

TABLE OF CONTENTS REPRODUCIBLE SHEETS



From lines to systems
of equations

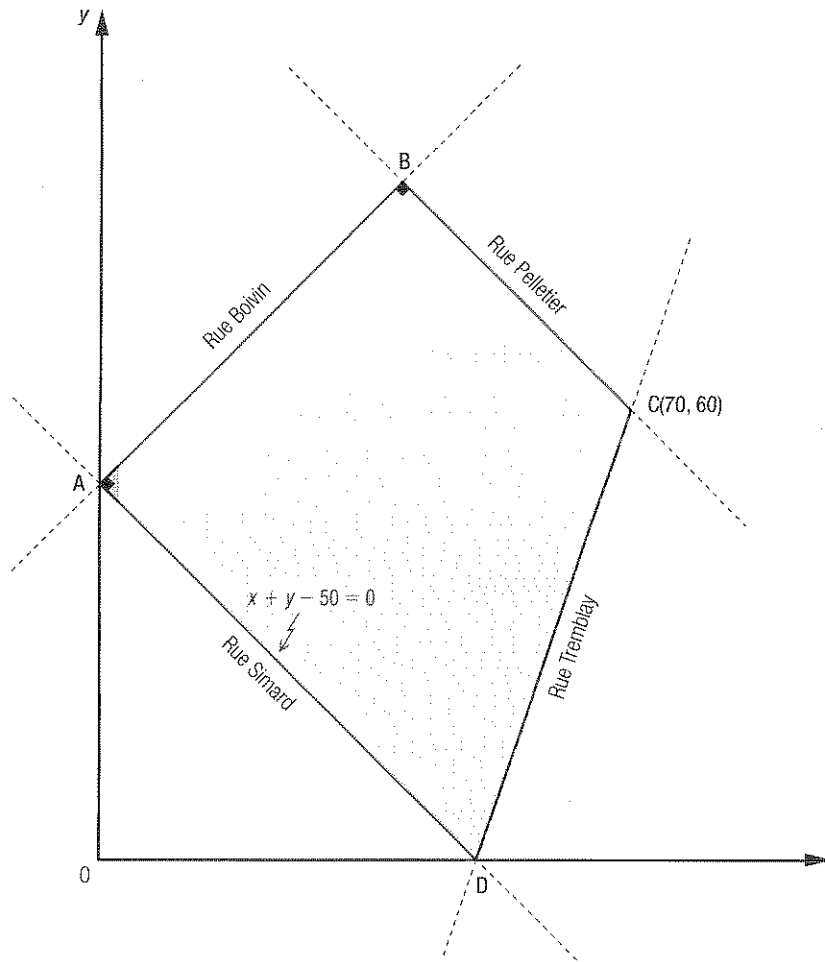
LES Urbanization	
LES 1 – A new residential sector	1
LES 2 – Zoning	2
SECTION 1.1 Points and segments in the Cartesian plane	
Problem – Mail from the sky	3
Support	4
Consolidation	6
Enrichment	9
SECTION 1.2 Lines in the Cartesian plane	
Support	10
Consolidation	12
Enrichment	15
SECTION 1.3 Systems of equations	
Support	16
Consolidation	18
Enrichment	21
SECTION 1.4 Half-planes in the Cartesian plane	
Support	22
Consolidation	24
Enrichment	27
SNAPSHOT I	28
Answer key for <i>Vision 1</i> Reproducible sheets	34

Name: _____

Group: _____ Date: _____

LES 1: A new residential sector

The trapezoid below represents a new residential sector.
The graph is scaled in metres.

