

*Definition of the Domain
for Summative Evaluation*

MTH-4102-1

Mathematics Geometry III

Isometry and Similarity

Québec 

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for Summative Evaluation*

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Mathematics Geometry III

Isometry and Similarity

Formation professionnelle et technique
et formation continue

Direction de la formation générale
des adultes

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1. INTRODUCTION

This Definition of the Domain for Summative Evaluation describes and classifies the essential and representative elements of the secondary-level adult education Mathematics program and, more specifically, of the course entitled Geometry III (Isometry and Similarity). As such, it gives an overview of the program, but should by no means replace the program itself. The purpose of defining the domain is to ensure that all summative evaluation instruments are consistent with the overall program.

The Definition of the Domain for Summative Evaluation for each course in this program is organized in a similar manner; however, the content of this definition of the domain is specific to the course entitled Geometry III (Isometry and Similarity).

The goal of the Definition of the Domain for Summative Evaluation is to prepare examinations that are valid from one version to another or from one school board to another, taking into account the responsibilities shared by the Ministère de l'Éducation and the school boards.

2. PROGRAM ORIENTATIONS AND CONSEQUENCES FOR SUMMATIVE EVALUATION

ORIENTATIONS

The main objective of the secondary-level adult education Mathematics program is to help students fully understand mathematical concepts.

The program is designed to help students master the use of certain mathematical tools used in the field of science and technology or in different trades.

The program aims to provide students with the skills they need to process information by applying mathematical models and appropriate strategies for solving problems.

The program also aims to improve the students' ability to clearly relate information using mathematical language.

The program is intended to help students develop a systematic work method.

The program will help students master the use of technological tools.

CONSEQUENCES

Evaluation should involve verifying whether the student has fully understood the different concepts.

Evaluation items should pertain to situations in the field of science and technology or to situations related to trades.

Evaluation items should involve performing tasks that require the students to classify information, use mathematical models and solve problems.

Evaluation items should involve performing tasks that require the use of mathematical language. The appropriateness and clarity of the language used should be taken into account in the marking process.

Evaluation items should require the students to present their work in a clear and structured manner. This should be taken into account in the marking process.

The use of a scientific calculator is permitted for the examinations related to this course.

3. CONTENT OF THE PROGRAM FOR PURPOSES OF SUMMATIVE EVALUATION

Concepts

- Isometry
 - isometric transformations: translation, rotation, reflection
 - congruent triangles
- Similarity
 - similarity transformations
 - similar triangles and polygons
 - scale diagrams

Skills

Each skill is defined within the context of a mathematics program. Given that the adult education Mathematics program corresponds to the mathematics programs in the youth sector, the skills involved are the same for students in both sectors.

Structuring Being familiar with the fundamentals of mathematics, understanding some mathematical concepts, establishing cognitive relations.

Possible actions: to associate, classify, compare, complete, describe, define, contrast, distinguish, state, enumerate, group, name, rank, organize, recognize, arrange, and so on.

Mathematizing Interpreting a given situation using a mathematical model (arithmetic, algebraic or graphical).

Possible actions: to formalize, illustrate, represent, schematize, symbolize, translate, transpose, and so on.

Operating Performing a given operation or transformation.

Possible actions: to calculate, construct, break down, perform, estimate, evaluate, isolate, measure, reconstruct, solve, draw, transform, verify, and so on.

Analyzing or synthesizing Establishing a link between a problem and a given solution or finding a solution to a given problem.

Possible actions: to conclude, deduce, derive, explain, extrapolate, infer, justify, prove, solve, transfer, and so on.

4. TABLE OF DIMENSIONS

CONCEPTS	ISOMETRIES	SIMILARITIES
SKILLS	20%	80%
STRUCTURING 10%	Isometric transformations	Dilatations
	1 5%	6 5%
MATHEMATIZING 5%		Properties of similar triangles
		7 5%
OPERATING 45%	Construction of simple geometric figures	Construction
		8 5%
		Similar triangles
	2 5%	9 20%
	Construction of triangles	Similar polygons
	10 5%	
		Scale diagrams
	3 5%	11 5%
ANALYZING 10%	Congruence	Similarity
	4 5%	12 5%
SYNTHESIZING 30%	Problems dealing with everyday situations	
	5	30%

Key: The numbers 1 to 12 identify the dimensions.

5. OBSERVABLE BEHAVIOURS

Examination items should be formulated on the basis of the observable behaviours listed below. The requirements and restrictions specified in the dimensions and the objectives of the program must be observed.

Dimension 1

Given a set of isometric transformations, identify the one that represents a translation, a rotation or a reflection.

(structuring) /5

Dimension 2

Draw the image of a simple geometric figure under an isometry.

(mathematizing) /5

Dimension 3

Draw a triangle, given one of the following situations:

- the measure of an angle and the lengths of the two sides that form this angle
- the measures of two angles and the length of the side contained between these angles
- the measures of the three sides

(operating) /5

Dimension 4

Use the properties of congruent triangles to determine whether or not two triangles are congruent.

(analyzing) /5

Dimension 5

Solve problems related to everyday situations that involve the concepts of similarity or congruence of geometric figures.

(synthesizing) /30

Dimension 6

Given a set of geometric transformations, identify the transformation that represents a dilatation.

