LEARNING GUIDE
MATHEMATICS
DBE



LEARNING GUIDE
MATHEMATICS DBE

SOLUTIONS

MTH-3052-2 Data collection

Jean-Claude Hamel

2nd edition



DATA COLLECTION

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Introduction

he mathematics course *Data Collection* is the second mathematics course you are required to take in Secondary III. It is designed to develop your ability to deal with situations that involve collecting or processing data.

In the following pages you will learn different ways to build a representative sample of a population in order to conduct a sample survey. You will also learn how to use tables and graphs to represent data that has been collected as well as how to determine various measures associated with their distributions so they can be analyzed and compared. In addition, you will process data resulting from random experiments. To do this, you will use various mathematical tools to enumerate the possible outcomes and to calculate probabilities. This will allow you to draw conclusions, validate outcomes and make informed decisions in a wide range of situations.

INTRODUCTION



Throughout this course you will have many opportunities to apply your reasoning skills. You will make conjectures and validate them. You will have to justify your answers using mathematical arguments and by adopting a clear and structured approach. You will also be given opportunities to improve your situational problem-solving skills. To complete the challenges in this course, you will need to use various strategies and demonstrate perseverance.

You will also have several opportunities to develop your cross-curricular competencies such as exercising your critical judgment and communicating appropriately.

We now invite you to explore the four learning situations in this guide to enrich your knowledge of statistics and probability and to develop your competencies in statistics and probability.

ORGANIZATION AND USE OF THE GUIDE

This guide has been designed for individualized learning either in a classroom setting or through distance education. It is based on societal issues or everyday life situations which, even if they are sometimes fictitious, remain realistic.

This approach will solidify your learning path, respecting your work pace while encouraging you to:

- become an active participant in the learning process
- further develop your confidence using algebraic operations
- make the most of your own personal experience and knowledge;
- reinvest the knowledge you acquire into your own daily life.

Throughout this guide, you will find tools to measure your success and to find ways to overcome any difficulties you may be having. You will thus be able to progress in your learning and ensure your understanding of the concepts.

Your classroom instructor or your distance tutor remains available to support and enlighten you. If a point seems more difficult, do not hesitate to resort to their invaluable help for advice, strategies and tips to ensure you fully understand the subject.

Learning Situations

This guide contains **four learning situations** that not only will introduce you to new knowledge but lead you to handle it easily and apply it competently. Each learning situation is organized in the same way. Each one begins with an introduction, including a description of the task you will have to accomplish at the end of the situation. A first exploration activity invites you to verify your knowledge of the concepts you learned previously. You will use this activity to review certain concepts and mathematical operations that will be useful for the activities that will follow.

The learning situations then are divided into several learning activities. A situation is presented in each of them and you are asked some questions.

Even if you doubt your answers, do not hesitate to note them down. At this stage, they are simply intended to let you measure your current knowledge and stimulate your analytical abilities. Immediately after these questions, the notions, concepts and rules will be explained to you in detail and will be supported by many exercises that will allow you to acquire this new knowledge. All the answers to the exercises are found in the Answer Key at the end of the guide.

You then will be invited to perform some Integration Exercises on all the concepts addressed in the learning situation. The answers to these exercises are also found at the end of the guide.

Once you have completed the integration exercises, you will be ready for the summary activity, putting your communication and logical reasoning skills into practice. Each learning situation ends with a List of New Knowledge. This is your quick reference for the concepts learned.

Visual Cues

Your learning will be guided by captions and visual cues throughout the text.

In the **Glossary**

Words and expressions in blue are defined in the glossary at the end of the guide.

DID YOU KNOW?

The *Did you know*? captions provide additional information. None of the questions on the final examination deal with the information contained in these captions.

TIP

Look for the light bulb to find tips to make your work simpler.

CAUTION!

An exclamation mark indicates the paragraphs to which you should pay particular attention.



REMEMBER

Look for the paper clip for important points to remember as you progress.

REMINDER

The *Reminder* captions contain reminders of concepts covered in previous courses.

LIST OF NEW KNOWLEDGE

The List of New Knowledge summarizes the essential knowledge you have just learned.

The final section of the guide provides a summary of the course content and a self-evaluation to help you determine whether you have a good understanding of the material and are ready for the final examination. This section also includes the Answer Key to this evaluation and to the activities of each learning situation, as well as the glossary.

Scored Activities

This guide is accompanied by two scored activities in separate booklets. The purpose of these activities is to verify your actual progress. It is important to complete them to the best of your ability without any assistance from others. Refer to the Table of Contents to see when each scored activity must be completed. If you did not receive these booklets, you can download them from the SOFAD website at portailsofad.com.

The following table lists the topics that are evaluated by each scored activity and at what point you are required to complete these activities.

Evaluation Situation	Topics Covered	To Be Completed
Scored Activity 1	One-variable statistical distributions (Learning situations 1 and 2)	After Learning Situation 2
Scored Activity 2	Probability (Learning situations 3 and 4)	After Learning Situation 4

Once you have completed a scored activity, you must submit it to your tutor or instructor for correction. As a general rule, only one scored activity may be submitted at a time. You must also wait for it to be corrected before submitting the next scored activity. You can contact your education centre or school board for more information.

