



Commission scolaire English-Montréal
English Montreal School Board

Mathematics — 565-426

Secondary IV

May 2015

May Practice Exam

Competency Two *Uses Mathematical Reasoning*

Science Option



Question Booklet

Instructions

1. There are three parts to this evaluation situation.
 - Part A consists of six multiple choice questions.
 - Part B consists of four short answer questions.
 - Part C consists of six application tasks.

Part A and Part B questions are found in this *Question Booklet*.
Part C tasks are found in the *Student Booklet*.
2. Answer the questions in Parts A and B of the examination on page 3 of the *Student Booklet*.
3. Answer the questions in Part C of the examination in the *Student Booklet*
4. You are permitted to use a calculator (with or without graphic display), a geometry set (ruler, compass, set square, protractor) and additional graph paper.
5. You may refer to the memory aid you prepared on your own before the examination. The memory aid must consist on one **handwritten** letter-sized sheet of paper (8 ½ x 11). Both sides of the sheet may be used. The use of any other reference materials is strictly forbidden.
6. This *Question Booklet* must be returned at the same time as the *Student Booklet*, the memory aid and any graph paper used.

Note: Figures are not necessarily drawn to scale.

All the data and programs stored in your calculator's memory must be **erased** before the examination.

Calculators with a computer algebra system (CAS) are permitted only if this system is **disabled** before the examination.

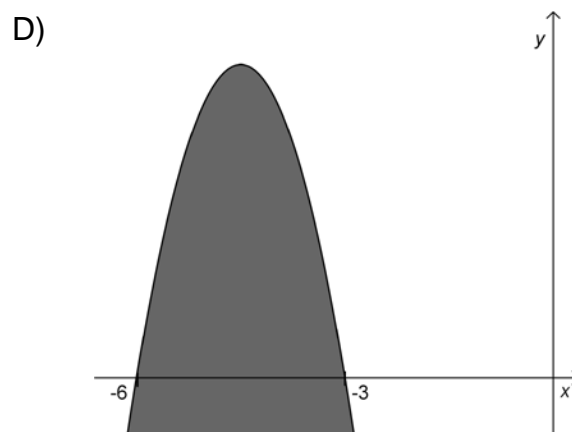
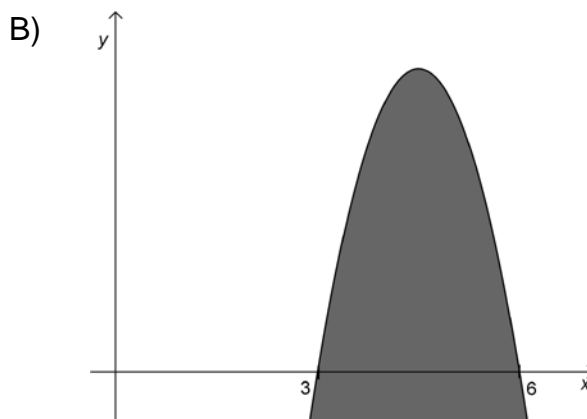
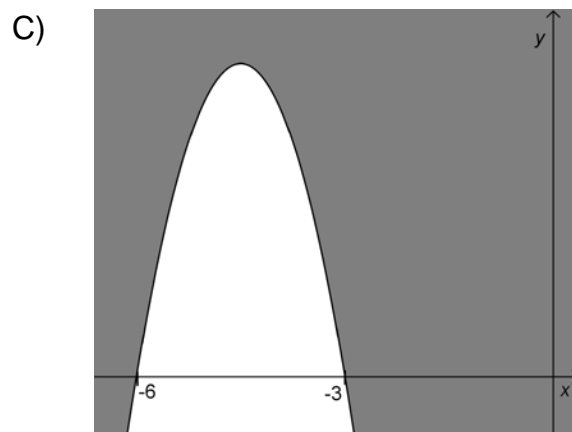
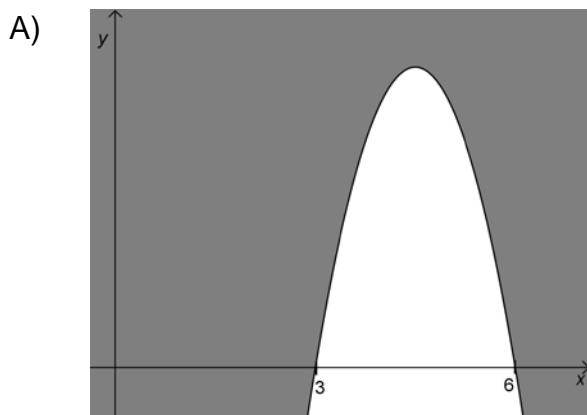
PART A

This part of the examination consists of Questions 1 to 6.

