

# Algebraic and graphical modeling in general context 1

**MATH**  
**4151-1**

## **RALLYE MATH** Your Path to Success



Marie-Ève Côté  
Martin Francoeur

ÉDITIONS  
**MARIE  
FRANCE**

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## **RALLYE MATHEMATICS**

Your path to success

SPÉCIMEN

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# TABLE OF CONTENTS

<b>1</b>	<b>Equations of straight lines (<i>review</i>)</b>	2
	Concept exercises	2
	Application exercises	3
	Context exercises	4
	<b>Task 1</b> – Installing a fence	6
	<b>Task 2</b> – Car racing	8
	<b>Task 3</b> – Home theatre	10
<b>2</b>	<b>Solving systems of equations</b>	12
	Concept exercises	12
	Application exercises	12
	Context exercises	14
	<b>Task 4</b> – A visit to the museum	16
	<b>Task 5</b> – A stay in Nicaragua	18
	<b>Task 6</b> – Traffic signs	20
<b>3</b>	<b>The second-degree polynomial function</b>	22
	Concept exercises	22
	Application exercises	23
	Context exercises	24
	<b>Task 7</b> – The double-crested cormorant's dive	26
	<b>Task 8</b> – Testing braking systems	28
	<b>Task 9</b> – A hot air balloon ride	30

<b>4</b>	<b>Exponential functions</b> .....	32
	Concept exercises .....	32
	Application exercises .....	33
	Context exercises .....	34
	<b>Task 10</b> – The rural exodus .....	36
	<b>Task 11</b> – Financial investment .....	38
	<b>Task 12</b> – Exposure to a hazardous substance .....	40
<b>5</b>	<b>The Periodic Function</b> .....	42
	Concept exercises .....	42
	Application exercises .....	43
	Context exercises .....	44
	<b>Task 13</b> – Dolphin echolocation .....	46
	<b>Task 14</b> – The heart’s electrical system .....	48
	<b>Task 15</b> – The concert .....	50
<b>6</b>	<b>The step function</b> .....	52
	Concept exercises .....	52
	Application exercises .....	53
	Context exercises .....	54
	<b>Task 16</b> – The Chaudière River .....	56
	<b>Task 17</b> – Bicycle manufacturing .....	58
	<b>Task 18</b> – Sightseeing tours .....	60
<b>C</b>	<b>Corrected notebook</b> .....	62



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# 2

## SOLVING A SYSTEM OF EQUATIONS

Corrected from the notebook, p. 62

### Concept exercises

1. Which systems of equations have only one solution?

A)  $y = -5x + 8$  and  $x + y = 12$

C)  $y = 2x + 3$  and  $3y = 6x + 9$

B)  $4y = 10x + 9$  and  $y = \frac{10x + 9}{4}$

D)  $y = 4x + 1$  and  $y - 4x - 1 = 0$  Answer: \_\_\_\_\_

2. What is the solution to the system of equations to the right?

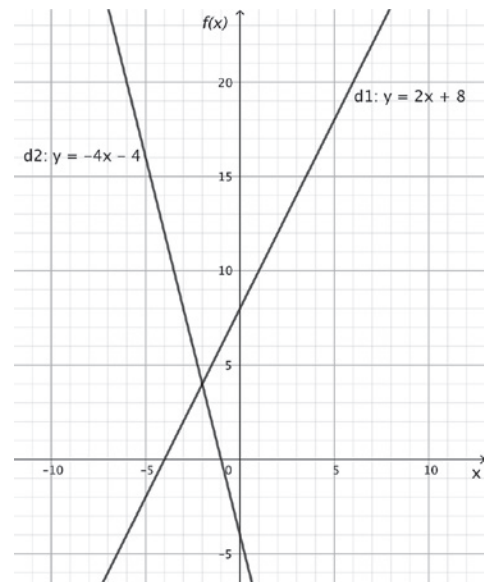
$y = 3x - 1$  and  $2x + 4y = 5$

A) (2, 9) B)  $\left(\frac{13}{14}, \frac{9}{14}\right)$  C)  $\left(\frac{9}{14}, \frac{13}{14}\right)$  D) (9, 13) Answer: \_\_\_\_\_

### Application exercises

3. The lines  $d_1$  and  $d_2$  shown in the graph opposite.

What is the solution to the system of equations formed by the lines  $d_1$  and  $d_2$ ?



Answer: \_\_\_\_\_

**Application exercises (continued)**

4. Consider the following system of equations:

- A straight line  $d_1$  passing through the points  $(-1, 3)$  and  $(6, 9)$ ;
- A straight line  $d_2$  whose slope is 2 and whose y-intercept is -4.

**What is the solution to a system of equations formed by the lines  $d_1$  and  $d_2$ ?**

Answer: \_\_\_\_\_



### Context exercises

5.  $x$  and  $y$  are two numbers. The sum of triple  $x$  and double  $y$  is equal to 5. The difference of half of  $x$  and the quadruple of  $y$  is equal to  $-4$ .

**What are the two numbers represented by  $x$  and  $y$ ?**

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Answer: \_\_\_\_\_

**Context exercises (*continued*)**

6. Nhu-Y would like to have the walls of his house painted again. She contacted two companies that offered her the following services:

**Company A**

- An hourly rate of \$19.
- A \$150 travel fee.

**Company B**

- An hourly rate of \$18.
- A \$175 travel fee.

**After how many hours of work do the two companies charge the same total cost?**

Answer: \_\_\_\_\_

## Task 4 A visit to the museum

Surinder, a history and citizenship education teacher, has organized a visit to the museum for his students.