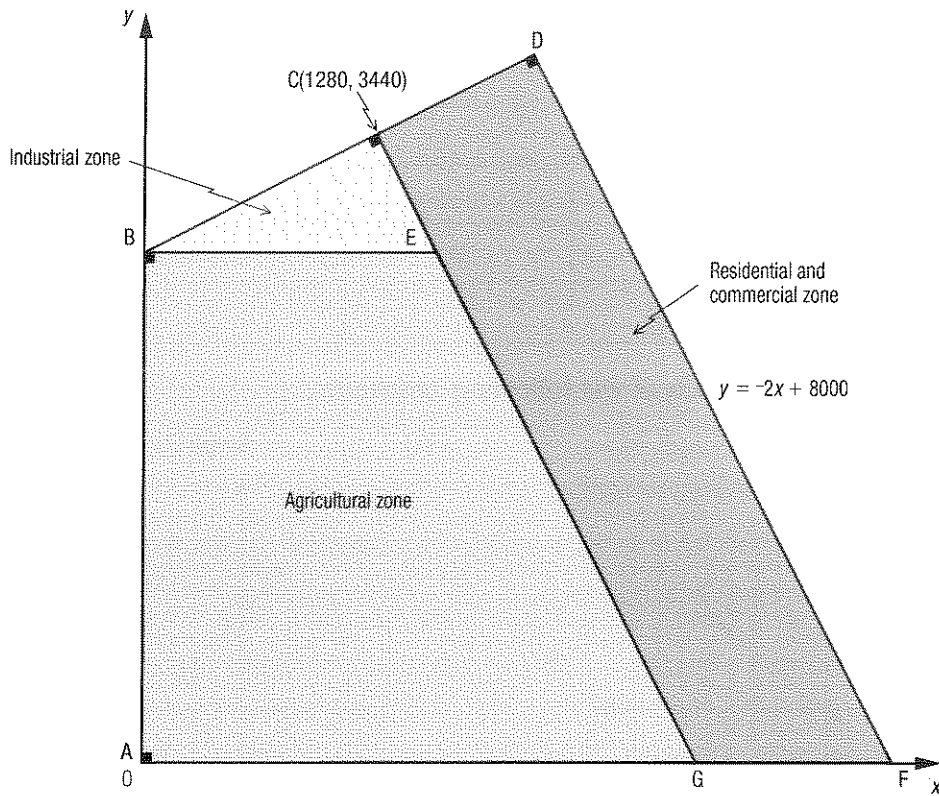


Name: _____

Group: _____ Date: _____

LES 2: Zoning

Below is a municipality's zoning plan. The graph is scaled in metres:



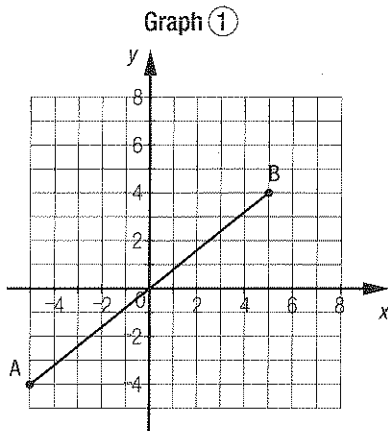
Points and segments in the Cartesian plane

1 Complete the table below.

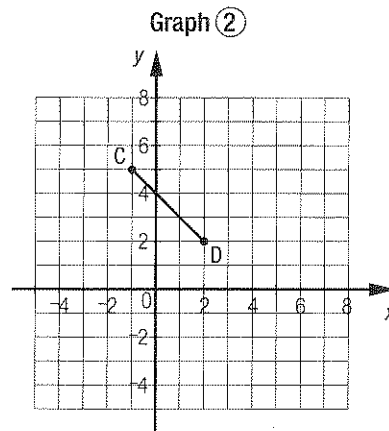
Coordinates of point A	Coordinates of point B	Change in the x-coordinates from point A to point B	Change in the y-coordinates from point A to point B	Slope of \overline{AB}
(2, 6)	(3, -5)			
(10, -1)	(3, 0)			
(2, 1)		7		-5
	(0, 6)		2	$\frac{1}{4}$
(0, 0)			1	10
	(-11, 5)	8		0
$(\frac{2}{3}, 3)$	$(\frac{1}{2}, \frac{3}{4})$			

