LEARNING GUIDE **MATHEMATICS** DBE

# SOLUTION MTH-3053-2

2nd EDITION

**GEOMETRIC REPRESENTATION** 



SOFAD

LEARNING GUIDE
MATHEMATICS FBC

# SOLUTIONS

MTH-3053-2

Jean-Claude Hamel

G E O M E T R I C REPRESENTATION

2nd Edition



#### **GEOMETRIC REPRESENTATION**

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#### INTRODUCTION

# Introduction

he Geometric Representation course is the third mathematics course that you are required to take in Secondary III. It is designed to build on your existing knowledge so that you can better describe and design objects and physical spaces. Most of this course deals with solids. Not only will you learn how to represent solids in different ways, but you will also learn how to calculate their area and volume. To perform these calculations, you will use various formulas, some of which will be new to you. But be warned! This is not just a matter of using formulas. You have to understand them as well. Throughout the course, you will discover how formulas can be deduced through logical reasoning. For this task, you will have to manipulates a few algebraic expressions.



Since geometry is the branch of mathematics that has always been the most closely linked with our ability to understand, justify and demonstrate, you will be required to constantly use your reasoning skills throughout the entire course.

You will also need to use your problem-solving skills, particularly when it comes to completing the complex tasks found at the end of each learning situation or when tackling the challenges you will be given in certain activities. To develop these skills, it is important that you maintain a positive attitude toward the obstacles you will encounter.

You will also have a few opportunities to develop your cross curricular competencies, notably the methodological competencies related to information and communications technologies as well as certain intellectual competencies, such as your ability to use creative thinking.

We now invite you to explore the five learning situations in this guide and enrich your knowledge of geometry.

# ORGANIZATION AND USE OF THE GUIDE

This guide has been designed for individual learning either in a classroom setting or through distance education. It is based on the issues that face society or situations in everyday life, although they are sometimes fictitious, they are realistic.

This orientation will make your path more concrete. While it respects your pace, it will make learning more enjoyable by encouraging you to:

- become an active participant in the learning process
- further to develop your confidence using algebraic operations
- draw on your own experience and knowledge
- reinvest the knowledge you acquire into your daily life.

Throughout this guide, you will find tools for measuring your success and finding ways to overcome any difficulties you may be having. This will allow you to continue to progress and succeed in your learning ensuring that you have a good understanding of the concepts.

Your classroom instructor or distance tutor is available to support and help you. If you get stuck on a particular topic, do not hesitate to contact this precious resource who will provide advice, strategies and tips to help you assimilate the material.

#### **Learning Situations**

This guide consists of **five learning situations** that will not only help you discover new knowledge, but will also lead you to master them with ease and apply them competently. Each learning situation is organized in the same way. Each one begins with an introduction, including a description of the task you will be asked to complete at the end of the situation. A first exploration activity asks you to check the status of your knowledge on concepts you have already learned. This activity will help you review certain concepts and mathematical operations that will be helpful for completing subsequent activities.

The learning situation is then divided into multiple learning activities. Each one deals with a specific subject and includes a series of questions.

Even if you doubt your answers, do not hesitate to write them down. At this stage, they are simply intended to measure your current knowledge and stimulate your analytical abilities. Rest assured that the notions, concepts and rules will be explained to you in detail and will be supported with numerous exercises that will help you acquire new knowledge. All the answers to the exercises are located in the Answer Key at the end of the guide.

This section is followed by integration exercises on all the concepts covered in the learning situation. The answers to these exercises are also located at the end of the guide.

Once you have completed the integration exercises, you will be able to carry out the Summary Activity and put your new communication and logical reasoning skills into practice. Each learning situation ends with a List of New Knowledge that has been covered. This is your quick reference the concepts learned.

#### **Visual Cues**

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

#### In the **Glossary**

The words and expressions written 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 exam deal with the infomation 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 notions and concepts covered in previous courses.

# LIST OF NEW KNOWLEDGE

The *List of New Knowledge* section summarizes essential knowledge that has been covered.

The final section of the guide contains a summary of the course content as well as 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 contains the Answer Key for this examination and for the activities in each of the learning situations, as well as the glossary.

## **Scored Activities**

This guide is accompanied by three scored activities in separate booklets. The purpose of these activities is to check your actual progress. It is important to complete them to the best of your ability without assistance from others. Refer to the table of contents for information on 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 when you must complete them.

Evaluation Situation	Topics Covered	When to be Completed
Scored Activity 1	Algebra (Learning Situation 1)	After Learning Situation 1
Scored Activity 2	Prisms and pyramids (Learning situations 2 and 3)	After Learning Situation 3
Scored Activity 3	Cylinders, cones and spheres (Learning situations 4 and 5)	After Learning Situation 5

Once you have completed a scored activity, you must submit it to your instructor or send it to your tutor for correction. As a general rule, only one scored activity may be submitted at a time and you must wait for it to be corrected before you submit the next. Contact your education centre or school commission for more information.