Each question in this part of the examination is worth 4 marks.

On page 3 of your *Student Booklet*, fill in the box under the letter that corresponds to your answer.

1. Which graph represents the solutions of the inequality $y \leq -2(x - 6)(x - 3)$ in the Cartesian plane?



2. Scientists are studying the risk of developing stomach ulcers in teachers. They surveyed teachers in different school boards. The table below shows the data collected by the scientists.

PERCENTAGE OF RISK OF DEVELOPING STOMACH ULCERS IN TEACHERS
ACCORDING TO THE AGES OF THE TEACHERS

| AGE (YEARS) | RISK OF STOMACH ULCERS (%) | | | | |
|----------------|----------------------------|----------|----------|----------|-----------|
| | [0, 20[| [20, 40[| [40, 60[| [60, 80[| [80, 100] |
| [25, 30[| 12 | 8 | 0 | 0 | 0 |
| [30, 35[| 1 | 4 | 8 | 10 | 0 |
| [35, 40[| 0 | 0 | 12 | 18 | 0 |
| [40, 45[| 0 | 0 | 0 | 10 | 16 |
| [45, 50[| 0 | 0 | 0 | 20 | 18 |

Which one of the following statements best describes the linear correlation between the ages of the teachers and their risk of developing stomach ulcers?

- A) The linear correlation is negative and weak.
- B) The linear correlation is negative and strong.
- C) The linear correlation is positive and weak.
- D) The linear correlation is positive and strong.
3. Given that the divisor is not equal to zero, what is the remainder of the following division?

$$(12x^3 + 82x^2 + 90x - 70) \div (12x^2 + 22x - 20)$$

- A) -30
- B) 30
- C) 130
- D) 170

4. Consider two lines in the Cartesian plane.

The equation of line l_1 is $\frac{x}{m} + \frac{y}{p} = 1$.

The equation of line l_2 is $mx - py + p = 0$.

In both equations, where $m > 0$, $p > 0$ and $m \neq p$

What is the relative position of lines l_1 and l_2 ?

- A) Lines l_1 and l_2 are perpendicular.
- B) Lines l_1 and l_2 are parallel and distinct.
- C) Lines l_1 and l_2 are parallel and coincident.
- D) Lines l_1 and l_2 intersect, but are not perpendicular.

5. In the following algebraic expression, the denominators are not equal to zero.

$$\frac{2x+3}{4x^2+12x+9} - \frac{3}{4x^2-9}$$

Which of the following expressions is equivalent to this algebraic expression?