2 Calculate the slope of each of the following segments.

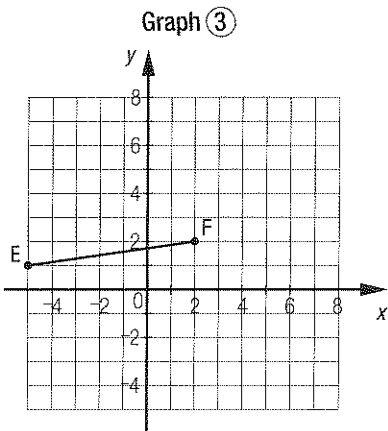
a)



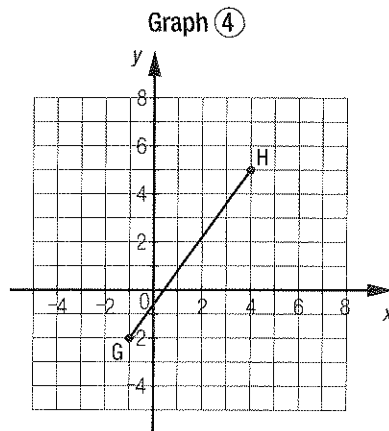
b)



c)



d)



Name: _____

Group: _____ Date: _____

3 Calculate the slope of a segment with the following endpoints:

- a) A(1, 6) and B(2, 3) _____ b) C(2, 3) and D(5, 4) _____
 c) E(5, 4) and F(4, 7) _____ d) G(4, 7) and H(1, 6) _____

4 Calculate the distance between the points:

- a) A(0, 0) and B(3, 4) _____ b) C(-2, 7) and D(-7, 19) _____
 c) E(8, 8) and F(2, 16) _____ d) G(-13, 0) and H(-3, -24) _____
 e) I(1, 0) and J(3, -4) _____ f) K(200, 12) and L(2, 325) _____

5 Among the following points:

A(2, 3), B(11, -1), C(3, 22), D(45, 15), E(5, 5), F(21, 0), G(6, 23), H(27, 12),
 I(3, -1), J(8, -5)

- a) Which two points are closest to one another? _____
 b) What distance separates the two points found in a)? _____
 c) Which two points are furthest from one another? _____
 d) What distance separates the two points found in c)? _____

6 Complete the table below.

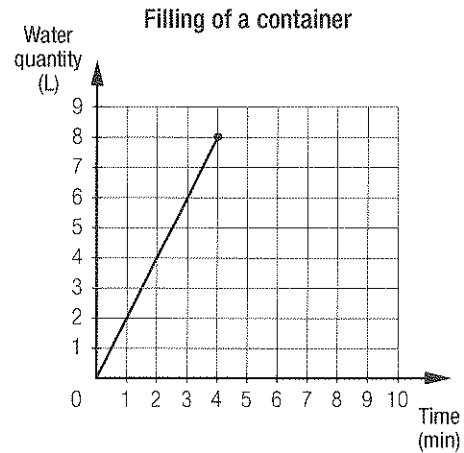
Coordinates of point A	Coordinates of point B	Coordinates of the midpoint of \overline{AB}	Coordinates of the point situated $\frac{2}{3}$ along \overline{AB}	Coordinates of the point which divides \overline{AB} in a ratio of 2:3
(0, 0)	(30, 90)			
(-6, 38)	(-36, 23)			
(23, 0)	(14, 21)			
(8, -9)	(-12, 4)			
(11, 10)	(2, 0)			
$(\frac{4}{5}, 6)$	$(\frac{1}{2}, -5)$			
(2, 5)		(6, 9)		
(-1, 6)		(-6, 8)		

Name: _____

Group: _____ Date: _____

Points and segments in the Cartesian plane

1 The adjacent graph represents the filling of a water container.



a) What is the slope of the segment shown?

b) What would be the slope of the segment, representing the drainage of the container as a function of time, if:

1) the container's draining was done at the same rate as its filling?

