Math 20-1 Course Outline - Spring 2021

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- Room 205
- Math 20-1 is a prerequisite for Math 30-1
- 5 credit course

I should take...

Mathematics-1 if I want to study mathematics or sciences at a university, college, or technical institute and go on to a related career.

Mathematics-1 is for students who plan to enter post-secondary programs such as engineering, mathematics, sciences, some business studies, or other programs that require advanced math skills. The sequence is a co-requisite for Mathematics 31 and may be required for post-secondary calculus courses.

Mathematics-1 includes topics such as permutations and combinations, relations and functions, sequences and series, and trigonometry.

Mathematics-2 if I want to attend a university, college, or technical institute after high school, but do *not* need calculus skills.

Mathematics-2 is for students wishing to study at the post-secondary level in diverse fields, including arts programs, some engineering technologies, medical technologies, and some apprenticeship programs. This path will fulfill most students' needs. Mathematics-2 is designed with a great deal of flexibility, so that the student can switch sequences in Grade 11 or Grade 12 if his or her interests change.

Mathematics-2 includes topics such as relations, functions and equations, probability, statistics, and trigonometry.

Mathematics-3 if I am interested in learning the mathematics needed to enter most trades or if I want to enter the workforce after high school.

Mathematics-3 is for students who want to apprentice to a trade or enter the workforce directly after high school. It is designed to meet the entrance requirements for apprentices in most trades programs.

Mathematics-3 includes topics such as finance, geometry, measurement, and trigonometry.

For more information, visit www.education.alberta.ca/math

Alberta Government

Course Content

The learner outcomes for Math 20-1 (as outlined later in the course outline) will be covered by studying three main topics.

・Topic 1: Algebra and Number
- o Absolute Value, Radicals, Radical Equations, Equivalent Forms of Rational, Expressions, Operations on Rational Expressions, Rational Equations

・Topic 2: Trigonometry
- o Angles, Sine, Cosine, Tangent, Sine Law, Cosine Law

・Topic 3: Relations and Functions
- o Factoring, Absolute Value Functions, Quadratic Functions in Standard Form, Quadratic Functions in General Form, Quadratic Equations, Systems of Equations, Inequalities, Quadratic Inequalities, Arithmetic Sequences and Series, Geometric Sequences and Series, Reciprocal Functions

Resources

Pre-Calculus Grade 11 Workbook - AVP 2011

・Students are strongly encouraged to purchase the workbook for $22 cash. They get to keep the book and write in it. It is extremely worth the money for each student. If purchasing a workbook is a problem please contact the teacher.

Expectations

・Students are required to have access to a graphing calculator for use throughout the course. It is important that this calculator is used throughout high school so that students are familiar with the calculator functions before writing the diploma exam in grade 12. While Alberta Education allows the use of any graphing calculator from the approved list on the diploma exam (see below), **students are strongly encouraged to use a calculator from the Texas Instruments Series (particularly the TI-84)** as this is the calculator that will be demonstrated during class instruction. The current list of approved calculators, and the Alberta Education diploma exam calculator policy can be found at http://education.alberta.ca/media/6902701/06-dip-gib-2014-15_using calculators-computers.pdf

***Students are **NOT** permitted to use cell phones, ipods, or other personal devices as calculators in class, on exams, or on the diploma exam.

・Use of personal electronic devices, such as ipods, cell phones, gaming devices, tablets, ipads, etc., is **NOT** permitted in class without prior permission. ・One Classroom Rule - RESPECT
- o For Self
- o For Others (Classmates, Teacher, Custodial and Other Staff)
- o For the Classroom

Timeline of Topics (estimate and subject to change)

1. Factoring Review - 4 classes
2. Radicals - 10 classes
3. Quadratics - 13 classes
4. Systems and Inequalities - 9 classes
5. Absolute Value and Reciprocal Functions - 8 Classes
6. Rationals - 10 classes
7. Sequence and Series - 5 classes
8. Trigonometry - 10 classes
9. Course Review - 15 classe

Evaluation

Final grades will be calculated as follows:

Radicals & Factoring	10%
Quadratics	12%
Systems and Inequalities	9%
Trigonometry	12%
Rationals	12%
Absolute Value & Reciprocal Functions	9%
Sequences and Series	6%
Final Exam	30%

Note – All coursework must be complete in order to receive credit for this course. Significant missing coursework will not be assigned a grade of zero if incomplete. Rather, the course will be designated as incomplete until all coursework is finished and an accurate grade can be calculated.

