Adult Basic Education (ABE)

Level III Mathematics

Mathematics 3102C

Transformations/Trigonometry

Curriculum Guide

Level III General College Profile Mathematics (General)
Mathematics 1102A: Consumerism and Travel/Measuring Length/Measuring Area
Mathematics 1102B: Getting Paid/Angles
Mathematics 1102C: Pythagorean Relationship/Trigonometry
Mathematics 2102A: Surface Area/Drawing and Design/Volume and Capacity
Mathematics 2102B: Interpreting Graphs/Banking and Budgeting
Mathematics 2102C: Slope/Right Triangles and Trigonometry
Mathematics 3102A: Measurement and Probability/Data/Linear Relationships
Mathematics 3102B: Real-Life Decisions/Properties of Figures
Mathematics 3102C: Transformations/Trigonometry

Newfoundland
Labrador

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General Information

Introduction

Mathematics 3102C when completed with **Mathematics 3102A and B** is equivalent to the Newfoundland and Labrador senior high school **Mathematics 3202 (Applied)** course.

Pre-requisite

Students must have completed **Mathematics 3102B**.

Resources

The student resource for this course is*:*

Math at Work 12. McGraw-Hill Ryerson. 2012. ISBN 13:978-1-25-901238-9

The instructor resources for this course are:

- *Math at Work 12 Teacher's Resource. McGraw-Hill Ryerson. 2012. ISBN 13:978-1-25-901242-6*
- *The Online Teacher's Resource Centre*
- *Math at Work 12 Teacher's Resource CD-ROM*

Instructors may also supplement with other resources at their discretion.

Study Guide

The Study Guide provides the student with Required Work for the course. It guides the student through the course by assigning relevant reading and exercises from the student resource. Sometimes the Study Guide provides important points for students to think about, to remember or to note. The Study Guide is designed to give students some degree of independence in their work. There is information in the Curriculum Guide applicable to teaching, learning and assessment that is not included in the Study Guide. Instructors should review this information and decide how to use it when teaching students.

Instructors can also exercise professional judgment and make minor alterations to the Required Work in the Study Guide. For example, an instructor may decide that it is unnecessary to assign students all the exercises to complete within each lesson.

Curriculum Guide

The Curriculum Guide includes the specific curriculum outcomes and achievement indicators for the course. The specific curriculum outcomes are listed numerically, and the achievement indicators are listed alphabetically. Suggestions for teaching, learning and assessment are also provided to support student achievement of the outcomes. Some of these suggestions will also be repeated in the curriculum guides for other mathematics courses as appropriate. The curriculum guide also states the pre-requisite for each Level III mathematics course.

Mathematics 3102C Outcomes/Achievement Indicators

Unit 1: Transformations

1. Demonstrate an understanding of transformations on a 2-D shape or 3-D objects, including:

    i.   translations
    ii. rotation
    iii. reflections
    iv. dilations

    a) Determine and explain whether a given image is a dilation of another given shape, using the concept of similarity.
    b) Draw, with or without technology, a dilation image for a given 2-D shape or a 3-D object, and explain how the original 2-D shape or 3-D object and its image are proportional.
    c) Identify and describe the applications of transformations in construction, industrial, commercial, domestic and artistic contexts.
    d) Solve a contextual problem that involves transformations.
    e) Draw the image of a 2-D shape that results from a given single transformation.
    f) Identify a single transformation that was performed, given the original 2-D shape or 3-D object and its image.
    g) Draw the image of a 2-D shape that results from a given combination of successive transformations.
    h) Explain the relationship between reflections and lines or planes of symmetry.
    i) Create, analyze and describe designs, using translations, rotations, and reflections in all four quadrants of the coordinate grid.

Unit 2: Trigonometry

1. Solve problems using the sine law and cosine law, excluding the ambiguous case.

   a) Solve a problem using the sine law when a diagram is given.

   b) Solve a problem using the cosine law when a diagram is given.

   c) Solve a problem using the sine law or cosine law when a diagram is given.

   d) Describe the use of the sine law and cosine law in construction, industrial, commercial and artistic applications.

Recommended Evaluation

Written Notes (Including all the Required Work)   10%

Assignments   30%

Tests/Quizzes   60%

Total   **100%**

Instructors have the discretion to make minor changes to this evaluation scheme.

Unit 1: Transformations —Suggestions for Teaching and Learning

- Ensure that students understand that a transformation is a process whereby a set of points change, and this change can be location, size or both.
- Review the criteria required for similarity in geometric shapes with students (corresponding angles are congruent and corresponding sides are proportional).
- Discuss with students that a dilation is a transformation in which an object is enlarged or reduced by a constant factor,
- Ensure students understand the effect of the magnitude of a scale factor. Students should understand that for an enlargement a scale factor is greater than 1 and for a reduction the scale factor is less than 1.
- Ensure students understand that it is necessary to use like units when finding a scale factor.
- Discuss dilations in the context of everyday examples: construction, industrial, commercial, domestic and artistic.
- Students may be familiar with making photo enlargements and reductions.
- Ensure that students understand that transformations such as translations, reflections and rotations do not change the size of the figure.
- Ensure that students understand how to work with translations involving a Cartesian plane.
- Focus on translating shapes such as rectangles and triangles before doing more complex shapes.
- Discuss with students that a reflection is a transformation in which an object is shown in its mirror image over a line of reflection.
- Lines of reflection can be horizontal, vertical or oblique.
- Ensure that students initially understand rotations of 90^0, 180^0 and 270^0 clockwise and counterclockwise.
- Ensure that students understand examples involving successive transformations.

Unit 1: Transformations —Suggestions for Assessment

- Instructors can use the BLM's on the CD-ROM to further reinforce the unit concepts.
- The BLM's on the CD-ROM can be useful for developing unit tests and the final exam.
- Instructors have discretion to combine the last unit test with the final exam if beneficial to the student.
- Students must pass the final exam with a minimum grade of 50% to receive credit for this course.
- Instructors should encourage students to reflect on the math concepts in this unit to relate to everyday life.
- Instructors should engage students in discussions to verbalize student thinking on the math concepts.
- Instructors should require students to always show complete calculations with correct units when relevant.
- Instructors can use their own professional judgment to design assessment tools (additional exercises, word problems, assignments, reflections, math journals, etc.) to meet individual student needs.

Unit 2: Trigonometry —Suggestions for Teaching and Learning

- Review with students how to use the three primary trigonometric ratios (sine, cosine, tangent) to determine the side lengths and angle measures in right triangles.
- Ensure that students understand how to correctly label sides in relation to opposite angles.
- Help students to construct a graphic organizer for the sine law and cosine law.
- Ensure students understand and memorize the formulae for the sine law and cosine law.
- When solving triangles, ensure students consider the following: the given information, what has to be solved, which law to use, etc.

Unit 2: Trigonometry—Suggestions for Assessment

- Instructors can use the BLM's on the CD-ROM to further reinforce the unit concepts.
- The BLM's on the CD-ROM can be useful for developing unit tests and the final exam.
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