2) the draining was done at one-half the filling rate? _____

3) the draining was done at one-fourth the filling rate? _____

c) What would be the filling completion point's coordinates if the time it took to fill the container was:

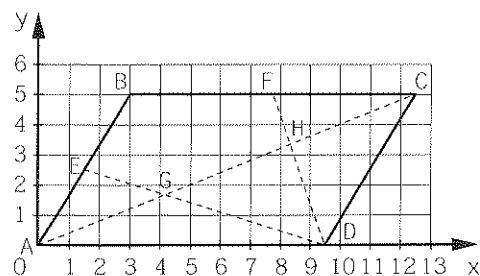
1) two times less? _____

2) three times less? _____

3) 135 minutes? _____

2 In the adjacent parallelogram ABCD, point F is the midpoint of \overline{BC} and point E is the midpoint of \overline{AB} .

In addition, $\overline{AG} \cong \overline{GH} \cong \overline{HC}$.



a) What are the coordinates of points E and F?

b) What are the coordinates of points G and H? _____

c) In what ratio does point G divide \overline{DE} ? _____

d) Starting from point F, at what fraction of the distance between points F and D is point H located? _____

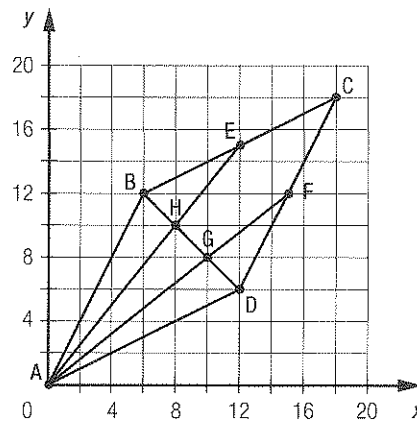
Name: _____

Group: _____ Date: _____

CONSOLIDATION 1.1

(cont'd)

3 In the adjacent rhombus ABCD, point E is the midpoint of \overline{BC} and point F is the midpoint of \overline{CD} . In addition, $\overline{BH} \cong \overline{GH} \cong \overline{DG}$.



- a) What are the coordinates of points E and F?

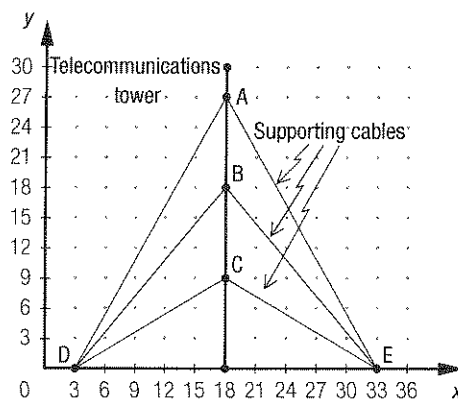
- b) In what ratio does point G divide \overline{DB} ?

- c) Starting from point B, at what fraction of the distance between points B and D is point H located?

4 a) Point P(12, -1) is located at $\frac{4}{5}$ of the length of segment AB. Find the coordinates of point B if those of point A are (4, 15).

b) Point P(-5, -9) divides segment DC in a ratio of 4:3. Determine the coordinates of point D if those of point C are (-14, -21).

5 The diagram shown below represents a telecommunications tower maintained by a series of supporting cables. The scale is in metres.



a) Calculate the slope of each of the six cables illustrated.

b) Determine the length of:

- 1) the two longest cables _____
- 2) the two shortest cables _____

c) Each cable needs an insulator. What are the coordinates of the insulators if:

- 1) one is located at $\frac{1}{5}$ of \overline{DC} and another at $\frac{1}{5}$ of \overline{EC} ? _____
- 2) one is located at $\frac{2}{5}$ of \overline{DB} and another at $\frac{2}{5}$ of \overline{EB} ? _____
- 3) one divides \overline{DA} in a ratio of 2:1 and another divides \overline{EA} in the same ratio? _____

Name: _____

Group: _____ Date: _____

CONSOLIDATION 1.1

(cont'd)