Learning Outcomes

Math 20-1 consists of the following learner outcomes as outlined in the *Mathematics Program of Studies* set forth by *Alberta Learning*.

Strand: Algebra and Number
General Outcome: Develop algebraic reasoning and number sense.

201-AN1 Absolute Value – Demonstrate an understanding of the absolute value of real numbers.

201-AN2 Radicals – Solve problems that involve operations on radicals and radical expressions with numerical and variable radicands.

201-AN3 Radical Equations – Solve problems that involve radical equations (limited to square roots.)

201-AN4 Equivalent Forms of Rational Expressions - Determine equivalent forms of rational expressions (limited to numerators and denominators that are monomials, binomials, or trinomials).

201-AN5 Operations on Rational Expressions – Perform operations on rational expressions (limited to numerators and denominators that are monomials, binomials, or trinomials).

201-AN6 Rational Equations – Solve Problems that involve rational equations (limited to numerators and denominators that are monomials, binomials, or trinomials).

Strand: Trigonometry
General Outcome: Develop trigonometric reasoning.

20-1-T1 Angles - Demonstrate an understanding of angles in standard position [0° – 360°].

20-1-T2 Sine, Cosine, and Tangent – Solve problems, using the three primary trigonometric ratios for angles from 0° to 360° in standard position.

20-1-T3 Sine and Cosine Law – Solve problems, using the cosine law and sine law, including the ambiguous case.

Strand: Relations and Functions

General Outcome: Develop algebraic and graphical reasoning through the study of relations.

201-RF1 Factoring – Factor polynomial expressions of the form:

$$\cdot \ ax^2 + bx + c, a \neq 0$$

$$a(f(x))^2 + b(f(x)) + c, a \neq 0$$

$$\cdot \ a^2x^2 - b^2x^2, a \neq 0, b \neq 0$$

$$\cdot$$

$$a^2(f(x))^2 - b^2(g(y))^2, a \neq 0, b \neq 0$$

$$\cdot$$

Where *a, b,* and *c* are rational numbers.

201-RF2 Absolute Value Functions – Graph and analyze absolute value functions (limited to linear and quadratic functions) to solve problems.

201-RF3 Quadratic Functions in Standard Form – Analyze quadratic functions of the standard form and determine the: vertex, domain and range, direction of opening, axis of symmetry, *x*- and *y*-intercepts.

201-RF4 Quadratic Functions in General Form – Analyze quadratic functions of general form to identify characteristics of the corresponding graph including: vertex, domain and range, direction of opening, axis of symmetry, *x*- and *y*-intercepts, and to solve problems.

201-RF5 Quadratic Equations – Solve problems that involve quadratic equations.

201-RF6 Systems of Equations – Solve, algebraically and graphically, problems that involve systems of linear-quadratic and quadratic-quadratic equations in two variables.

201-RF7 Inequalities – Solve problems that involve linear and quadratic inequalities in two variables.

201-RF8 Quadratic Inequalities – Solve problems that involve quadratic inequalities in one variable.

201-RF9 Arithmetic Sequences and Series – Analyze arithmetic sequences and series to solve problems.

201-RF10 Geometric Sequences and Series – Analyze geometric sequences and series to solve problems.

201-RF11 Reciprocal Functions – Graph and analyze reciprocal functions (limited to the reciprocal of linear and quadratic functions).