Adult Basic Education (ABE)

Level III Mathematics

Mathematics 2102C

Slope/Right Triangles and 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 2102C when completed with **Mathematics 2102A and B** is equivalent to the Newfoundland and Labrador senior high school **Mathematics 2202 (Applied)** course.

Pre-requisite

Students must have completed **Mathematics 2102B**.

Resources

The student resource for this course is*:*

- *Math at Work 11. McGraw-Hill Ryerson. 2012. ISBN 13:978-1-25-901237-2..*

The instructor resources for this course are:

- *Math at Work 11 Teacher's Resource. McGraw-Hill Ryerson. 2012. ISBN 13:978-1-25-901239-6*
- *The Online Teacher's Resource Centre*
- *Math at Work 11 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 2102C Outcomes/Achievement Outcomes

Unit 1: Slope

1. Demonstrate an understanding of slope:
    i. as rise/run
    ii. as a rate of change
    iii. by solving problems
    a) Describe contexts that involve slope; e.g., ramps, roofs, road grade, flow rates within a tube, skateboard parks, ski hills, etc.
    b) Explain, using diagrams, the difference between two given slopes and describe the implications.
    c) Describe the conditions under which a slope will be 0 or undefined.
    d) Explain using examples and illustrations, slope as rise over run.
    e) Verify that the slope of an object, such as a ramp or a roof, is constant.
    f) Explain, using illustrations, the relationship between slope and angle of elevation.
    g) Explain the implications, such as safety and functionality, of different slopes in a given context.

2. Solve problems that require the manipulation and application of formulas related to:
    i. volume and capacity
    ii. surface area
    iii. slope and rate of change
    iv. finance charges
    a) Explain, using examples and illustrations, slope as a rate of change.
    b) Explain and verify why different forms of the same formula are equivalent.
    c) Identify and correct errors in a solution to a problem that requires a formula.
    d) Solve a contextual problem involving the application of a formula that does not require manipulation.
    e) Solve a contextual problem that involves slope or rate of change.

f) Create and solve a contextual problem that involves a formula.
g) Describe, using examples, how a given formula is used in a trade or an occupation.

Unit 2: Right Triangles and Trigonometry
1. Solve problems that involve two or three right triangles.
    a) Solve a contextual problem that involves angles of elevation or angles of depression.
    b) Sketch a representation of a given description of a problem in a 2-D or 3-D context.
    c) Solve a contextual problem that involves two or three right triangles, using the primary trigonometric ratios.
    d) Identify all of the right triangles in a given illustration for a context.
    e) Determine if a solution to a problem that involves two or three right triangles is reasonable.

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: Slope—Suggestions for Teaching and Learning

- Discuss slope with students using real-life examples; e.g., the importance of slope when building stairs, ramps, roof trusses, etc.
- Discuss with students the concepts of steepness and positive and negative slope.
- Discuss with students the concepts of 0 and undefined slopes.
- Ensure students understand that horizontal lines have slope 0 and vertical lines have an undefined slope.
- Ensure students understand slope as rise / run.
- Ensure students can identify rise / run by looking at line segments of varying slopes drawn on grid paper.
- Ensure that students make the connection between slope of a line segment and the tangent ratio.
- Discuss with students situations where slope steepness is important and situations where a small slope is more practical.
- Ensure that students understand that slope is equal to the change in the y values divided by the change in x values, which can be determined using coordinates. This is referred to as rate of change.
- Ensure students understand how to correctly use the slope formula.
- Discuss with students that there are trades and occupations where knowledge and application of the slope formula is commonly used; e.g., carpentry, construction, road building, etc.

Unit 1: Slope—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: Right Triangles and Trigonometry —Suggestions for Teaching and Learning

- Review the primary trigonometric ratios with students.
- Ensure students sketch a diagram to model the problems they are solving and show all calculations.
- Ensure students understand how to identify the opposite and adjacent sides and the hypotenuse on a diagram.
- Ensure students understand how to use the inverse of the trigonometric functions in order to determine the measure of a missing acute angle in a right triangle.
- Ensure students keep their calculators in degree mode when completing the calculations in this unit.
- Ensure students understand and can identify the angle of elevation and angle of depression. Discuss real-life scenario where angles of elevation and depression would be used.
- Ensure students can apply their knowledge of solving problems with one right triangle to solving problems with two and three right triangles.
- Sometimes students will have to use two triangles to solve trigonometric problems.
- Ensure students understand how to use the properties of a triangle to check whether a situation to a problem is reasonable; e.g., the smaller angle should be located opposite the side with the shortest length, the sum of the angles in a triangle is 180 degrees, and the sum of any two side lengths should be greater than the length of the third side.

Unit 2 Right Triangles and 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.
- Instructors have discretion to combine the last unit test with the final exam if beneficial to the student.
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