

MATHEMATICS

MTH-2008-3 Statistics and Probability I

**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 *Statistics and Probability I*. 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 module in this program is organized in a similar manner; however, the content of this definition of domain is specific to the module entitled *Statistics and Probability I*.

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

- * Table of data, frequency distribution table
- * Broken-line graph
- * Vertical bar graph
- * Horizontal bar graph
- * Pictograph
- * Circle graph
- * Histogram
- * Tree diagram
- * Probability of an event

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, 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 (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 finding a solution to 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		STATISTICS		PROBABILITY	
SKILLS		75%		25%	
STRUCTURING	10%	Title, quantitative variable, data, frequency, relative frequency, 1	5%		
		Type of graphs 2	5%		
MATHEMATIZING					
OPERATING	60%	Frequency distribution and relative frequency tables 3	10%	Tree diagrams	
		Broken-line graphs, vertical & horizontal bar graphs, 4	20%		
		Circle graphs 5	10%		
		Histograms 6	10%		
ANALYZING OR SYNTHESIZING					
30%	7	Broken-line graphs, vertical & horizontal bar graphs, circle graphs, 7	15%	8	Probability of an event

Key: The numbers 1 to 9 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 identify in a table of data, in a frequency distribution table or in a statistical series, the following elements: title, quantitative variables, data, frequency, relative frequency, range, class, class width.

Dimension 2

To identify different types of graphs: broken-line graph, vertical bar graph, horizontal bar graph, pictograph, circle graph, histogram.

Dimension 3

To construct a frequency distribution or a relative frequency table on the basis of a statistical series.

Dimension 4

To construct a broken-line graph, a vertical bar graph, a horizontal bar graph or a pictograph on the basis of a table of data or a frequency distribution.

Dimension 5

To construct a circle graph on the basis of a table of data or a frequency distribution.

Dimension 6

To construct a histogram on the basis of a frequency distribution.

Dimension 7

To derive information from a broken-line graph, a vertical bar graph, a horizontal bar graph, a circle graph, a histogram or a pictograph.

Dimension 8

To draw a tree diagram for the total number of possible outcomes, a particular outcome or a given event on the basis of random experiments in real-life situations.

Dimension 9

To determine the probability of a particular outcome or of a given event on the basis of random experiments in real-life situations.

6. JUSTIFICATION OF CHOICES

In keeping with the objectives of this module, special emphasis has been placed on the construction of graphs and histograms.

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

STRUCTURING	10%
MATHEMATIZING	0%
OPERATING	60%
ANALYZING OR SYNTHESIZING	30%

With regard to content, all the objectives fall under the two main topics in this module: statistics and probability. The themes have thus been weighted as follows:

STATISTICS	75%
PROBABILITY	25%

It should be noted that the first part of the three terminal objectives on statistics is covered in Dimension 7.

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 the dimensions.
- Students are permitted to use a calculator.
- 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.

