



MATH-082 – Mathematics, Advanced Level (Developmental Mathematics)

College Preparation and Upgrading

Effective Term & Year: Fall 2022

Course Outline Review Date: 2025-04-01

Program Area: Upgrading for Academic and Career Entry

Description:

This course covers the algebra and trigonometry to satisfy math requirements for some vocational, career and technical programs and/or further academic programs. Math 082 helps students build problem-solving skills and prepares students for entry into programs or courses requiring a Math 082 prerequisite. A positive attitude about math is not essential, but it helps make learning math more productive. It is hoped that all students will increase their competence and appreciation of math through taking this course.

Program Information:

Math 082 fulfills the math requirement for the BC Adult Graduation Diploma.

Delivery Methods: On-campus (Face-to-Face), Directed/Guided Studies

Credit Type: ABE Credits

Credits: 0

Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	112.5
Seminar/Tutorials	
Laboratory/Studio	
Practicum/Field Experience	
Co-op/Work Experience	

Other

Total	112.5
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Course Requisites:

- Complete 1 of the following
 - Completed at least 1 of the following:
 - [MATH070](#) – Mathematics Intermediate Level (Algebraic)
 - [MATH072](#) – Mathematics Intermediate Level (Developmental)
 - Or Foundations of Mathematics and Pre-Calculus 10 or equivalent.

Flexible Assessment: Yes

In some cases students may be able to apply for recognition of prior learning outside the classroom. This flexible assessment process provides equivalent course credit. It is a rigorous process that may include external evaluation, worksite assessment, demonstration, standardized test, self-assessment, interview, products/portfolio, and challenge exam, or other measures as appropriate. Tuition fees apply. Contact an education advisor for more information.

Course Transfer Credit:

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see <https://www.bctransferguide.ca/> or <https://transferalberta.alberta.ca> . For more transfer credit information, please visit <https://www.cotr.bc.ca/Transfer>

All requests for course transfer credit from institutions in British Columbia or elsewhere should go to the College of the Rockies Enrolment Services office.

Textbook Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

Face-to-face and Directed Studies:

Martin-Gay, K. E. (2014). *Introductory Algebra*. (5th ed.) Prentice-Hall Inc.

Please see the instructor's syllabus or check COTR's online text calculator <https://textbook.cotr.bc.ca/> for a complete list of the currently required textbooks.

Learning Outcomes:

Upon the successful completion of this course, students will be able to:

1. Operations with Real Numbers

- a) write fractions as decimals and repeating decimals as fractions;
- b) add, subtract, multiply and divide rational numbers;
- c) evaluate powers with rational bases and integer exponents;
- d) demonstrate the order of operations with rational numbers;
- e) evaluate radicals with rational radicands and distinguish between exact answers and approximate answers;
- f) simplify, add, subtract, multiply and divide square roots;

2. First Degree Equations and Inequalities

- a) solve first degree equations, in one variable, including those involving parentheses;
- b) solve formulas for a given variable when other variables are known;
- c) solve formulas for a given variable;
- d) solve first degree inequalities in one variable;
- e) solve practical problems that can be solved using a first degree equation;

3. Polynomials

- a) distinguish between monomials, binomials, trinomials and other polynomials (in one variable only);
- b) apply the laws of exponents to variable expressions with integral exponents;
- c) evaluate polynomials by substitution;
- d) add, subtract, and multiply polynomials;
- e) factor polynomials by removing the largest common factor;
- f) factor binomials of the form $ax^2 + bx + c$ and trinomials of the form $ax^2 + bx + c$;

- g) solve quadratic equations using the law of zero products;
- h) (optional) factor trinomials of the form

4. Rational Expressions

- a) simplify, by factoring, rational expressions consisting of polynomial numerators and either monomial, binomial, or trinomial denominators;
- b) determine values for which a rational expression is undefined;
- c) multiply and divide rational expressions;
- d) add and subtract rational expressions consisting of monomial and/or binomial denominators;
- e) solve simple rational equations and check solutions;