(structuring) /5

Dimension 7

Express a word problem related to the properties of similar triangles as an equation.
(mathematizing) /5

Dimension 8

Draw the image of a geometric figure under a dilatation.
(operating) /5

Dimension 9

Calculate the length of the unknown sides of two similar triangles by applying the properties of these triangles.
(operating) /20

Dimension 10

Calculate the length of the unknown sides of two similar polygons by applying the properties of these polygons.
(operating) /5

Dimension 11

Given a scale diagram, calculate the actual dimensions of geometric figures, or given the actual dimensions of geometric figures, calculate the measures to be used in a scale diagram.
(operating) /5

Dimension 12

Use the properties of similar triangles to determine whether or not two triangles are similar.
(analyzing) /5

6. JUSTIFICATION OF CHOICES

Given that the program focuses on helping the students learn how to use various mathematical tools to solve practical problems dealing with everyday situations, the emphasis has been placed on the skills needed to solve such problems: **operating** and **analyzing**. At the same time, the mastery of new vocabulary related to geometry should not be ignored.

Since it is also important that students be able to follow a systematic procedure to solve a word problem, they should clearly understand the steps involved in solving a problem.

The weighting of the skills listed below is based on the program itself and the time normally required to master these skills.

STRUCTURING	10%
MATHEMATIZING	5%
OPERATING	45%
ANALYZING OR SYNTHESIZING	40%

Similarly, with regard to the concepts, the study of similarity and its applications figures prominently in this course. The concepts have thus been weighted as follows:

ISOMETRY	20%
SIMILARITY	80%

7. DESCRIPTION OF THE EXAMINATION

A. TYPE OF EXAMINATION

There shall be a written examination consisting mostly of items that will be scored subjectively (free-response or extended-response items). Some items may be scored objectively.

The items should take into account the restrictions and the requirements specified in the dimensions and the objectives of the program. The weighting of marks should be consistent with the percentages set out in the table of dimensions.

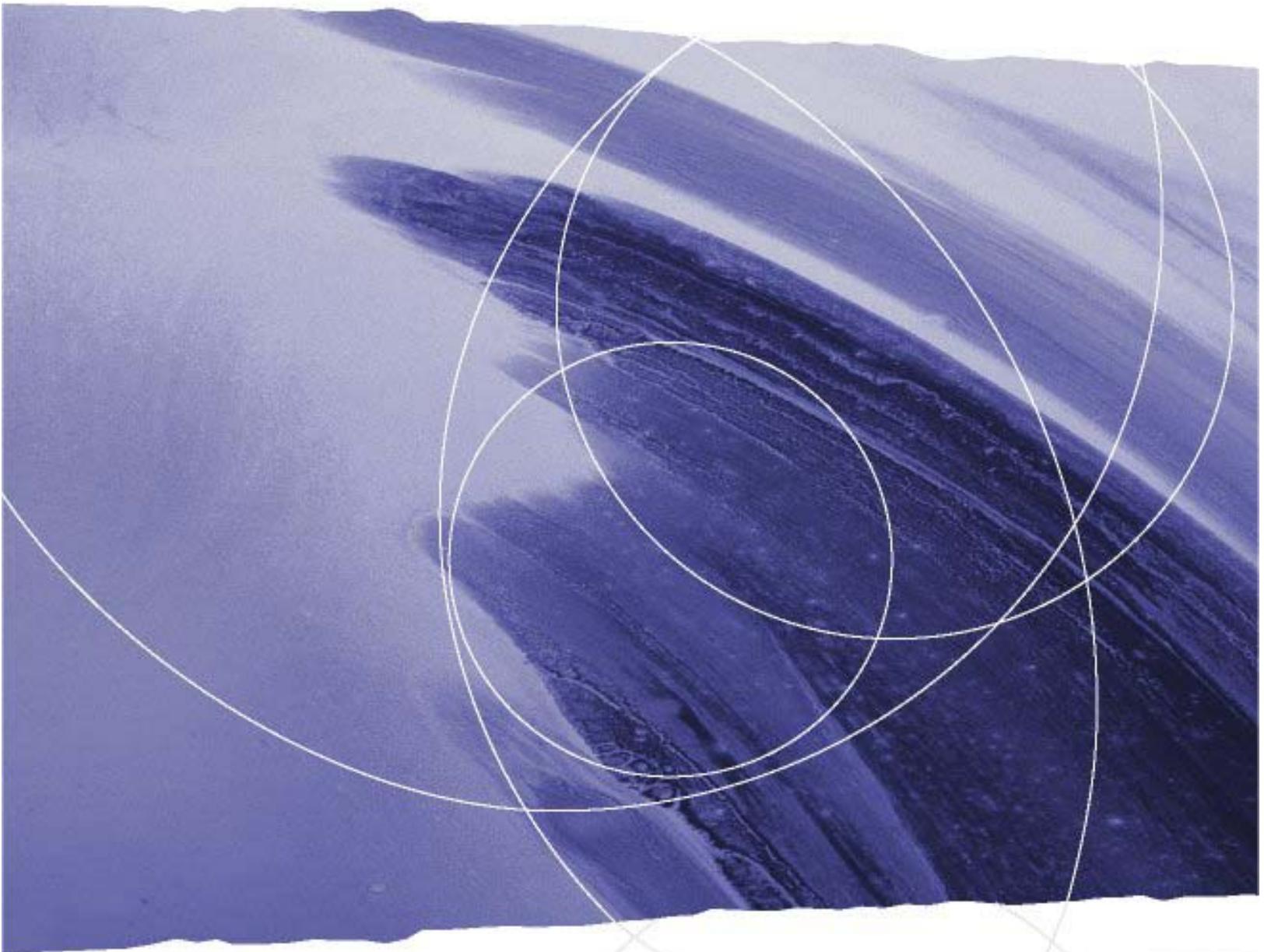
B. CHARACTERISTICS OF THE EXAMINATION

The examination will be administered in a single session lasting no more than two and a half hours.

Students are permitted to use a scientific calculator and a geometry set. However, they are not permitted to use a graphing calculator.

C. PASS MARK

The pass mark is set at 60 out of 100.



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