UNIFORM EXAMINATIONS

Secondary Cycle Two

Information Document - June 2014 - August 2014 - January 2015

Mathematics

Secondary IV

Science Option	565-420
Technical and Scientific Option	564-420
Cultural, Social and Technical Option	563-420

UN QUÉBEC POUR TOUS

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Introduction

This document provides information about the uniform examinations for each of the three mathematics options offered in the second year of Secondary Cycle Two. These examinations will be administered in June 2014, August 2014 and January 2015, according to the timetable established by the Minister of Education, Recreation and Sports.

The Ministère de l'Éducation, du Loisir et du Sport (MELS) is responsible for producing uniform examinations for the June, August and January examination sessions. Each examination is based on the Framework for the Evaluation of Learning, the Progression of Learning and the Québec Education Program. Information gathered on examinations administered in previous years is also taken into account.

In addition, MELS has encouraged the participation of the school system by inviting teachers and education consultants from different schools to contribute to the development and validation of these examinations.

These examinations evaluate the development of the competency *Uses mathematical reasoning*. They focus on the main concepts and processes covered in the three options that make up the Mathematics program in the second year of Secondary Cycle Two.

1. STRUCTURE OF THE UNIFORM EXAMINATIONS

Each uniform examination is divided into three parts. The following table gives a breakdown of the types of tasks involved as well as the number of marks allotted.

Breakdown of the types of tasks and the number of marks allotted in the uniform examination

EXAMINATION PART	TYPE OF TASK	NUMBER OF TASKS	MARKS PER TASK	TOTAL MARKS
Part A	Multiple-choice questions	6	4	24
Part B	Short-answer questions	4	4	16
Part C	Situations involving applications	6	10	60

For the uniform examination in each of the three options, MELS provides the following documents:

For the students:

- Question Booklet – Parts A and B
- Student Booklet in which the students record their answers to the questions in Part B and indicate the reasoning they used for each of the six situations involving applications in Part C, which are presented in this booklet
- A machine-scored answer sheet, on which students will record their answers to the questions in Part A of the June examinations[1]

  - Please note that machine-scored answer sheets will be provided for Part A of the June 2014 examinations so that these questions can be graded centrally by MELS. Machine-scored answer sheets will not be provided for the August 2014 and January 2015 examinations.

For teachers:

- Marking Guide

For invigilators:

- Instructions for Invigilators

[1] For the August 2014 and January 2015 examinations, students will record their answers to the questions in Part A in their Student Booklet.

2. CONTENT OF THE UNIFORM EXAMINATIONS

The questions in Parts A and B of the uniform examinations are intended to evaluate mastery of mathematical concepts and processes.

Part C consists of six situations involving applications, which require the student to explain his or her mathematical reasoning and organize and apply mathematical concepts and processes in a clearly defined context. Because there are different aspects of reasoning, these tasks may involve a variety of different actions (e.g. choosing and using mathematical concepts and processes, justifying, proving, convincing, assessing, taking a position, comparing, deducing, generalizing).

The examinations are developed by taking into account the relative importance of the branches of mathematics in the examination for each option.

The following table presents the distribution of the marks for each branch of mathematics in the examinations for the three options. The interval presented under each percentage weighting indicates the possible differences among the examinations for the same option. These differences stem from the number of marks allotted for the different types of tasks.

Relative importance of each branch of mathematics

	Arithmetic and Algebra	Statistics and Probability	Geometry
Science Option	52% From 48% to 54%	6% From 4% to 8%	42% From 40% to 44%
Technical and Scientific Option	40% From 36% to 44%	24% From 20% to 28%	36% From 32% to 40%
Cultural, Social and Technical Option	32% From 28% to 36%	24% From 20% to 28%	44% From 40% to 46%

The situations involving applications in Part C were developed by taking into account the requirements associated with the tasks designed to evaluate the different aspects of mathematical reasoning. For the purpose of developing the uniform examinations, these situations have been grouped into two categories.

Category I — Tasks in which students must choose and carry out a set or series of operations to meet the requirements of the task by using the appropriate mathematical concepts and processes and strategies

Category II — Tasks in which students must draw on different aspects of reasoning to convince using mathematical arguments, to recognize a model and apply it, to prove a statement or property, to disprove a statement using a counterexample or to formulate a conjecture

The following table presents the breakdown, by category, of the situations involving applications in Part C of the examinations for the three options.

