



Commission scolaire English-Montréal
English Montreal School Board

Mathematics — 565-426

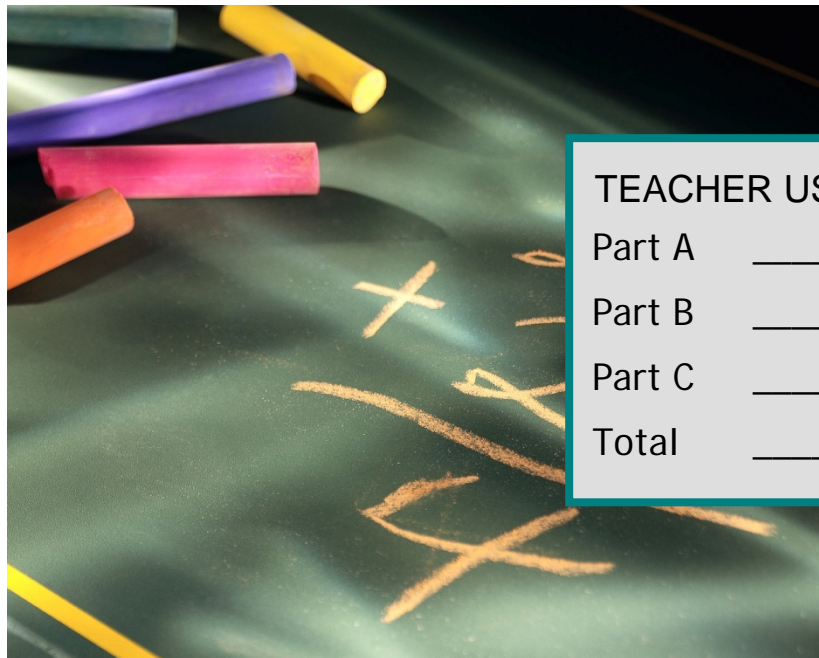
Secondary IV

May 2014

May Practice Exam

Competency Two *Uses Mathematical Reasoning*

Science Option



TEACHER USE ONLY

Part A _____ /24

Part B _____ /16

Part C _____ /60

Total _____ /100

Student Booklet

Name: _____

Group: _____

Time: 3 hours

PART A

1. [A] [B] [C] [D]
2. [A] [B] [C] [D]
3. [A] [B] [C] [D]
4. [A] [B] [C] [D]
5. [A] [B] [C] [D]
6. [A] [B] [C] [D]

PART B

7. The height of the pyramid is _____ cm.

4	0
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8. The binomial _____ represents the result of the division.

4	0
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9. The cost of mailing a package weighing 4.7 kilograms is \$_____.

4	0
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10. The solutions of the inequality are _____

_____.

4	2	0
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PART C

This part of the examination consists of Questions 11 to 16.

Each question in this part of the examination is worth 10 marks.

For each question, you must show all your work to justify your answer.

Your work must be organized and clearly presented and cannot simply involve listing the calculator applications used to obtain results or information.

All the work you show in this booklet for Questions 11 to 16 will be considered.

You will be given a mark of 0 if you do not show your work or if your work does not justify your answer.

The evaluation criteria for the competency required to answer the questions in this part of the examination are the following:

- Criterion 1 Formulation of a conjecture suited to the situation
- Criterion 2 Correct use of appropriate mathematical concepts and processes
- Criterion 3 Proper implementation of mathematical reasoning suited to the situation
- Criterion 4 Proper organization of the steps in an appropriate procedure
- Criterion 5 Correct justification of the steps in an appropriate procedure



11. HIGH

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What is the length of the fence to be replaced, to the nearest tenth?

The length of the fence that needs to be replaced is _____ m.

Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	0
	Cr3	40	32	24	16	8	0
	Cr2	40	32	24	16	8	
	Cr4 Cr5	20	16	12	8	4	

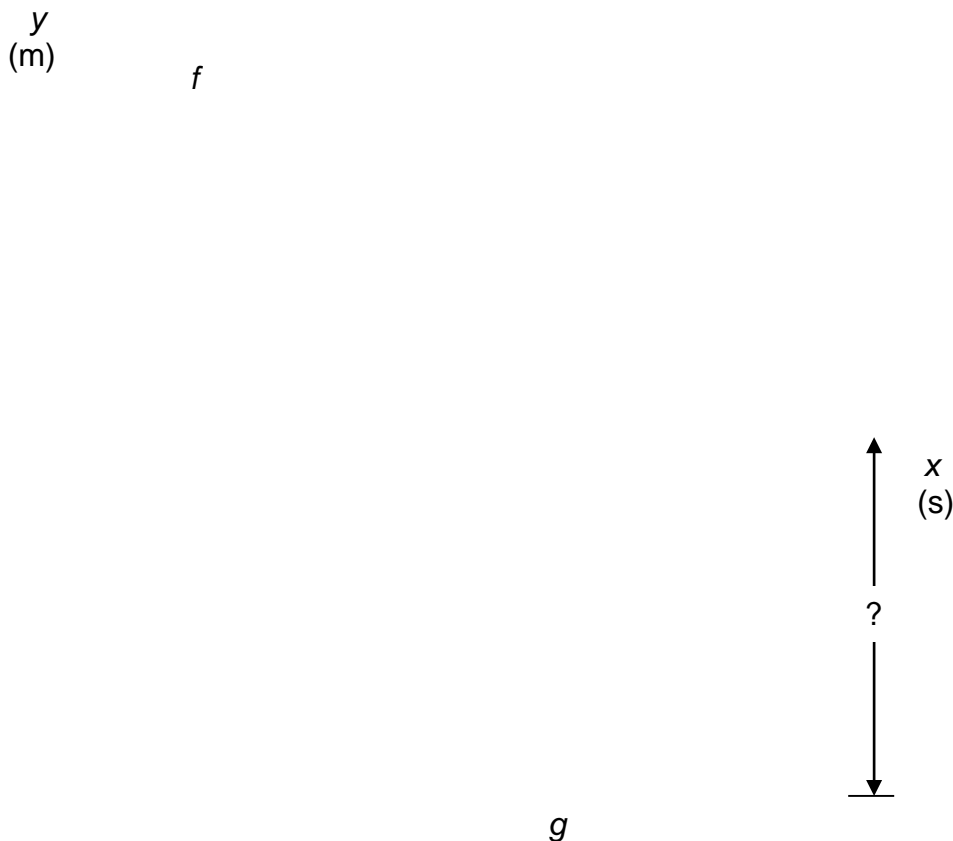


12. THE WATERCRAFT

Marine engineers working for the Canadian Special Forces have created a prototype dolphin-like watercraft. This watercraft can leap out of the water and dive into the water in different trajectories controlled by the driver.



A side view of one of its test runs is represented in the graph below.



From the moment it leaps out of the water, the trajectory of the watercraft can be expressed by function f , and when it enters the water, its trajectory can be expressed by function g .

where x : time elapsed, in seconds, from the moment the watercraft leaps out
 $f(x)$: distance above water, in metres
 $g(x)$: distance under water, in metres

The watercraft stays underwater for 6 seconds.

In addition:

- $f(x) = -1.6x^2 + 3.2x$
- $g(3) = -1.0$

What is the maximum distance underwater of the watercraft on this test run?



The maximum distance underwater of the
 watercraft is _____ m on this test run.

Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	0
	Cr3	40	32	24	16	8	0
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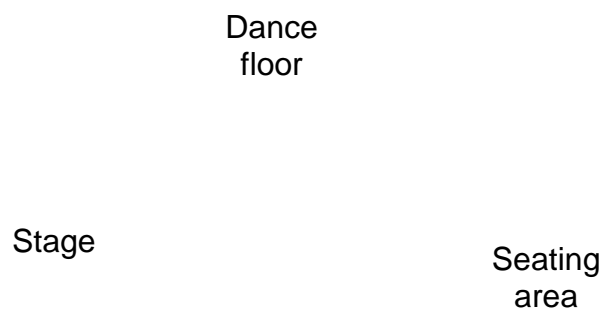


13. DANCE HALL

A dance hall is separated into three areas: the stage, the dance floor, and a seating area. A partial sketch of the hall has been drawn in the Cartesian plane below.