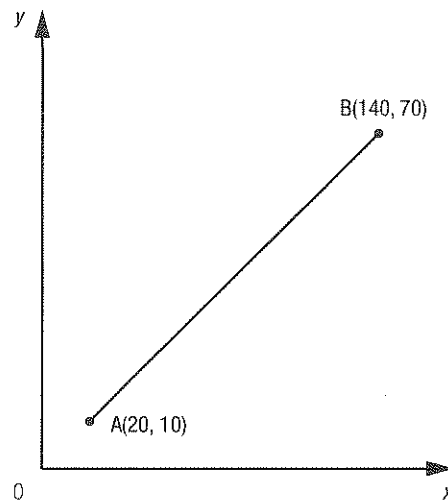
6 Annie wants to move to be as close as possible to her workplace. Her home, A, and her office, B, are represented in the adjacent Cartesian plane.

- A residential building C is located at $\frac{3}{4}$ of the length of \overline{AB} .
- A residential building D divides \overline{AB} in a ratio of 2:3.

Considering that the scale is in kilometres:

- a) Which building should she choose?

- b) What distance will she travel to get to the office from her new building?



7 An individual moves along a path illustrated by a Cartesian plane, scaled in metres. The coordinates at the point of departure are (-2, 5). The individual travels in a straight line, from one point to another. The following are the points, in sequence, at which the individual stops: A(10, 0), B(8, 4), C(-1, 6), D(6, 6), E(3, -1).

- a) What is the total distance that this individual travels?

- b) This individual drops an object at $\frac{2}{3}$ along the path from the point of departure to point A. What is the shortest distance that must be travelled to recover the lost object if the individual is currently located at point E?

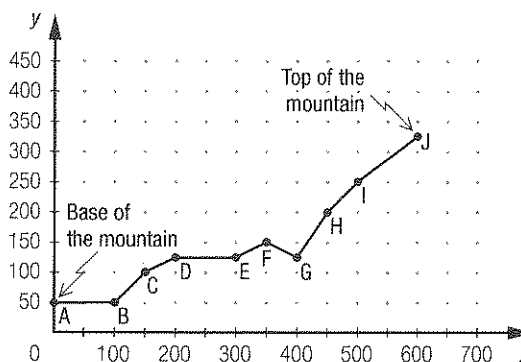
8 A man leaves his house, located at coordinates (100, 1400), to go duck hunting on Lake Corneille. On his way to the hunt, he has to pick up his duck whistles from a warehouse at coordinates (437.5, 950). Considering that the warehouse divides the route between his house and the hunting location at a ratio of 3:5, find the coordinates of the point corresponding to the hunting grounds and the total distance travelled to get there. The scale is in kilometres.

Points and segments in the Cartesian plane

I The adjacent graph represents the side of a mountain, along which a cable car will be installed. The scale is in metres.

The cable car must meet the following requirements:

- the cable car must join point A to point J
- the pick-up and drop-off locations must be set at ground level
- the slope of the cable must be constant over its entire length
- four evenly spaced pylons must support the cable between the pick-up and drop-off locations
- the height of the cable at the pick-up and drop-off locations must be 5 m



Coordinates of the points

A	(0, 50)
B	(100, 50)
C	(150, 100)
D	(200, 125)
E	(300, 125)
F	(350, 150)
G	(400, 125)
H	(450, 200)
I	(500, 250)
J	(600, 325)

a) What is the slope of the cable?

b) What is the length of the cable?

c) What are the coordinates of the base of each of the four pylons?

d) What is the length of the cable between each pylon?

Replace the third requirement — “the slope of the cable must be constant” — with “two pylons are added, so the slope of the first and last third of the cable’s length is equal to $\frac{1}{2}$ ”.

e) What is the slope of the cable for the middle third of its length?

f) What is the new length of the cable?