Distribution of the situations involving applications in Part C of the uniform examinations

	Category I	Category II
Science Option	4	2
Technical and Scientific Option	4	2
Cultural, Social and Technical Option	5	1

3. CONDITIONS FOR ADMINISTERING THE UNIFORM EXAMINATIONS

3.1 Examination dates

The uniform examinations will be administered in June 2014, August 2014 and January 2015, according to the timetable established by the Minister of Education, Recreation and Sports.

3.2 Time allotted

According to the official timetable, three hours are allotted for each examination. According to the *Administrative Guide for the Certification of Studies and Management of Ministerial Examinations*, however, an additional 15 minutes must be allotted for each examination if necessary.

3.3 Preparation phase of the uniform examinations

The week before each uniform examination

The teacher asks the students to prepare a memory aid on one letter-sized sheet of paper (8½ X 11). Both sides of the sheet may be used. This memory aid must be handwritten. Mechanical reproduction of this memory aid is forbidden. The student's name and the examination code must be indicated on the memory aid.

3.4 Performance phase of the uniform examinations

Permitted materials

- Memory aid prepared by the student prior to the examination
- Calculator (with or without a graphic display)
- Ruler, set square, compass, protractor, graph paper

Administration of the uniform examinations

- The invigilator must explain the rules for taking the examination.
- The invigilator asks the students to read the instructions in the examination materials.
- Each student works alone.
- After the examination, the invigilator collects the memory aids, the graph paper used and the documents distributed to students.

Students are strictly prohibited from using any electronic device (e.g. cell phone, MP3 player, camera) during the examination. Any student who does not abide by this rule must be expelled from the examination room and will be considered to have cheated.

3.5 Rules for using calculators

Prohibited calculators and devices

Calculators with a computer algebra system (CAS) are not permitted during ministerial examinations because this type of software will, for example, allow students to use the calculator to factor an algebraic expression.

This type of calculator is permitted **only if** the CAS is disabled for the examination.

Computers, tablet PCs, electronic organizers and calculators with an alphanumeric keyboard (QWERTY or AZERTY) are prohibited.

Prohibited accessories and peripherals

User guides, memory expansion features or any other calculator accessories or peripherals are not allowed during the examination. Thus, memory expansion chips or cards and data or program libraries are strictly forbidden. Communication between calculators is also not permitted during the examination.

Configuring calculators for the examination

Prior to the examination, students must be duly informed in writing of the rules regarding the use of calculators on a ministerial examination.

The data and programs stored in the calculator's memory must be erased before the examination. Before the day of the examination, students must have been given the opportunity to learn how to reset their calculator's memory.

Using a calculator containing programs or data stored in the memory will be considered a form of cheating.

Students may not share their calculator with another student.

3.6 Measures adapting the conditions for administering ministerial examinations

Measures that adapt the conditions for administering ministerial examinations may be taken to enable students with specific needs to demonstrate their learning. For further information on the implementation of these measures, please refer to the documents made available to schools by the Direction de la sanction des études.

4. MARKING PROCEDURES FOR THE UNIFORM EXAMINATIONS

June examinations

The answers to the questions in Part A, which students must record on the machine-scored answer sheet, will be graded by MELS. School boards and private schools are responsible for grading Parts B and C of the examinations.

The Marking Guide contains an answer key for Part B of the examinations. Examples of appropriate reasoning are also presented for the different situations involving applications in Part C. The scorer must exercise his or her judgment and accept any other appropriate reasoning.

The situations involving applications are graded using the rubric in the Appendix. The five performance levels in this rubric, which are presented as brief descriptions, make it possible to evaluate student work in accordance with the criteria indicated. Teachers should ensure that they have a common understanding of the requirements of the situations involving applications.

The Marking Guide provides additional guidelines to make it easier to grade each situation involving applications and use the rubric.

The result obtained for the situations involving applications in Part C of the uniform examination will be determined using the weighting of the evaluation criteria.

The weighting of the evaluation criteria will vary according to the purpose and requirements of each situation involving applications. Both the Marking Guide and the Student Booklet will show the weighting for each situation involving applications.

August and January examinations

School boards and private schools are responsible for grading all three parts of the uniform examinations administered in August and January.

The Marking Guide contains an answer key for Parts A and B of the examinations. Examples of appropriate reasoning are also presented for the different situations involving applications in Part C. The scorer must exercise his or her judgment and accept any other appropriate reasoning.

5. CALCULATING THE STUDENT'S MARK ON THE UNIFORM EXAMINATION

The preliminary result obtained on Part C of the examination consists of the sum of the results obtained for the situations involving applications. This result is expressed as a mark out of 600. The final result on Part C, expressed as a mark out of 60, is calculated by dividing the preliminary result by 10 and rounding it off to the nearest unit.

