Adult Basic Education (ABE)

Level III Mathematics

Mathematics 2102B

Interpreting Graphs/Banking and Budgeting Curriculum Guide

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

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

Contents

General Information

Introduction

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

Pre-requisite

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

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 2102B Outcomes/Achievement Outcomes

Unit 1: Interpreting Graphs

1. Solve problems that involve creating and interpreting graphs including the following:
    i. bar graphs
    ii. histograms
    iii. line graphs
    iv. circle graphs

    a) Determine the possible graphs that can be used to represent a given data set, and explain the advantages and disadvantages of each.
    b) Create, with and without technology, a graph to represent a given data set.
    c) Solve a contextual problem that involves the interpretation of a graph.
    d) Describe trends in the graph of a given set.
    e) Interpolate and extrapolate values from a given graph.
    f) Explain, using examples, how the same graph can be used to justify more than one conclusion.
    g) Explain, using examples, how different graphic representations of the same data can be used to emphasize a point of view.

Unit 2: Banking and Budgeting

1. Demonstrate an understanding of financial institution services used to access and manage finances.
    a) Describe the type of banking services available from various financial institutions, such as online services.
    b) Describe the type of accounts available at various financial institutions.
    c) Identify the type of account that best meets the needs for a given set of criteria.
    d) Describe the advantages and disadvantages of online banking.
    e) Identify and explain various automated teller machine service charges.
    f) Describe the advantages and disadvantages of debit card purchases.
    g) Describe ways that ensure the security of personal and financial information; e.g., passwords, encryption, protection of personal identification number (PIN) and other personal identity information.
2. Solve problems that involve personal budgets.
    a) Identify income and expenses that should be included in a personal budget.
    b) Explain consideration that must be made when developing a budget; e.g. prioritizing, recurring and unexpected expenses.
    c) Create a personal budget based on a given income and expense data.
    d) Collect income and expense data, and create a budget.
    e) Modify a budget to achieve a set of personal goals.
    f) Investigate and analyze, with or without technology, "What if…" questions related to personal budgets.
3. Demonstrate an understanding of compound interest.
    a) Solve problems that require the manipulation and application of formulae related to:
        i. volume and capacity
        ii. surface area
        iii. slope and rate of change
        iv. simple interest

v. finance charges

b) Solve a problem that involves simple interest, given three of the four values in the formula I=Prt.
c) Solve a contextual problem involving the application of a formula that does not require manipulation.
d) Solve a contextual problem involving the application of a formula that requires manipulation.
e) Identify and correct errors in a solution to a problem that involves a formula.
f) Compare simple and compound interest, and explain their relationship.
g) Solve, using a formula, a contextual problem that involves compound interest.
h) Explain, using examples, the effect of different compounding periods on calculations of compound interest.
i) Estimate, using the Rule of 72, the time required for a given investment to double in value.

4. Demonstrate an understanding of credit options, including credit cards and loans.

a) Compare advantages and disadvantages of different types of credit options, including bank and store credit cards, personal loans, lines of credit and overdraft.
b) Make informed decisions and plans related to the use of credit, such as service charges, interest, payday loans and sales promotions, and explain the reasoning.
c) Describe strategies to use credit effectively, such as negotiating interest rates, planning payment timelines, reducing accumulated debt and timing purchases.
d) Compare credit card options from various companies and financial institutions.
e) Solve a contextual problem that involves credit cards or loans.
f) Solve a contextual problem that involves credit linked to sales promotions.

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: Interpreting Graphs—Suggestions for Teaching and Learning

- Discuss with students the similarities and differences between bar graphs, circle graphs and histograms as they relate to a data set.
- Ensure students realize that the suitability of the graph depends on the data set given, and that the choice of the graph is determined by what you want to analyze and interpret from the data.
- Ensure students understand the importance of adding a title, labels and legend to graphs.
- Remind students that calculating percentages is important to creating circle graphs.
- Ensure that students understand that line and bar graphs must have a title and labels.
- Ensure students understand how to determine an appropriate scale with equal increments on the x and y axes. Review independent and dependent variables with respect to the x and y axes.
- Ensure students understand how to sort data into bins. 20 can be included in the 20-30 bin, but it is also acceptable to put it into the 10-20 bin. It is important for students to consistently follow one or the other.
- Discuss with students that words such as increase, decrease, constant rate and percent are often used to describe the trend displayed in the graph.
- Ensure that students understand how to identify values that fall within the given range of data points (interpolation) as well as outside (extrapolation).
- Discuss with students that different conclusions can be interpreted from the same graph. Students should understand that changing a certain aspect of a graph may change the perception of the information displayed.
- Discuss with students how changing such things as scale and the setting of a starting point can affect the interpretation of data.
- Ensure students are aware that graphs are used frequently to display data and that there is a potential to present misleading information.

Unit 1: Interpreting Graphs—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: Banking and Budgeting —Suggestions for Teaching and Learning

- Discuss with students the types of services financial institutions provide, include savings accounts, checking accounts, credit cards, lines of credit, mortgages and investments.
- Discuss with students types of bank accounts they have and why they choose them.
- Discuss with students the advantages and disadvantages of online banking. One advantage is convenience, but not all students may feel comfortable using technology to complete banking.
- Discuss with students the potential dangers of using bank cards to make purchases as well as the advantages.
- Engage students in a discussion about the ATM service fees that financial institutions charge customers.
- Discuss the following three types of consumer charges that banks use: regular account fees, surcharges and foreign fees.
- Discuss with students the importance of keeping personal records and tracking bank charges.
- Discuss with students the importance of using strong passwords when online banking.
- Encourage students to research ways that banks ensure online security; e.g., using firewalls, multiple layers of passwords, chip technology and check imaging.
- Encourage students to create a personal budget by identifying all sources of income and fixed/variable expenses.
- Discuss with students the importance of prioritizing expenses to first ensure that the basic necessities of life are met.
- Discuss with students the importance personal goals, the cost of each goal, and a timeline for achieving each goal.
- Ensure students understand that in order to realize financial goals, it may be necessary to decrease expenses, increase income or both.
- Ensure that students understand the algebra involved in calculating simple and compound interest. Students should understand how to substitute the required values into the formulae and solve the equations. Students should show all steps in their calculations.

Unit 2: Banking and Budgeting —Suggestions for Teaching and Learning

- Ensure students understand how to rearrange the interest formulae as needed to solve problems. Students may be given time in months and expected to change it into years before substituting into the interest formulae.
- Students should be aware that in the real-world, compound interest is more common than simple interest.
- Ensure students understand the formulae to calculate both simple and compound interest.
- Ensure that students understand the Rule of 72 to estimate how long it will take an investment to double at a given interest rate compounded annually.
- Discuss with students why knowledge of credit is important for personal financial well-being.
- Discuss with students the advantages and disadvantages of the different types of credit available such as credit cards, loans and lines of credit.
- Discuss with students ways to reduce personal debt in their lives. Daily living and spending habits, as well as long-term spending patterns, are two major factors contributing to personal debt.
- Discuss with students things they should consider when shopping around for a credit card; e.g., annual interest rates, annual fees, rewards offered, etc.
- Discuss with students the advantages and disadvantages of deferred payment plans some stores may offer as a sales promotion.

Unit 2 Banking and Budgeting—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.
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