In addition:

- Point G is on line segment HK.
- The slopes of lines FG and JK are equal.
- $m \overline{HG} = 65$ units



Prove that $m \overline{GK} = m \overline{FG}$.



Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	0
	Cr3	40	32	24	16	8	0
	Cr2 Cr5	40	32	24	16	8	
	Cr4	20	16	12	8	4	



14. THE FARM FIELD

Nicholas wants to divide his farm field into two separate crops.

His farm field is represented by right trapezoid KLMN in the Cartesian plane below. The scale of this graph is in metres.

In addition:

- ◆ The coordinates of point N are (0, 70)
- ◆ The coordinates of point M are (168, 0)

This year, Nicholas wants to grow carrots only in the portion of his field that belongs to the half-plane described by the inequality $35x - 12y - 5040 \geq 0$.

What is the area of the portion of the field where Nicholas will grow carrots this year?



The area of the portion of the field where
 Nicholas will grow carrots this year is
 _____ m².

Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	0
	Cr3	40	32	24	16	8	0
	Cr2	40	32	24	16	8	
	Cr4 Cr5	20	16	12	8	4	



15. REWARD POINTS

The local supermarket is offering a new reward points program. For each amount they paid on groceries (before taxes), customers who are members of the program earn points that they can then exchange for discounts or free items.

Function f described below can be used to determine the number of points earned according to the total cost of groceries, before taxes.

$$f(x) = -100 \left[-\frac{1}{10}(x-2) \right]$$

where x : total cost of groceries, before taxes, in dollars

$f(x)$: amount of reward points earned

Jessica and Maggie are both members of this program. Today, they each purchased groceries of more than \$45 (before taxes) at the local supermarket.

Jessica stated the following:

If the total amount I paid on groceries, before taxes, is three times as Maggie' paid for her groceries, then I will earn three times as many points as she will earn.

Is Jessica's statement true or false?

Explain your answer.



- Jessica's statement is true.
- Jessica's statement is false.

Explanation:

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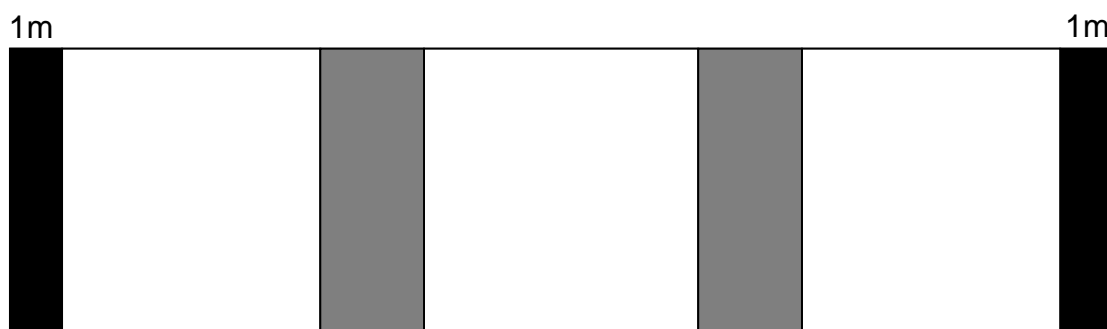
16. THE AREA RUG

A large rug is being designed for a dance hall.

The rug is made up of three congruent white squares, two congruent grey rectangles and two congruent black borders.

The black borders are 1 m wide.

The lengths of all three shapes are the same.



- ◆ The perimeter of the rug is 42 m.
- ◆ The area of the rug is 68 m^2 .

What is the area of one of the grey rectangles?



The area of one of the grey rectangles is

_____ m².

Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	0
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