COLLEGE OF THE ROCKIES

MATH-070 – Mathematics Intermediate Level (Algebraic)

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:

MATH070 is an entry level course that prepares students for higher level Algebraic Math courses. Topics range from essential computation and problem solving skills to algebra and trigonometry, with a much higher emphasis on algebra than MATH 072. It is mainly intended for those students wishing to prepare for MATH 080 – Advanced Level Algebraic Math.

Program Information:

Math 070 can be used as a prerequisite for MATH 080 and MATH 082.

Delivery Methods: Directed/Guided Studies

Credit Type: ABE Credits

Credits: 0

Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	90
Seminar/Tutorials	
Laboratory/Studio	
Practicum/Field Experience	
Co-op/Work Experience	
Other	
Total	90

Course Requisites:

- Complete 1 of the following
    - Completed the following:
        - MATH060 – Math – Fundamental Level 6
    - Or Mathematics 9 or equivalent or permission of the instructor.

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 Columba 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:

Brodie, S., Corbett, P, Grinder, P., Robbins, P., Sarsiat, A. (1999). *Adult Basic Education Intermediate Level Mathematics,* A Series of 14 Modules. Province of British Columbia, Ministry of Advanced Education, Training and Technology and the Centre for Curriculum, Transfer and Technology

Martin-Gay, K.E. *Introductory Algebra,* 2nd Edition. 2003 Prentice Hall, Inc.

ISBN: 0-13-067684-5

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:

Estimation is a skill that is emphasized. Students are strongly encouraged to check answers and that solutions are reasonable in the context.

1. Operations with Rational Numbers

It is expected that students will be able to:

- write fractions as decimals and decimals as fractions
- add, subtract, multiply, and divide rational numbers
- use order of operations
- graph rational numbers on the number line
- define absolute value

2. Measurement

It is expected that students will be able to:

- use the common metric units for temperature, length, area, volume/capacity and mass
- use the common Imperial or US Customary units for temperature, length, area, volume/capacity and force
- convert between and within metric and Imperial or US Customary units using tables and/or calculators
- use proportional reasoning for conversions

3. Perimeter, Area, and Volume

It is expected that students will be able to:

- find perimeters of triangles, squares, rectangles, parallelograms, trapezoids, circles and composite figures using formulas
- find areas of the above shapes using formulas
- find the surface areas of cubes, rectangular solids, right cylinders, spheres, and composite solids using formulas
- find the volumes of cubes, rectangular solids, right cylinders and cones, spheres, and composite solids using formulas
- distinguish between concepts of perimeter and area and their respective units

4. Ratio, Proportion and Percent

It is expected that students will be able to:

- read, write, interpret and compare ratios
- read, write and identify proportions and use them to solve problems
- use ratio and proportion to interpret and make scale drawings
- use ratio and proportion to solve problems involving similar triangles
- use ratios and proportions to solve problems involving:

  i. finding percent when part and whole are known
  ii. finding part when percent and whole are known
  iii. finding whole when part and percent are known

5. Algebra

It is expected that students will be able to:

- explain the use of variables
- evaluate algebraic expressions using substitution
- combine like terms and remove parentheses
- solve first degree equations in one variable
- translate a problem into an equation
- use equations to solve problems
- solve simple formulas for a given variable
- use formulas to solve problems

6. Linear Equations and Graphing

It is expected that students will be able to:

- draw a Cartesian co-ordinate system
- plot and name points in a Cartesian co-ordinate system
- given an equation in two variables:

 i. determine if an ordered pair is a solution
 ii. find ordered pairs which are solutions

- graph equations of the form $x = a$ and $y = b$
- define slope and relate to grade and pitch
- graph linear equations using

  i. slope and y-intercept
  ii. two intercepts
  iii. a table of values

- find x- and y-intercepts;
- 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

- solve problems using graphs of linear equations

7. Powers, Roots, and Scientific Notation

It is expected that students will be able to:

- read and write numbers expressed as powers
- evaluate powers with integral exponents
- apply laws of exponents to simplify expressions
- express numbers using scientific notation
- convert between scientific and standard notation
- determine the square root of a perfect square
- express a square root as a mixed radical in simplest form (numerical radicands only)
- approximate square roots of real numbers using a calculator

8. Polynomials

It is expected that students will be able to:

- distinguish between monomials, binomials, trinomials and other polynomials in one variable only
- apply the laws of exponents to variable expressions with integral exponents
- evaluate polynomials by substitution
- add, subtract, and multiply polynomials in one variable
- factor polynomials by removing the largest common factor
- factor binomials of the form $a^2x^2 - b^2y^2$;
- factor trinomials of the form $ax^2 + bx + c$ with a = 1 ONLY
- divide a polynomial by a monomial

9. Trigonometry

It is expected that students should be able to:

- name parts of a triangle
- find missing side of a right triangle using the Pythagorean Theorem
- find the measure of an unknown side or angle of a right triangle using sine, cosine, or tangent ratios
- solve problems using right angle trigonometry

The outcomes of this course meet and are consistent with the outcomes prescribed for Mathematics: Intermediate Level – Algebraic Mathematics in the Adult Basic Education: A Guide to Upgrading in British Columbia's Public Post-Secondary Institutions – An Articulation Handbook 2021/22 Edition.

Course Topics:

- Operations with Rational Numbers
- Measurement

- Perimeter, Area, and Volume
- Ratio, Proportion and Percent
- Algebra
- Linear Equations and Graphing
- Powers, Roots, and Scientific Notation
- Polynomials
- Trigonometry

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: Directed/Guided Studies

Assessment Type	% of Total Grade
Module Tests*	50%
Midterm*	20%
Final Exam*	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.

Evaluation Notes Comments:

* Tests: students must achieve 70% or better to progress to the next module.

** Midterm: students must achieve 65% or better to progress to the next module.

*** Final Exam: students must achieve 50% or better to pass the course.

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

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.