

MATHEMATICS

MTH-4066-2 Geometry III

**DEFINITION OF THE DOMAIN FOR
SUMMATIVE EVALUATION**

FEBRUARY 1995

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1. INTRODUCTION

This Definition of the Domain for Summative Evaluation describes and classifies the essential and representative elements of the *Mathematics* program, and, more specifically, of the module entitled *Geometry III*. 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 domain is specific to the module entitled *Geometry III*.

The goal of the Definition of the Domain for Summative Evaluation is to prepare examinations that are valid from one version to another, from year to year, and 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 purpose of the adult education secondary level *Mathematics* program is to help adults understand the mathematical concepts needed to solve problems related to everyday situations, expand their knowledge of mathematics and ultimately, facilitate access to a future career. Consequently, in the program, mathematics is presented as a practical tool for solving common, real-life problems.

Another area of development emphasized in the program involves mastering the mathematical operations used in science and technology for processing the kind of information students encounter in their daily lives, and which enables them to understand various everyday phenomena in terms of quantities and relations. In developing these skills, the *Mathematics* program can also prepare interested adults for studies leading to a career in science.

Whether the aim is to enable students to solve practical problems or to orient them towards a career in science, all the learning activities in the program emphasize the acquisition of a systematic work method.

The program places equal emphasis on mastering the use of a calculator or a microcomputer in the classroom. This particular area of development is addressed throughout the different learning activities.

Consequences

Evaluation items should deal with either original and practical situations taken from everyday life or those associated with an occupation.

Evaluation items should also pertain to situations in the fields of science or mathematics. For example, examination problems could deal with such things as the calculation of interest rates or the use of mathematical formulas used in science.

Evaluation should measure the adult's ability to follow the steps involved in solving a problem. It should also verify whether or not the student has mastered a work method.

The use of a calculator is permitted.

3. CONTENT OF THE PROGRAM FOR PURPOSES OF SUMMATIVE EVALUATION

Concepts

- * Isometric transformations (translations, rotations, reflections)
- * Transformations of similitude
- * Congruent triangles and similar triangles (congruence and similarity)
- * Similar polygons
- * Scale diagrams

Skills

Each skill is defined within the context of a mathematics program. Given that the adult education *Mathematics* program harmonizes with 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. <i>Possible actions:</i> to associate, classify, complete, describe, define, compare, contrast, state, enumerate, group, name, rank, organize, recognize, arrange, and so on.
MATHEMATIZING:	Interpreting a given situation using a mathematical model (arithmetical, algebraic or graphical). <i>Possible actions:</i> to formalize, illustrate, represent, schematize, symbolize, translate, transpose, and so on.
OPERATING:	Performing a given operation or transformation. <i>Possible actions:</i> 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 solving a given problem. <i>Possible actions:</i> to conclude, deduce, derive, explain, extrapolate, infer, justify, prove, solve, transfer, and so on.

4. TABLE OF DIMENSIONS

For purposes of summative evaluation, only skills and knowledge (concepts) will be measured. In the table below, essential and representative elements of the program have been grouped by combining concepts with skills. Each combination of one or more concepts with a skill is called a dimension. A given dimension may encompass more than one objective and, conversely, a given objective can be related to more than one dimension.

CONCEPTS	CONGRUENCE	SIMILARITY
SKILLS	25%	75%
STRUCTURING	Isometric transformations	Transformations of
8%	1 4%	5 4%
MATHEMATIZING		Properties of similar triangles
5%		6 5%
OPERATING	Construction of simple	Construction
		7 6%
		Similar triangles
	2 6%	8 20%
	Construction of a triangle	Similar polygons
		9 5%
		Scale diagrams
52%	3 10%	10 5%
ANALYZING OR SYNTHESIZING	Congruence	Similarity
		11 5%
		Problems from everyday life
35%	4 5%	12 25%

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 objectives of the program must be observed.

Dimension 1

To recognize, among a set of illustrations representing isometries of geometric figures, those which illustrate a translation, a rotation and a reflection.

Dimension 2

To draw the image of a simple geometric figure under an isometry.

Dimension 3

To draw a triangle defined by one of the following groups of measures: an angle and the two sides which form this angle; two angles and the side contained between these angles; the three sides.

Dimension 4

To determine whether triangles are congruent or similar by applying the properties of congruent triangles.

Dimension 5

To recognize, among a set of illustrations representing isometric transformations of geometric figures, those which illustrate a transformation of similitude.

Dimension 6

To apply the properties of similar triangles to solve word problems.

Dimension 7

To draw the image of a geometric figure under a transformation of similitude.

Dimension 8

To calculate the lengths of the sides of two similar triangles by applying the properties of these triangles.

Dimension 9

To calculate the lengths of the sides of two similar polygons by applying the properties of these polygons.

Dimension 10

To calculate the actual dimensions of geometric figures, given a scale diagram, or vice versa.

Dimension 11

To determine whether two triangles are similar or congruent by applying the properties of similar triangles.

Dimension 12

To solve a problem from everyday life involving concepts of similarity or congruence in geometric figures.

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 these problems: **operating** and **analyzing**. However, mastery in the new vocabulary of geometry is still important.

Since it is also important that students be able to use 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 the program itself and the time normally required to master these skills.

STRUCTURING	8%
MATHEMATIZING	5%
OPERATING	52%
ANALYZING OR SYNTHESIZING	35%

With regard to concepts, it is clear that the study of transformations of similitude is of prime importance. The concepts have been weighted as follows:

ISOMETRIES	25%
TRANSFORMATIONS OF SIMILITUDE	75%

7. DESCRIPTION OF THE EXAMINATION

A. TYPE OF EXAMINATION

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

B. CHARACTERISTICS OF THE EXAMINATION

- The examination must be taken in a single session lasting no more than two hours.
- The distribution of marks should be consistent with the percentages indicated in the table of dimensions.
- Students are permitted to use a calculator and a geometry set.
- The items must reflect the requirements and restrictions outlined in the objectives of the program.

C. PASS MARK

The pass mark is set at 60 out of 100.

