM AND CHEATING:

Refer to the College Policy on Student Misconduct: Plagiarism and Cheating at

https://www.gprc.ab.ca/files/forms_documents/Student_Misconduct.pdf

**Note: all Academic and Administrative policies are available at https://www.gprc.ab.ca/about/administration/policies/

MA0130 Tentative Timeline Winter 2015

January 2015

January 2015
Su Mo Tu We Th Fr Sa
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31

February 2015
Su Mo Tu We Th Fr Sa
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Dec 28	29	30	31	Jan 1, 15	2	3
4	5	6 Course Intro	7 MathXL and Review	8 1.1 1.2	9 1.4	10
11	12	13 1.5	14 MathXL-1A Due Review	15 2.1	16 2.3	17
18	19	20 2.4	21 MathXL-2A Due Review	22 Section 1 Test	23 3.1	24
25	26	27 3.2	28 3.3	29 3.4	30 Review	31

February 2015

February 2015
Su Mo Tu We Th Fr Sa
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28

March 2015
Su Mo Tu We Th Fr Sa
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Feb 1	2 MathXL-3A Due	3 4.1 4.2	4 4.3	5 4.4	6 Review	7
8	9 MathXL-4A Due	10 Section 2 Test	11 Review	12 Midterm	13 Graphs and Transformations of Exponential Functions	14
15	16	17	18	19	20	21
22	23	24 5.3 Exponents Review	25 5.4	26 5.5	27 5.6	28

Timelines are tentative and may change at the discretion of the instructor

MA0130 Tentative Timeline Winter 2015

March 2015

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Mar 1	2	3 Review	4 5.7	5 5.8	6 Review	7
8	9 MathXL-5A Due	10 6 Trig Ratios; Angles in Standard Position	11 Special Angles and Exact Trig Ratios; The Unit Circle	12 Radian Measure	13 Review	14
15	16	17 6.4; 6.5	18 6.6	19 Applications of Sinusoidal Functions	20 Review	21
22	23 MathXL-6A Due	24 Section 3 Test	25 7.2; Solving Equations Graphically	26 Reicprocal and Quotient Identities: Verification, Proofs and Solving Equations	27 Pythagorean Identities: Verification, Proofs and Solving Equations	28
29	30	31 Review	Apr 1	2	3	4

April 2015

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Mar 29	30	31	Apr 1 Sum and Difference and Identities: Simplifying and Finding Exact Values	2 Double Angle Identities: Simplifying, Finding Exact Values, Proofs and Solving Equations	3	4
5	6 MathXL7A-Due	7 8.1; 8.2; 8.3; Trig Proofs Due	8 8.4; 8.6	9 Review	10 Section 4 Test	11
12	13 MathXL-8A Due	14 Review	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	May 1	2

Timelines are tentative and may change at the discretion of the instructor