## **Self-Evaluation**

The final activity in this learning guide is the self-evaluation. It will allow you to evaluation the evaluate your acquired knowledge and the skills you have developed. A self-evaluation grid accompanies this activity. The grid is used to determine the concepts you have mastered and those for which a review is necessary before moving on to exam. The grid indicates which activities to review for each concept.

Be sure to prepare before you complete the self-evaluation. Review the concepts in the List of New Knowledge sections and make sure that you have completed the exercises correctly. It is recommended that you complete the self-evaluation without referring to the guide or the answer key. Once you have completed the self-evaluation, compare your answers with those in the answer key and review as needed.

#### **Answer Key**

After the self-evaluation test, you will find the answer key for the exercises in the guide. Refer to the answer key at the end of each series of exercises to ensure that you have fully understood all of the concepts before continuing on to the next activity or learning situation. This section also contains the answer key for the self-evaluation test.

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

#### Glossary

The glossary is the last section of the guide. It contains definitions of words written in blue in the learning situations in alphabetical order. Do not hesitate to refer to the glossary while reading to ensure you properly understand the terms and expressions included.

#### **Additional Materials**

Ensure that you have all the materials you need.

- Your learning guide accompanied by a notebook in which you will summarize the important concepts that relate to the list of essential knowledge included in the introduction.
- A dictionary, calculator and lead pencil to write your answers and notes in your guide, a coloured ballpoint pen to correct your answers, a highlighter to highlight key concepts, an eraser, etc.

## **Instructional Support**

Whether you are learning at an education centre or through distance education, you are never on your own. In the classroom, you will have the support of your instructor, whereas in distance education, you can count on your tutor for support. They will answer your questions.

#### Additional information on Distance Education

Here are some suggestions to help you organize your study time. The course involves approximately seventy-five hours of work.

- Establish a study schedule taking not only your availability and needs into consideration, but also your family, professional and other obligations.
- Try to spend several hours per week studying, preferably in blocks of two hours each time.
- Stick with your schedule as much as possible.

Your tutor is the resource person you can count on, and who will correct and comment on the three scored activities in the course. Do not hesitate to ask questions if you experience difficulties with the theory or exercises, or if you need encouragement to continue with your studies. Write down your questions as they arise and contact your tutor by telephone during his or her hours of availability. You can also send your questions to your tutor by e-mail. His or her schedule and contact information has not been sent to you with this guide. Ask for this information at the education centre where you registered.

Your tutor is there to guide you and provide information that will help you succeed in your education.

## **Evaluation for Certification Purposes**

If you want to earn the three credits attached to 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. Furthermore, some adult education centres require students to achieve an average of 60% on the scored activities in order to take the final examination.

For more information on the evaluation criteria for the exam, contact your instructor if you are taking this course in a classroom, or your tutor if you are taking the course through distance education.

#### Essential knowledge covered in the situations

Learning Situation	Essential Knowledge
1. Considering All the Possibilities	<ul> <li>Manipulating numerical and algebraic expressions</li> <li>Converting various units of measurement</li> <li>Finding measurements</li> </ul>
2. Working in Architect	<ul> <li>Describing, constructing and representing objects</li> <li>Net, projection and perspective</li> <li>Finding measurements</li> </ul>
3. Creating a Unifying Project	<ul> <li>Net, projection and perspective</li> <li>Finding measurements</li> <li>Acquiring various formulas in the form of statements: P1. In a right triangle, a<sup>2</sup> + b<sup>2</sup> = c<sup>2</sup> (Pythagoras).</li> <li>P2. If a triangle is such that the square of the measurement of one side is equal to the sum of the squares of the measures of the others, then it is a right triangle.</li> </ul>
4. Designing a Useful O	<ul> <li>bject</li> <li>Manipulating numerical and algebraic expressions</li> <li>Net, projection and perspective</li> <li>Converting various units of measurement</li> <li>Finding measurements</li> </ul>
5. Exploring Infinity	<ul> <li>Manipulating rational and irrational numbers</li> <li>Manipulating numerical and algebraic expressions</li> <li>Finding measurements</li> </ul>



**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.

*Geometric Representation* (MTH-3053-2) is the third course in the DBE mathematics program. It consists of five learning situations (LS).

SOFAD

Considering All the Possibilities Working in Architecture

**Creating a Unifying Project** 

Designing a Useful Object

Exploring Infinity

#### ACQUIRE KNOWLEDGE AND DEVELOP SKILLS

# THE LEARNING SITUATIONS IN THIS GUIDE WILL ENABLE YOU TO:

- manipulate numerical and algebraic expressions, as well as rational and irrational numbers
- describe, construct and represent objects using nets, projections and perspective
- convert between different units of measurement
- search for measurements

# 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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