Adult Basic Education

Level II Mathematics

Mathematics 2018
Statistics and Probability

Curriculum Guide

Suggested Resource: *Prism Math Blue Student Workbook (Canadian Edition). McGraw-Hill Ryerson. 2005. ISBN 13: 978-0-07-096033-6 (10:0-07-096033-X).*

Level II Mathematics Courses
Mathematics 2011: Whole Numbers
Mathematics 2012: Fractions
Mathematics 2013: Decimals
Mathematics 2014: Percents
Mathematics 2015: Interest
Mathematics 2016: Measurement
Mathematics 2017: Geometry
Mathematics 2018: Statistics and Probability
Mathematics 2019: Algebra Readiness I
Mathematics 2020: Algebra Readiness II

Newfoundland Labrador

Table of Contents

To the Instructor

Introduction to Mathematics 2018: Statistics and Probability

This course is eight in a series of ten ABE Level II Mathematics courses. This course is recommended for students who have transitioned from ABE Level I into ABE Level II. Such students will likely need this course in order to develop the skills and confidence to continue in Level II and eventually progress to Level III. Likewise, students who left school without a junior high school education will benefit from this course as well. In this course, students will be introduced to multiple bar and line graphs, misleading graphs, circle graphs, stem-and-leaf plots, mean, mode, median and probability.

Students may/may not have to complete all ABE Level II Mathematics courses. Students are only required to complete sufficient Level II Mathematics courses to ensure success in one of the Level III graduation profiles. For example, a Level II student intending to complete the Degree-Technical Profile (Academic) in Level III may need to complete more Level II Mathematics courses than a student intending to complete the General College Profile (General) in Level III.

Mathematics 2018: Statistics and Probability is divided into two units. The outcomes for this course are given below. By completing the **Required Work** in the Study Guide, students will fulfill the outcomes for this course.

The first unit, ***Graphs, Mean, Median, and Mode,*** will cover the following course outcomes:

1.01 Interpret and construct multiple bar graphs.
1.02 Interpret and construct multiple line graphs.
1.03 Interpret misleading graphs.
1.04 Interpret and construct circle graphs.
1.05 Interpret and create stem-and-leaf plots.
1.06 Find the mean, median and mode of a data set.

The second unit, ***Probability,*** will cover the following course outcomes:

2.01 Find the probability of specific events.
2.02 Determine 0 and 1 probabilities.
2.03 Determine probability from a sample space.
2.04 Solve word problems related to probability.

To the Instructor

Students are required to complete one assignment and one final exam in this course. Instructors have flexibility to substitute another assignment and/or tests, or to adjust the evaluation scheme to meet the needs of individual students.

Curriculum Guide

Each new ABE Level II Mathematics course has a Curriculum Guide for the instructor and a Study Guide for the student. The Curriculum Guide includes the specific curriculum outcomes for the course. Suggestions for teaching, learning and assessment are provided to support student achievement of the outcomes. Some suggestions for teaching, learning and assessment will be repeated in the curriculum guides for the Mathematics courses when appropriate. Each Level II Mathematics course is divided into two units except **Mathematics 2019: Algebra Readiness I** and **Mathematics 2020: Algebra Readiness II**. The two pre-algebra courses are required for any Level II student, who has not successfully completed Grade 9 Mathematics, intending to do the academic mathematics stream in Level III. These two courses are more challenging and have more content than the other Level II Mathematics courses. Each unit is presented in the Curriculum Guide as a **two-page layout of four columns** as illustrated in the figure below.

Curriculum Guide Organization
The Two-Page, Four-Column Spread

Unit Number – Unit Title	
Outcomes	**Notes for Teaching and Learning**
Specific curriculum outcomes for the unit.	Suggested activities, elaboration of outcomes, and background information.

Unit Number – Unit Title	
Suggestions for Assessment	**Resources**
Suggestions for assessing students' achievement of outcomes.	Recommended resources that address outcomes.

To the Instructor

Study Guide

The Study Guide provides the student with the name of the text required for the course and specifies the lessons and pages that the student will need to refer to in order to complete the **Required Work** for the course. It guides the student through the course by assigning relevant reading and exercises. 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. Instructors should note, however, that there is material in the Curriculum Guide in the *Notes for Teaching and Learning* and *Suggestions for Assessment* columns that is not included in the Study Guide, and instructors will need to review this information and decide how to include it.

Resources

Recommended student resources for this course:

- *Prism Math Blue Student Workbook (Canadian Edition)*. McGraw-Hill Ryerson. 2005. ISBN 13: 978-0-07-096033-6 (10:0-07-096033-X). http://www.mcgrawhill.ca

Recommended instructor resources:

- *Prism Math Blue Teacher's Edition (Canadian Edition)*. McGraw-Hill Ryerson. 2005. ISBN 007096034-8 (9-780070-960343). http://www.mcgrawhill.ca

The *Prism Math Blue Student Workbook* is designed to help struggling students gain a solid understanding of and confidence in numeracy fundamentals. This is a non-grade specific text that is focused on easy-to-understand instructions as well as review materials and assessment opportunities. Feedback from Newfoundland and Labrador ABE instructors in 2010 indicated a desire for one Level II Mathematics student text, and this resource meets this purpose. This resource is also used in adult learning settings in other Atlantic jurisdictions.

