

*Definition of the Domain
for Summative Evaluation*

MTH-4110-1

Mathematics Operations on Algebraic Fractions

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for Summative Evaluation*

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Mathematics Operations on Algebraic Fractions

Formation professionnelle et technique
et formation continue

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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 Operations on Algebraic Fractions. 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 Operations on Algebraic Fractions.

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 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 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 or graphing calculator is permitted for the examinations related to this course.

3. CONTENT OF THE PROGRAM FOR PURPOSES OF SUMMATIVE EVALUATION

Concepts

Rational algebraic fractions

- product of three algebraic fractions
- quotient of two algebraic fractions
- simplification of an algebraic expression containing four algebraic fractions that are multiplied or divided
- simplification of an algebraic expression containing three algebraic fractions that are added or subtracted

Order of operations

- applying the order of operations rule to simplify an algebraic expression

Skills

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

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.

4. TABLE OF DIMENSIONS

CONCEPTS SKILLS	RATIONAL ALGEBRAIC FRACTIONS 50%	ORDER OF OPERATIONS 50%
OPERATING 100%	Simplify an algebraic fraction. 1 10%	Apply the order of operations rule to simplify algebraic expressions that are multiplied, divided, added or subtracted.
	Simplify the product of three algebraic fractions. 2 10%	
	Simplify the quotient of two algebraic fractions. 3 10%	
	Simplify an algebraic expression containing four algebraic fractions that are multiplied or divided. 4 10%	
	Simplify an algebraic expression containing three algebraic fractions that are added or subtracted. 5 10%	
		6 50%

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

Simplify a rational algebraic fraction whose numerator and denominator are factorable polynomials that contain up to four terms each. Each term contains no more than two variables. The students must clearly show all their work.

(operating) /10

Dimension 2

Simplify the product of three rational algebraic fractions. The polynomials in the numerators and the denominators contain no more than four terms. Each term contains no more than two variables. The students must clearly show all their work.

(operating) /10

Dimension 3

Simplify the quotient of two rational algebraic fractions. The polynomials in the numerators and the denominators contain no more than four terms. Each term contains no more than two variables. The students must clearly show all their work.

(operating) /10

Dimension 4

Simplify an algebraic expression containing up to four rational algebraic fractions that are multiplied and divided. The polynomials in the numerators and denominators are factorable and contain up to four terms. Each term contains no more than two variables. The students must clearly show all their work.

(operating) /10

Dimension 5

Simplify an algebraic expression containing up to three rational algebraic fractions that are added or subtracted. The denominators must be factorable polynomials that contain up to four terms each. Each term contains no more than two variables. The common denominator must contain no more than three factors. The students must clearly show all their work.

(operating)

/10

Dimension 6

Apply the order of operations rule and simplify algebraic expressions containing no more than four rational algebraic fractions and two sets of parentheses. The polynomials in the numerators and denominators are factorable and contain up to four terms. Each term contains no more than two variables. The students must clearly show all their work.

(operating)

/50

6. JUSTIFICATION OF CHOICES

In the examination, 100% of the items test the students' **OPERATING** skills by verifying whether they have mastered certain operations or transformations:

- simplifying algebraic fractions
- finding the product of three algebraic fractions
- finding the quotient of two algebraic fractions
- simplifying an algebraic expression containing four algebraic fractions that are multiplied or divided
- simplifying an algebraic expression containing three algebraic fractions that are added or subtracted
- applying the order of operations rule to simplify an algebraic expression

7. DESCRIPTION OF THE EXAMINATION

A. TYPE OF EXAMINATION

The summative examination will be a written examination consisting of extended-response 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.

