



## Mathematics Intermediate Level (Developmental) - MATH 072

Upgrading for Academic and Career Entry

### Course Outline

COURSE IMPLEMENTATION DATE: September 2015  
OUTLINE EFFECTIVE DATE: September 2022  
COURSE OUTLINE REVIEW DATE: April 2027

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#### GENERAL COURSE DESCRIPTION:

MATH 072 is an entry level course that prepares students for higher level math courses or can be used to satisfy personal and career goals. Topics range from essential computation and problem-solving skills to algebra and geometry. MATH 072 prepares students for entry into programs requiring an Intermediate level Math or a Math 10 pre-requisite.

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**Program Information:** Math 072 can be used as a prerequisite for MATH 081 and MATH 082.

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**Delivery:** This course is delivered in a directed studies format.

**Hours for this course:** 90 hours

#### Typical Structure of Instructional Hours:

| Instructional Activity             | Duration |
|------------------------------------|----------|
| Lecture Hours                      |          |
| Seminars / Tutorials               |          |
| Laboratory / Studio Hours          |          |
| Practicum / Field Experience Hours |          |
| Other Contact Hours                | 90       |
| <b>Total</b>                       | 90       |

#### Practicum Hours (if applicable):

| Type of Practicum      | Duration |
|------------------------|----------|
| On-the-job Experience  | N/A      |
| Formal Work Experience | N/A      |
| Other                  | N/A      |
| <b>Total</b>           | N./A     |

Other Contact Hours:

- Directed Studies

**Course Outline Author or Contact:**

Allison Platt, BSc, BEd

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Signature

**APPROVAL SIGNATURES:**

Department Head

Joy Brown

E-mail: [jbrown3@cotr.bc.ca](mailto:jbrown3@cotr.bc.ca)

Dean of Trades and Technology

Dr. Jack Moes

E-mail: [jmoes@cotr.bc.ca](mailto:jmoes@cotr.bc.ca)

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Department Head Signature

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Dean Signature

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Valid from: September 2022 – April 2027

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Education Council Approval Date

**COURSE PREREQUISITES AND TRANSFER CREDIT:**

**Prerequisites:** Either MATH 060, Mathematics 9 or equivalent or permission of the instructor.

**Corequisites:** None

**Flexible Assessment (FA):**

Credit can be awarded for this course through FA

Yes  No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

**Transfer Credit:** For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>.

Students should also contact an academic advisor at the institution where they want transfer credit.

**Prior Course Number:** Math 070 ⇔⇔ Math 072

**Date changed:** January 2015

## Textbooks and Required 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.

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

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## LEARNING OUTCOMES:

### 1. Estimating Skills/Calculator Use

It is expected that students will be able to:

- estimate answers to problems
- use a scientific calculator to calculate and solve problems involving adding, subtracting, multiplying and dividing whole numbers, fractions and decimals
- check that answers and solutions to problems are reasonable in the context of the given question.

### 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 units for temperature, length, area, volume/capacity and force
- convert between and within metric and Imperial units using tables and/or calculators
- take and read measurements with common measuring tools (e.g. thermometer, ruler, measuring tape, triple beam balance, bathroom scale, stop watch, Vernier caliper, micrometer) (optional)
- describe and apply precision, accuracy and tolerance (optional)
- estimate in metric and Imperial units of measurement (optional).

### 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 by measuring and using formulas
- find areas of the above shapes by measuring and using formulas
- find the surface areas of cubes, rectangular solids, cylinders, cones, spheres and composite solids by using formulas
- find the volumes of cubes, rectangular solids, cylinders, cones, spheres and composite solids by 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 proportions to solve problems involving similar triangles.

#### **5. Percent**

It is expected that students will be able to:

- 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.

#### **6. Geometry**

It is expected that students will be able to:

- name and draw points, lines, rays, segments and angles
- name and draw triangles, quadrilaterals, other common polygons and circles
- construct with a compass and straight edge:
  - i. the perpendicular bisector of a line segment
  - ii. the bisector of an angle
  - iii. a copy of an angle (optional)
  - iv. parallel lines (optional)
  - v.  $30^\circ$ ,  $45^\circ$  and  $60^\circ$  angles (optional)
- classify and distinguish among acute, right, obtuse, straight, reflex, complementary and supplementary and vertically opposite angles
- describe the angle relationships created when parallel lines are cut by a transversal
- measure angles with a protractor
- classify triangles according to sides and angles
- identify similar and congruent figures.

#### **7. Statistics**

It is expected that students will be able to:

- conduct a survey to collect data
- tabulate the data
- calculate median, mean, mode and range
- graph the data
- interpolate and extrapolate from the information provided.

#### **8. Signed (Rational) Numbers**

It is expected that students will be able to:

- add, subtract, multiply and divide signed (rational) numbers
- demonstrate order of operations with signed (rational) numbers
- graph signed (rational) numbers on the number line
- define absolute value.

## 9. 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 one variable
- use formulas to solve problems.

Plus: Unit 1-9 of the Learning Outcomes are the core units of the Intermediate Level Math course. To complete the course, students should choose to complete either A or B (below).

**A This option prepares the student for Advanced-Level Algebraic Math or Advanced-Level Developmental Math.**

## 10. Powers, Roots, and Scientific Notation

- read and write numbers expressed as powers
- calculate powers with integral exponent
- use the rules of exponents to calculate products and quotients of powers with the same base
- use the rules of exponents to calculate the powers of powers
- express numbers using scientific notation
- convert between scientific and standard notation
- read and write numbers expressed as roots
- calculate using roots.

## 11. Polynomials

- add and subtract polynomials
- multiply and divide polynomials by a monomial
- remove common factors from polynomials.

## 12. Trigonometry

- name the parts of a right triangle
- find the 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.

## 13. Graphing

- draw a Cartesian coordinate system
- plot and name points in a Cartesian coordinate system
- given an equation in two variables:
  - i. determine if an ordered pair is a solution

- ii. find ordered pairs which are solutions
- iii. create a table of values
- graph linear equations
- determine the slope of a line given two points on the line
- relate slope to grade and pitch
- find x- and y-intercepts
- solve problems using graphs of linear equations.

**B Additional material pertaining to specific vocations.**

The outcomes of this course meet and are consistent with the outcomes prescribed for Mathematics: Intermediate Level – Developmental Mathematics in the Adult Basic Education in British Columbia Colleges – An Articulation Handbook <http://www.aved.gov.bc.ca/abe/handbook.pdf>

**EVALUATION AND ASSESSMENT:**

| Assignments   | % Of Total Grade |
|---------------|------------------|
| Module tests* | 50%              |
| Midterm**     | 20%              |
| Final Exam*** | <u>30%</u>       |
| Total         | 100%             |

\*Note:

- \* 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.

*Please see the instructor’s syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments, and use of electronic aids.*

**EXAM POLICY:**

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of “0” for the exam.

**COURSE GRADE:**

Course grades are assigned as follows:

| Grade             | A+   | A     | A-    | B+    | B     | B-    | C+    | C     | C-    | D     | F    |
|-------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Mark<br>(Percent) | ≥ 95 | 94-90 | 89-85 | 84-80 | 79-75 | 74-70 | 69-65 | 64-60 | 59-55 | 54-50 | < 50 |

A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

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**ACADEMIC POLICIES:**

See [www.cotr.bc.ca/policies](http://www.cotr.bc.ca/policies) for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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**COURSE CHANGES:**

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment, and marketing needs. The instructor will endeavour to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.