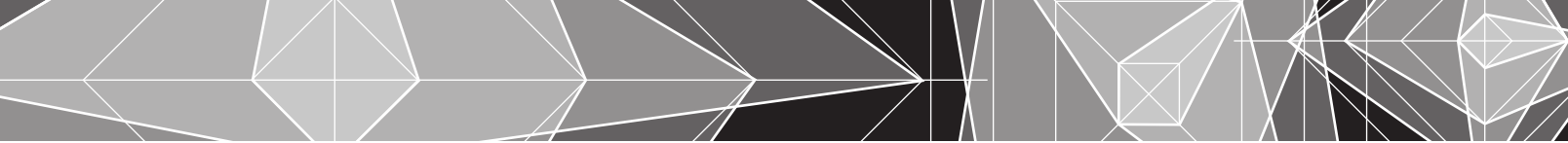
Here is number of students in each of his four groups who attended the trip this year:

Group	Students
401	33
402	31
403	32
404	29

Last year, Surinder made two visits to this museum.

- In November, for 130 students and six teachers, the school paid \$1 458.
- In April for 88 students and three teachers, the total was \$970.50.

**If there are three other teachers accompanying him on this visit and the rates for a student and for a teacher have not changed, will Surinder be able to bring all his students on the school's budget of \$1 200? If not, how much is he short?**



Corrected from the notebook, p. 62

**Task** **4** **A visit to the museum (*continued*)**

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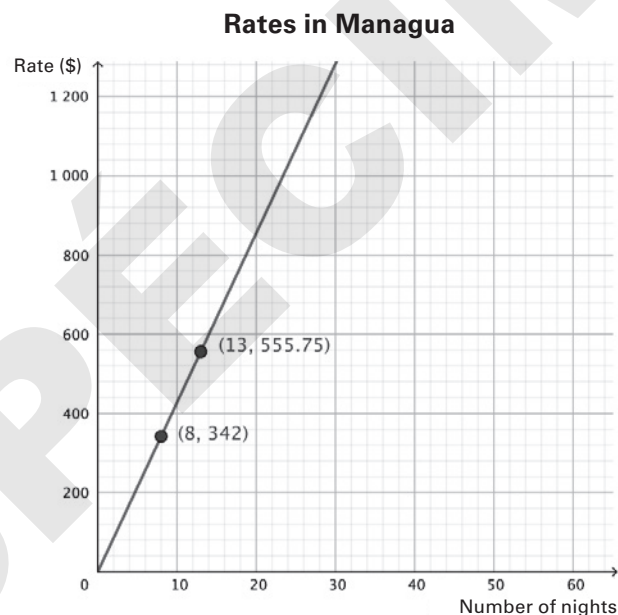
Answer: \_\_\_\_\_

\_\_\_\_\_

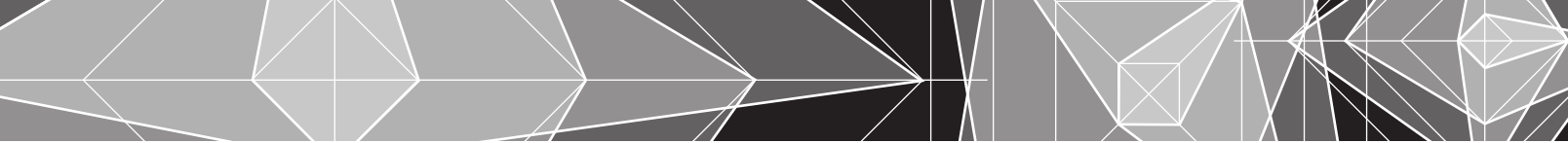
## Task 5 A stay in Nicaragua

Since childhood, you and your best friend have dreamed of visiting Nicaragua for its landscapes and tourist attractions. For your 30th birthday, you are finally planning a visit. You compare the following rates for accommodation in the cities of Managua and Puerto Cabezas, where you will be staying over the course of your 15-night trip. Ideally you would like to spend an equal amount of time in each city.

Rates in Puerto Cabezas	
Rate (\$)	Number of nights
93.75	3
281.25	9
468.75	15
656.25	21



**Propose a vacation plan that would not exceed a budget of \$570 for accommodation in hotels in the city of Managua and in hotels in the city of Puerto Cabezas.**



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**Task** **5** **A stay in Nicaragua (*continued*)**

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Answer: \_\_\_\_\_

\_\_\_\_\_

## Task 6 Traffic signs

In a small town will be installing a metal border around its traffic signs to reinforce and protect them from further damage. This costs \$2.10 per centimetre.

Here are the details of the two types of signs that need to be repaired.

Panels "Stop"	Panels "Yield"
	
<ul style="list-style-type: none"> <li>• The "Stop" sign is a regular octagon;</li> <li>• The "Yield" sign is an equilateral triangle;</li> <li>• The perimeter of the "Stop" sign is 10 cm less than fivefold of one side of the perimeter of the "Yield" sign;</li> <li>• The triple perimeter of the "Stop" sign increased by half of the perimeter of the "Yield" sign is equal to 795 cm.</li> </ul>	

To encourage local businesses, city council will offer a \$5 000 grant to the public library if the work costs less than \$20 000.

**If 40 "Stop" signs and eight "Yield" signs must be repaired, will the municipal library receive the city council grant?**



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**Task** **6** **Traffic signs (*continued*)**

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Answer: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_