Lines in the Cartesian plane

1 Complete the table below.

Coordinates of point A	Coordinates of point B	Slope of line AB	y-intercept of line AB	Equation of line AB	
				Function form	General form
(0, 0)	(2, 6)				
(0, 15)	(1, 5)				
(2, 0)	(3, 6)				
(-5, 5)	(2, 21)				
(2, 16)	(-3, -5)				
(21, 21)	(34, 108)				
(-5, 7)	(2, -45)				
$(\frac{1}{2}, \frac{3}{5})$	(4, -34)				

2 Write the following equations in general form.

a) $y = 3x + 2$

b) $y = x - 5$

c) $y = -5x + 2$

d) $y = -2x - 7$

e) $y = \frac{2}{3}x + 4$

f) $y = -\frac{5}{9}x + 9$

g) $y = \frac{1}{2}x - \frac{5}{2}$

h) $y = \frac{2}{3}x + \frac{14}{3}$

3 Write the following equations in function form.

a) $3x + 4y - 5 = 0$

b) $-x + 2y - 4 = 0$

c) $-3x + 6y - 10 = 0$

d) $6x - 5y + 2 = 0$

e) $22x + 11y - 1 = 0$

f) $x + y - 2 = 0$

g) $2x + y - 5 = 0$

h) $x + 6y + 1 = 0$

Name: _____

Group: _____ Date: _____

4 Match each of the equations with its correct description.

Equation	Description
① $y = 3x + 6$	Ⓐ The slope of the line represented by this equation is $-\frac{3}{2}$.
② $3x + 2y - 5 = 0$	Ⓑ The line represented by this equation passes through point P(2, 12).
③ $y = x - 2$	Ⓒ The y-intercept of the line represented by this equation is $-\frac{3}{7}$.
④ $2x + 7y + 3 = 0$	Ⓓ The line represented by this equation passes through point R(2, 0).
⑤ $y = -5x + 1$	Ⓔ The line represented by this equation is perpendicular to line $x - 5y + 5 = 0$.

5 Complete the table below.

Equation of line AB	Slope of a line parallel to line AB	Slope of a line perpendicular to line AB
$y = 12x + 5$		
$y = -5x + 9$		
$y = \frac{1}{2}x + 2$		
$y = -\frac{4}{5}x + \frac{4}{5}$		
$2x + y - 5 = 0$		
$x - 5y - 5 = 0$		
$2x + 2y - 9 = 0$		
$x - 3y - 4 = 0$		

6 Below is some information regarding two lines, l_1 and l_2 :

- The equation of line l_1 is $y = 3x + 2$.
- Line l_2 passes through point A(2, 5).

a) If l_2 is parallel to l_1 , write its equation in:

- 1) function form _____
- 2) general form _____

b) If l_2 is perpendicular to l_1 , write its equation in:

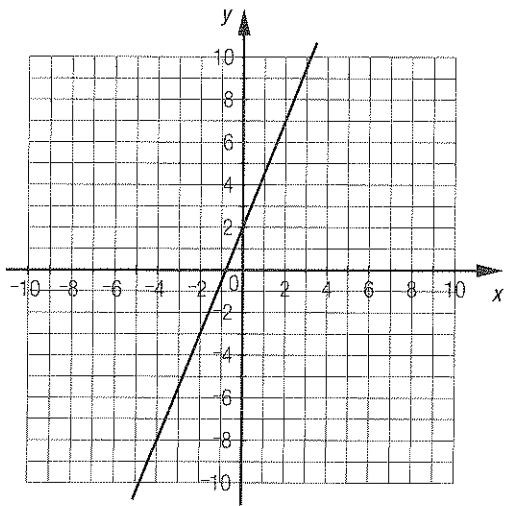
- 1) function form _____
- 2) general form _____

