

*Definition of the Domain
for Summative Evaluation*

MTH-4107-1

Mathematics Straight Lines II

Paralell and Perpendicular Lines and Distance

Québec 

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for Summative Evaluation*

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Paralell and Perpendicular Lines and Distance

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 Straight Lines II (Parallel and Perpendicular Lines and Distance). 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 Straight Lines II (Parallel and Perpendicular Lines and Distance).

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

Equation of a line

- given the coordinates of one of its points and the equation of an oblique line parallel to it
- given the coordinates of one of its points and the equation of an oblique line that is perpendicular to it
- horizontal line or vertical line, given the coordinates of one of its points and the equation of a line parallel or perpendicular to it
- relationship between two lines (parallel, perpendicular, coincident, convergent, etc.)
- problem related to finding the equation of a line that is parallel or perpendicular to another line

Distance between two points

- given their coordinates
- problem that involves calculating distances and comparing, adding or subtracting these distances

Division of a segment

- ratios established by points of division or by the position of certain points on a given segment
- coordinates of a point of division of a segment, given the ratio
- problem that involves determining the coordinates of a point of division (where the ratio is given and where the ratio is not given)

Skills

Each skill is defined within the context of a mathematics program.

Structuring Being familiar with the fundamentals of mathematics, understanding some mathematical concepts and establishing simple relations among them.

Possible actions: to associate, classify, compare, complete, describe, define, contrast, distinguish, state, enumerate, group, name, rank, organize, recognize, arrange, 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 Demonstrating, in an organized fashion, the complex connections between concepts or definitions and their related actions and illustrations.

Possible actions: to conclude, correct, deduce, derive, demonstrate, explain, extrapolate, infer, justify, and so on.

Synthesizing Effectively integrating a variety of concepts and skills to solve a problem.

Possible actions: to solve a problem.

4. TABLE OF DIMENSIONS

CONCEPTS SKILLS	EQUATION OF A LINE 40%	DISTANCE 20%	DIVISION OF A SEGMENT 40%
STRUCTURING 10%		Determine the segment that corresponds to an expression needed to calculate the distance between two points. 6 5%	Determine the ratios established by points of division or by the position of certain points on a given segment. 10 5%
OPERATING 40%	Determine the equation of a line, given the coordinates of one of its points and the equation of a line parallel to it. 1 10%	Calculate the distance between two points, given their coordinates. 7 5%	Determine the coordinates of a point of division of a segment, given the ratio. 11 5%
	Determine the equation of a line, given the coordinates of one of its points and the equation of a line perpendicular to it. 2 10%		
	Determine the equation of a horizontal line or a vertical line, given the coordinates of one of its points and the equation of a line parallel or perpendicular to it. 3 10%		
ANALYZING 10%	Determine the relationship between two lines (parallel, perpendicular, coincident, convergent, etc.). 4 10%		
SYNTHESIZING 40%		Solve a problem that involves calculating distances and comparing, adding or subtracting these distances. 8 10%	
		Solve two problems that involve determining the coordinates of points of division and calculating the distance between certain points. 9 20%	
		Solve a problem that involves calculating distance, determining the coordinates of a point of division or finding the equation of a line that is parallel or perpendicular to another line. 5 10%	

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

Determine the equation of a line, given the coordinates of one of its points and the equation of a line parallel to it. The students must clearly show all their work.

(operating) /10

Dimension 2

Determine the equation of a line, given the coordinates of one of its points and the equation of a line perpendicular to it. The students must clearly show all their work.

(operating) /10

Dimension 3

Determine the equation of a line, given the coordinates of one of its points and the equation of a horizontal or vertical line that is perpendicular or parallel to it. The students must clearly show all their work.

(operating) /10

Dimension 4

Given four equations of oblique, vertical or horizontal lines presented in various algebraic forms, determine the relationship between two of these lines. The lines can be parallel, perpendicular, coincident, non-perpendicular concurrent or concurrent in a given point. The students must clearly show all their work and justify their answers.

(analyzing) /10

Dimension 5

Solve a problem that involves calculating distance, determining the coordinates of a point of division or finding the equation of line that is parallel or perpendicular to another line. The students must clearly show all their work.

(synthesizing) /10

Dimension 6

Determine the segment that corresponds to an expression needed to calculate the distance between two points whose coordinates are given.
(structuring) /5

Dimension 7

Calculate the distance between two points, given their coordinates. The students must clearly show all their work.
(operating) /5

Dimension 8

Solve a problem that involves calculating distances and comparing, adding or subtracting these distances. The students must clearly show all their work.
(synthesizing) /10

Dimension 9

Solve two problems that involve determining the coordinates of points of division of one or more segments and calculating the distances between certain points. The ratio values are given. The students must clearly show all their work.
(synthesizing) /20

Dimension 10

Determine the ratios established by points of division or by the position of certain points on a given segment. The points of division are indicated on the segment.
(structuring) /5

Dimension 11

Determine the coordinates of a point that divides a line segment in a given ratio. The students must clearly show all their work.
(operating) /5

6. JUSTIFICATION OF CHOICES

In the examination, 10% of the items test the students' **STRUCTURING** skills by verifying their knowledge of:

- ratios related to points of division or the position of points on a segment
- how to calculate the distance between two points

In the examination, 40% of the items test the students' **OPERATING** skills by verifying whether they have mastered certain operations or transformations:

- determining the equation of a line, given the coordinates of one of its points and the equation of an oblique line parallel to it
- determining the equation of a line, given the coordinates of one of its points and the equation of an oblique line perpendicular to it
- determining the equation of a horizontal line or a vertical line, given the coordinates of one of its points and the equation of a line parallel or perpendicular to it
- calculating the distance between two points, given their coordinates
- determining the coordinates of a point of division of a segment, given the ratio

In the examination, 10% of the items test the students' skill in **ANALYZING** information; they involve verifying whether the students have the ability to make connections:

- by determining the relationship between two lines (parallel, perpendicular, coincident, concurrent, etc.)

In the examination, 40% of the items test the students' **SYNTHESIZING** skills by verifying their ability to:

- solve problems
- use a rigorous work method
- communicate clearly using mathematical language

7. DESCRIPTION OF THE EXAMINATION

A. TYPE OF EXAMINATION

The summative examination will be a written examination consisting of short-response, extended-response or multiple-choice items.

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; however, they are not permitted to use a graphing calculator.

C. PASS MARK

The pass mark is set at 60 out of 100.