The total examination mark is calculated by adding the final result on Part C to the results for Parts A and B.

For the June 2014 examination session, MELS will calculate the student's mark by adding the total obtained on Parts B and C to the total obtained on Part A.

6. CALCULATING THE STUDENT'S SUBJECT MARK

Calculating the final mark for the competency *Uses mathematical reasoning*

The mark students obtain on the uniform examination is combined with their school mark for the competency *Uses mathematical reasoning.* Each of these marks will count for 50% of their final mark for this competency.

Calculating the subject mark

The subject mark is obtained by combining the results for the two competencies according to the weighting of the competencies established by MELS. These weightings can be found in the Framework for the Evaluation of Learning.

Appendix

RUBRIC FOR THE SITUATIONS INVOLVING APPLICATIONS

		OBSERVABLE INDICATORS				
		LEVEL A	**LEVEL B**	**LEVEL C**	**LEVEL D**	**LEVEL E**
EVALUATION CRITERIA	**Cr. 3** **Proper implementation of mathematical reasoning suited to the situation**	*The student . . .* • takes every aspect of the situation into account • chooses the required concepts and processes and uses actions, strategies, hypotheses, assumptions, etc. that allow him/her to meet all the requirements of the situation	*The student . . .* • takes most of the aspects of the situation into account • chooses the required concepts and processes and uses actions, strategies, hypotheses, assumptions, etc. that allow him/her to meet most of the requirements of the situation	*The student . . .* • takes some aspects of the situation into account • chooses appropriate concepts and processes that allow him/her to meet some of the requirements of the situation • uses actions, strategies, hypotheses, assumptions, etc. that allow him/her to meet some of the requirements of the situation	*The student . . .* • takes few aspects of the situation into account • chooses concepts and processes that allow him/her to partially meet some of the requirements of the situation • uses actions, strategies, hypotheses, assumptions, etc. that allow him/her to partially meet some of the requirements of the situation	*The student . . .* • takes none of the aspects of the situation into account • chooses concepts and processes that are of little or no relevance to the requirements of the situation • uses actions, strategies, hypotheses, assumptions, etc. that are of little or no relevance to the requirements of the situation
	Cr. 2 **Correct use of appropriate mathematical concepts and processes**	• applies the required concepts and processes appropriately to meet the requirements of the task	• applies the required concepts and processes appropriately, but makes minor mistakes (e.g. miscalculations, inaccuracies, omissions)	• applies some of the required concepts and processes, but makes some minor mistakes OR applies all the required concepts and processes or most of them, but makes one conceptual or procedural error	• applies some required concepts and processes, but makes several conceptual or procedural errors	• applies concepts and processes that are not very appropriate, while making several conceptual or procedural errors OR applies inappropriate concepts and processes
	Cr. 4 **Proper organization of the steps in an appropriate procedure**	• supports his/her reasoning with work that is clear, organized and in keeping with the rules and conventions of mathematical language	• supports his/her reasoning with clear work, although some steps are implicit, and makes some minor mistakes or is sometimes imprecise regarding the rules and conventions of mathematical language	• supports his/her reasoning with work that is somewhat unorganized or lacks clarity, while making some mistakes regarding the rules and conventions of mathematical language	• supports his/her reasoning with work that consists of confusing and isolated elements, while making several mistakes regarding the rules and conventions of mathematical language	• shows little work to support his/her reasoning, or his/her work is entirely unrelated to the situation and does not observe the rules and conventions of mathematical language
	Cr. 5 **Correct justification of the steps in an appropriate procedure**	• rigorously uses appropriate arguments when required to justify or support his/her statements, conclusions or results	• uses appropriate arguments when required to justify or support his/her statements, conclusions or results	• uses some appropriate arguments or arguments that need much more elaboration when required to justify or support his/her statements, conclusions or results	• uses few or largely inappropriate arguments when required to justify or support his/her statements, conclusions or results	• uses erroneous or inappropriate arguments or does not use any arguments when required to justify or support his/her statements, conclusions or results
	Cr. 1* **Formulation of a conjecture suited to the situation**	• formulates one or more appropriate conjectures that account for every aspect of the situation	• formulates one or more appropriate conjectures that account for most of the aspects of the situation	• formulates one or more partially appropriate conjectures that account for certain aspects of the situation	• formulates one or more largely inappropriate conjectures that account for few aspects of the situation	• formulates one or more inappropriate conjectures or does not formulate a conjecture

* Students may be required to make conjectures (hypotheses, assumptions, etc.) at different stages in their reasoning. Criterion 3 will be used to evaluate these conjectures, but the written work involved in making these conjectures may not always be fully shown.

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