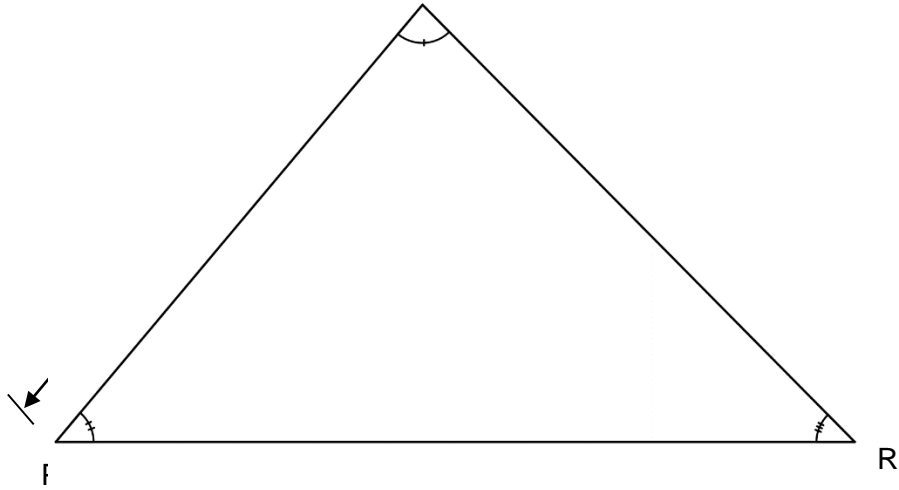
A) $-\frac{1}{8}$

C) $\frac{2x}{(2x+3)(2x-3)}$

B) $\frac{x}{(x+3)(x-3)}$

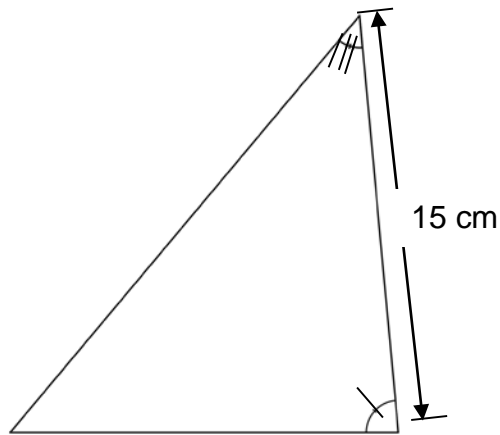
D) $\frac{2x-6}{(2x+3)(2x-3)}$

6. Consider triangle PQR represented below

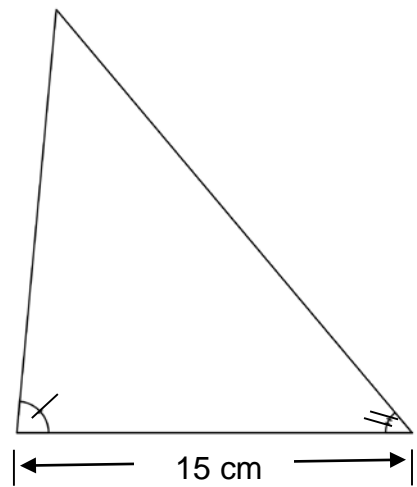


Which of the triangles represented below is necessarily congruent to triangle PQR?

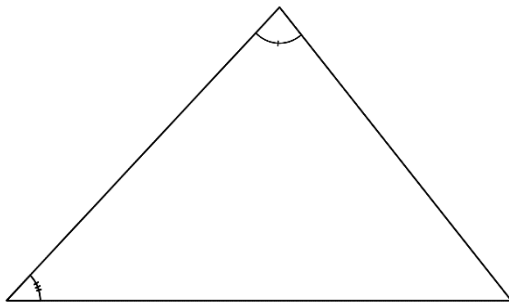
A)



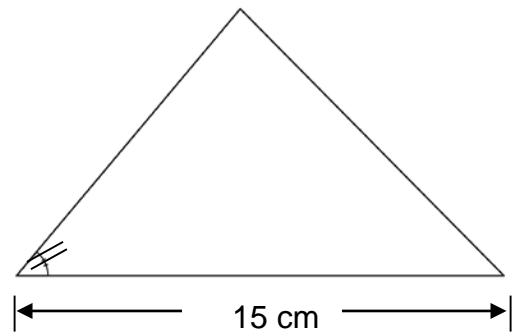
C)



B)



D)



PART B

This part of the examination consists of Questions 7 to 10.

Each question in this part of the examination is worth 4 marks.

Write each of your answers in the space provided on page 3 of your *Student Booklet*.

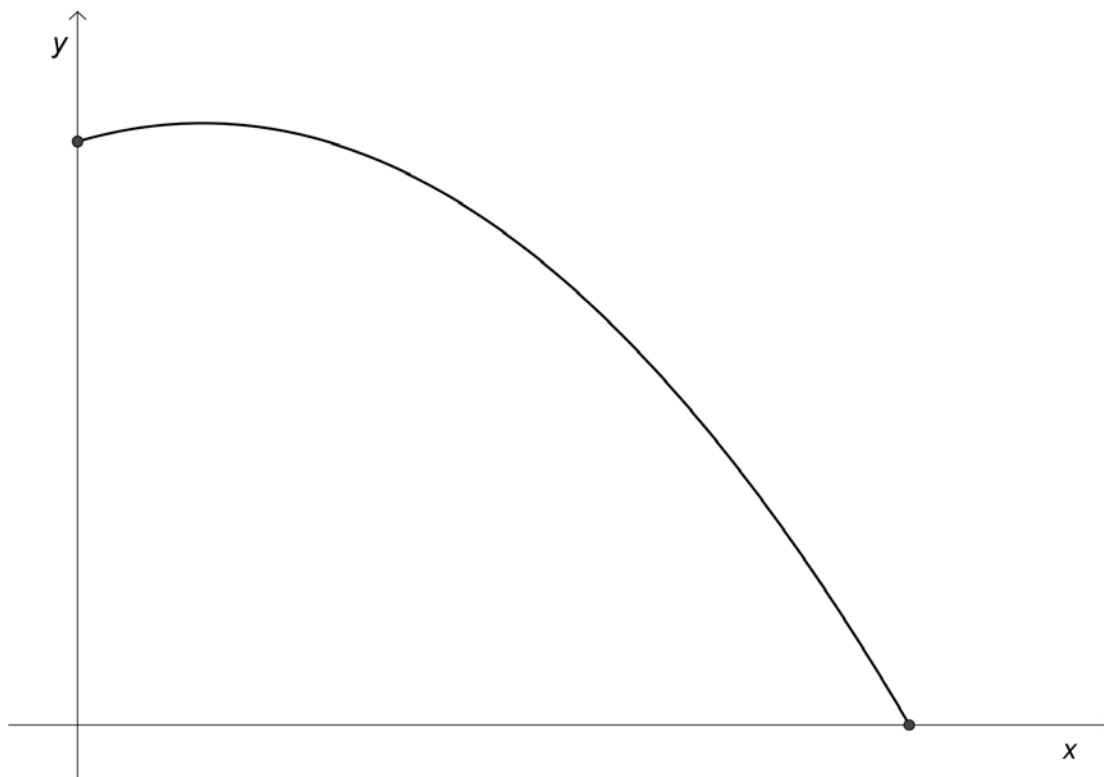
7. A Frisbee was thrown from a cliff. The distance between the Frisbee and the ground in relation to the time elapsed from the moment the Frisbee was thrown is represented by function f described below.