Self-Evaluation

The final activity in this learning guide is a self-evaluation. It will allow you to test your acquired knowledge and the skills you have developed. The self-evaluation grid that accompanies this activity will help you identify which concepts you have mastered and which ones you should review before taking the certification exam. The grid indicates which activities to review for each concept.

Before completing the self-evaluation, take some time to prepare. Review the concepts found in the *List of New Knowledge* sections, and make sure you have completed all of the exercises correctly. It is recommended that you complete the self-evaluation without referring to the guide or answer key. After you have finished this activity, compare your answers to those in the answer key and do further review as needed.

Answer Key

An answer key for all of the exercises can be found in the second to last part of the guide. Refer to it after each set of exercises to make sure you have fully understood all of the concepts before continuing on to the next activity or learning situation. At the end of this section is the answer key for the self-evaluation activity.

Note that there is no answer key for the questions related to the explanation of concepts. Only the numbered exercises are included in the answer key.

Glossary

At the very end of this learning guide is a glossary. It gives the definitions of the words in blue that appear throughout the learning situations. These words are listed in alphabetical order. Refer to the glossary often as these definitions will help you better understand these important terms and expressions.

Additional Materials

Ensure that you have all the materials you need.

- Your learning guide, along with a notebook in which you will write down important concepts to remember regarding the list of essential knowledge given in the introduction.
- A dictionary, a calculator and a pencil to write down your answers and notes in your guide, a coloured ballpoint pen to correct your answers, a highlighter for highlighting key concepts, an eraser, etc. To perform certain tasks, you will need geometry instruments, such as a ruler graduated in centimetres, a protractor, a square and a compass.

Instructional Support

Whether you are learning at an education centre or through distance education, you are never on your own. Students learning in a classroom can get help from their instructor, while distance education students can count on their tutor for support, and to answer your questions.

Additional Information About Distance Education

Here are a few suggestions that will help you organize your study time. The course requires an estimated 75 hours of work.

- Create a study schedule based on your family and work obligations, as well as the course requirements.
- Try to devote a few hours a week to your studies, preferably setting aside two hours at a time.
- Stick to your schedule as much as possible.

Your tutor is the resource person you must call if you need help of any kind, and who will correct and comment on the course's two scored activities. Do not hesitate to consult him or her if you are having difficulty with any of the theory or exercises in this course or if you need encouragement to continue your studies. Make a note of any questions as they arise, and contact your tutor by telephone during his or her available hours. You may also choose to send your questions to your tutor by email, at any time. If you did not receive your tutor's schedule and contact information with this guide, ask for them at the learning centre where you registered.

Your tutor is there to guide you throughout your learning process and to provide you with information you need to ensure your success.

Evaluation for Certification Purposes

In order to earn the credits for this course, you must obtain a mark of at least 60% on the final examination that will be held in an adult education centre. To be eligible to write this examination, ideally you should have obtained an average of at least 60% on the scored activities that accompany this guide. Note that some adult education centres require students to achieve an average of 60% or more on the scored activities in order to take the final examination.

Consult your instructor or tutor to find out when and where the final examination will be held and the schedules and requirements. Also ask what materials you are allowed to have with you during the examination.

Essential Knowledge Addressed in the Learning Situations

Learning Situation	Essential Knowledge
1. Conducting a Sample Survey	 Organizing and interpreting statistical data Constructing and interpreting distribution tables Representing and interpreting graphs (histograms)
2. Comparing Data	 Calculating measures of central tendency and measures of dispersion Representing and interpreting graphs (box-and-whisker plots)
3. Games of Chance	 Enumerating and calculating probabilities Representing events (using tables and tree diagrams)
4. Using Probabilities in Everyday Life	 Enumerating and calculating probabilities Representing events (using tables, tree diagrams and geometric figures)

This course is designed to help you acquire the following mathematical knowledge.



Solutions — that is the essence of this mathematics series. Finding solutions means exploring, discovering and learning. It also means reasoning and drawing on previous knowledge to develop new skills.

Data Collection (MTH-3052-2) is the second course in the DBE mathematics program. It consists of four learning situations (LS).

SOFAD

Conducting a Sample Survey

Comparing Data

LS1

LS2

LS3

LS4

Games of Chance

Using Probabilities in Everyday Life

ACQUIRE KNOWLEDGE AND DEVELOP SKILLS

THE LEARNING SITUATIONS IN THIS GUIDE WILL ENABLE YOU TO:

- formulate and validate conjectures;
- organize and interpret statistical data, and then represent them in different types of graphs;
- calculate measures of central tendency and measures of dispersion;
- represent events using tables, tree diagrams and geometric figures

OUR LEARNING TOOLS INCLUDE:

- theoretical and practical activities
- numerous exercises and a detailed answer key
- scored activities enabling teachers to track learners' progress

TITLES IN THE SOLUTIONS SERIES OF THE DBE MATHEMATICS PROGRAM

SECONDARY III

- MTH-3051-2 Algebraic and Graphical Modelling
- MTH-3052-2 Data Collection
- MTH-3053-2 Geometric Representation

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