5. Linear Equations

- a) graph a linear equation including the forms $x = a$ and $y = b$;
- b) given a linear equation or its graph, determine its
 - i. slope
 - ii. x- and y-intercepts
- c) determine the equation of a line, $y = mx + b$, given
 - i. its graph
 - ii. its slope and a point on the line
 - iii. two points on the line

6. Systems of Linear Equations

- a) solve a system of first degree equations in two unknowns by graphing, substitution, and elimination methods;
- b) solve practical problems that can be solved using a system of equations;

7. Radical Expressions

- a) simplify square roots with variable radicands;

- b) add, subtract, multiply and divide square roots with variable radicands;
- c) solve equations with one square root containing a polynomial radicand and check for extraneous solutions;

8. Trigonometry

- a) solve right triangles using one or more of
 - i. the sine ratio
 - ii. the cosine ratio
 - iii. the tangent ratio
 - iv. the Pythagorean theorem
 - v. the angle sum property of triangles
- b) evaluate sine and cosine for angles from 0° to 180° (optional); and
- c) solve triangles using the Law of Cosines or the Law of Sines, excluding the ambiguous case (optional).

9. Optional Learning Outcomes

Students must complete one of the following three optional topics:

A. The Quadratic Equation

- a) solve quadratic equations by factoring;
- b) solve equations of the form by completing the square;
- c) solve quadratic equations by using the quadratic formula;
- d) graph and determine its
 - i. x- and y-intercepts
 - ii. vertex
- e) solve practical problems that can be solved using a quadratic equation;

B. Statistics

- a) determine the mean, median, mode, range and standard deviation of a set of data;
- b) represent data graphically using broken line graphs and bar graphs;
- c) understand how the normal curve can be used to describe a normally distributed population;
- d) calculate z-scores and determine areas under the normal curve;
- e) use areas under the normal curve to analyze data in terms of the probability of various events;

C. Financial Mathematics

- a) solve simple interest problems using the formula, $i = prt$ (for any variable);
- b) solve compound interest problems for A or P using
- c) find the effective interest rate using
- d) solve annuity problems using (for A or P only);
- e) find periodic payment using ;
- f) determine the finance charge on a loan; and
- g) determine the interest rate on a loan using tables or appropriate technology.

Material covered in this course is consistent with the articulated outcomes found in the 2017/2018 ABE BC Articulation Handbook. This handbook is available online at www.bctransferguide.ca/search/abe.

Course Topics:

- Fractions, Decimals & Percents
- Real Numbers
- Equations & Inequalities
- Exponents & Polynomials
- Factoring
- Rational Expressions
- Graphing Linear Equations
- Systems
- Roots & Radicals Quadratics
- Trigonometry

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

The outcomes of this course meet and are consistent with the outcomes prescribed for Computer Studies: Fundamental Level in the Adult Basic Education in British Columbia Colleges – An Articulation Handbook –
<https://www.bctransferguide.ca/wp-content/uploads/2022/08/abeguide2223.pdf>

Evaluation and Assessments

Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Unit Tests and/or Midterm Exams	30%
Unit Quizzes and Assignments	40%
Final Exam (cumulative)	30%
Total	100%

Assessment Type: Directed/Guided Studies

Assessment Type	% of Total Grade
Unit Tests and/or Midterm Exams	30%
Unit Quizzes	40%
Final Exam (cumulative)	30%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=95	94-90	89-85	84-80	79-75	74-70	69-65	64-60	59-55	54-50	<50

Pass requirements: None

Evaluation Notes: A grade of “D” grants credit, but may not be sufficient as a prerequisite for sequential courses.

Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a “0” on the exam.

Academic Policies:

College of the Rockies policies related to courses can be found at <https://cotr.bc.ca/about-us/college-policies/> and include the following:

- Policy 2.4.3 Students with Documented Disabilities
 - Policy 2.4.4 Student Conduct (plagiarism, other cheating, behavioral misconduct)
 - Policy 2.5.8 Academic Performance
 - Policy 2.5.3 Grade Appeal
 - Policy 2.4.9 Student Concerns Re Faculty
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Course Changes:

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.