$$f(x) = -\frac{1}{20}(x+14)(x-20)$$

where x : time elapsed in seconds, from the moment the Frisbee was thrown

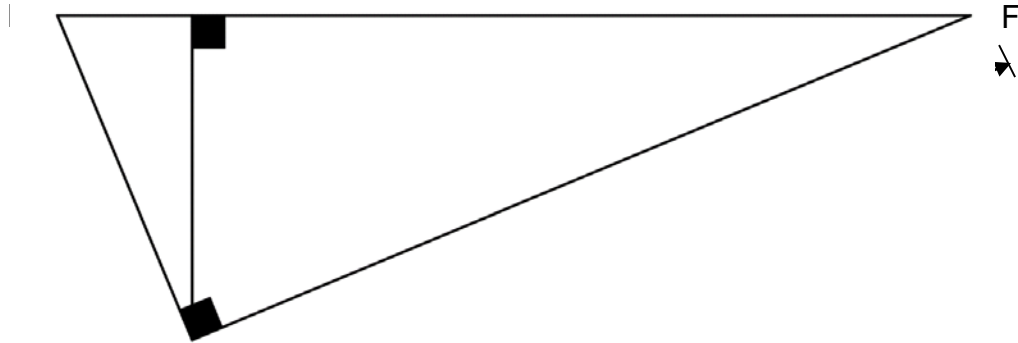
$f(x)$: distance, in metres, between the Frisbee and the ground

$$\text{dom } f = [0, 20]$$



For how long did the distance between the Frisbee and the ground decrease?

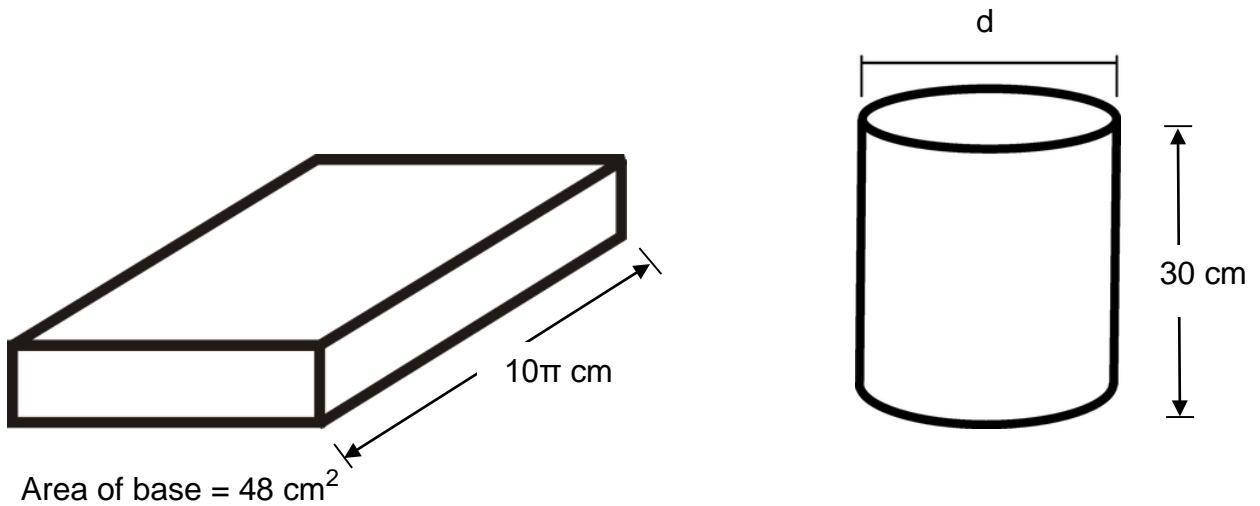
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9. The right prism with a rectangular base and the cylinder represented below are equivalent.

The height of the rectangular prism is 10π cm and the area of the base of the rectangular prism is 48 cm^2 . The height of the cylinder is 30 cm.



What is the diameter of the cylinder?

10. What are the solutions of the inequality $\frac{1}{4}(x-1)(x-8) - 2 < 0$?