To the Instructor

The *Prism Math Blue Teacher's Edition* mirrors the student workbook, but contains the following helpful additions:

- All answers are conveniently provided for each assigned exercise.
- Error Analysis at the bottom of each lesson gives suggestions for responding to and assessing student performance.
- Blackline Masters (BLM's) of chapter tests are contained in this resource. These masters can be photocopied and used by instructors for chapter tests/exams/etc.

Recommended Evaluation

Assigned Exercises	20%
Assignments	30%
Final Exam (entire course)	50%
	100%

The overall pass mark for the course is 50%.

Note: The evaluation scheme recommended above is presented as a suggestion. Institutions may choose an alternate evaluation scheme in order to meet the individual needs of adult learners. The Department of Education has no requirement that a final exam must be given in this course. Instructors/institutions can decide if a final exam is necessary based on their own policies and procedures.

Unit 1: Graphs, Mean, Median, and Mode —Suggestions for Teaching, Learning and Assessment

Outcomes	Notes for Teaching and Learning
1.01 Interpret and construct multiple bar graphs. 1.02 Interpret and construct multiple line graphs. 1.03 Interpret misleading graphs. 1.04 Interpret and construct circle graphs. 1.05 Interpret and create stem-and-leaf plots. 1.06 Find the mean, median and mode of a data set.	• The word *statistics* originally meant *state numbers*. Today, it is often associated with numerical information, or data, collected by the government such as numbers of births, death and marriages. Data from economics and social science can also be organized and interpreted using statistics. • Students should understand that bar graphs are useful for showing comparisons. • Students should understand that both multiple bar and line graphs can be used to compare two or more sets of data. • Students should label both axes on their graphs, as well as include an appropriate title and scale when constructing graphs in this unit. • Students should understand that circle graphs show how a total amount is divided into parts. Circle graphs often display data as percents. • Instructors may need to review material on fractions, decimals and percents before students begin work on circle graphs. Students may also need instruction on using the protractor to accurately measure sectors on circle graphs. • Students should understand some common causes of misleading graphs; for example, misleading scales showing exaggerated increases/decreases in a trend. • When constructing stem-and-leaf plots, make sure students understand that if a number is in the data set more than once, a leaf is needed for each number. • Mean, mode and median are refereed to in statistics as measures of central tendency and these measures form the basis of statistical analysis.

Unit 1: Graphs, Mean, Median, and Mode —Suggestions for Teaching, Learning and Assessment

Outcomes	Notes for Teaching and Learning
	• Students should understand that the mean can be affected by extremely high or low numbers. For this reason, the mean is sometimes a poor indicator of central tendency. • Ensure that students remember to list the numbers in a data set in order from smallest to largest to determine median. If the data set contains an odd number of items, then the median is the middle number. • Ensure students understand that a data set can have more than more than one mode; for example, if there are two modes, the data is bi-modal. Also, a data set can have no mode.

Unit 1: Graphs, Mean, Median, and Mode —Suggestions for Teaching, Learning and Assessment	
Suggestions for Assessment	**Recommended resources that address outcomes.**
• Instructors may ask students to complete the *Chapter 13 Pre-test* to determine their prior knowledge of statistics and probability. • If a student scores an acceptable grade on the pre-test, it is unnecessary for the student to complete the course as competency will be established. The student should show all calculations on the pre-test, and complete it without using a calculator. It is recommended that this grade be 80% or above. • Instructors can use the grade on the pre-test as the final grade for the course. This grade can be entered on the ABE database as part of the official ABE transcript. • Instructors should follow the suggestions given in **Lesson Follow-up and Error Analysis** section found in the *Teacher's Edition*. This section is written in blue and is at the bottom of the page containing each lesson. • Answers for all exercises and word problems are contained in the *Teacher's Edition*. Instructors can quickly assess and provide feedback on student performance. • A chapter test Blackline Master (BLM) corresponding to this unit is found in the assessment section of the *Teacher's Edition* (near the end of the book).This BLM is suitable to be administered to students as part of the official evaluation for the course. Answers are also provided in the *Teacher's Edition*. • Instructors can use their professional judgement to design their own assessment tools (additional exercises and word problems, assignments, tests, exams, etc) to meet the individual needs of students.	• *Prism Math (Blue)*, page 196. Answers on the same pages of the *Prism Math (Blue) Teacher's Edition*. • *Prism Math (Blue) Teacher's Edition*, pages 265-277.

Unit 2: Probability —Suggestions for Teaching, Learning and Assessment

Outcomes	Notes for Teaching and Learning
2.01 Find the probability of specific events. 2.02 Determine 0 and 1 probabilities. 2.03 Determine probability from a sample space. 2.04 Solve word problems related to probability.	• Instructors may need to review fractions, decimals and percents with students prior to starting this unit. • Students should understand that the theoretical probability of an event occurring is given by number of outcomes favourable to that event / number of possible outcomes. • Experimental probability is the likelihood that something occurs based on the results of an experiment. This is written as number of times the outcome occurs / number of times the experiment is conducted. • Instructors should ensure that students understand how to create a list or table for the sample space. • Students should write all probabilities in simplest form. Instructors should also show students that probabilities can be written as percents.

Unit 2: Probability —Suggestions for Teaching, Learning and Assessment

Suggestions for Assessment	Recommended resources that address outcomes.
• Same comments as for Unit 1	• *Prism Math (Blue)*, page 196. Answers on the same pages of the *Prism Math (Blue) Teacher's Edition.* • *Prism Math (Blue) Teacher's Edition*, pages 265-277.