Lines in the Cartesian plane

1 Write the equation for each of the following lines in:

- 1) function form
- 2) general form

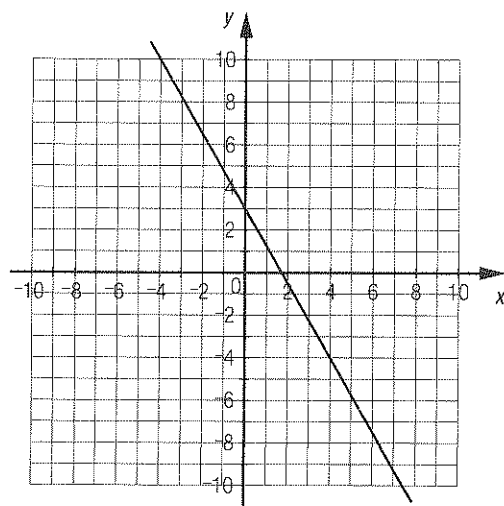
a)



1) _____

2) _____

b)



1) _____

2) _____

2 For each of the lines described below, write the equation in function form.

- a) The line which passes through points A(2, 6) and B(-8, 3). _____
- b) The line which has a slope of 3 and passes through point C(-5, 7). _____
- c) The line parallel to the line of equation $y = \frac{2}{7}x - 9$ and passes through the origin of the Cartesian plane. _____
- d) The line perpendicular to the line of equation $2x - 5y + 4 = 0$ and passes through point D(3, -2). _____

3 Write the following equations in general form.

- | | |
|---------------------------------------|--------------------------------------|
| a) $y = \frac{2}{3}x + 5$ | b) $y = -\frac{4}{5}x - 8$ |
| _____ | _____ |
| c) $y = 2x - \frac{6}{7}$ | d) $y = \frac{7}{2}x + \frac{13}{2}$ |
| _____ | _____ |
| e) $y = -\frac{4}{9}x + \frac{12}{9}$ | f) $y = \frac{9}{8}x - \frac{5}{4}$ |
| _____ | _____ |

Name: _____

Group: _____ Date: _____

CONSOLIDATION 1.2

(cont'd)

4 Write the following equations in function form.

a) $2x + y - 9 = 0$

b) $7x + 6y - 32 = 0$

c) $-4x - 5y - 9 = 0$

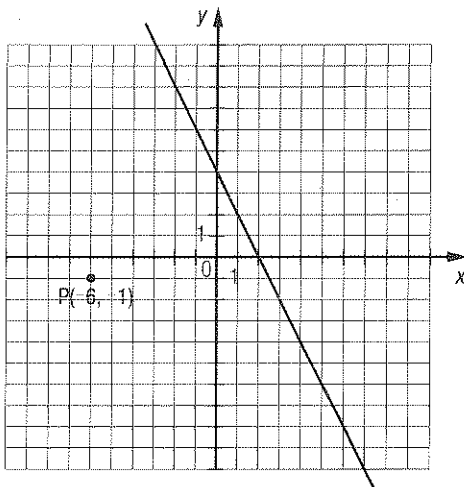
d) $8x - 3y + 12 = 0$

e) $x - 5y - 13 = 0$

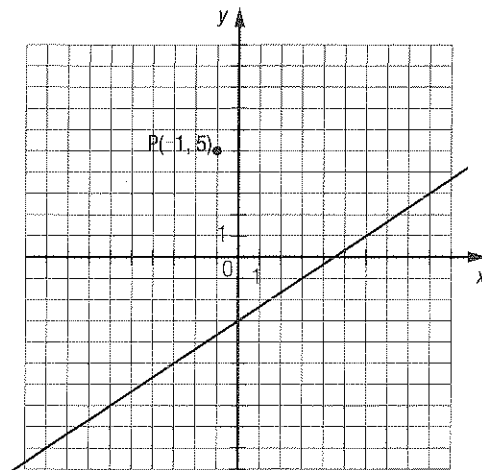
f) $-2x + 2y - 12 = 0$

5 For each of the following, calculate the distance between point P and the y-intercept of the line.

a)



b)



c) The coordinates of point P are (7, 4) and the equation of the line is $2x + 5y - 5 = 0$.

d) The coordinates of point P are (1, -5) and the equation of the line corresponds to the perpendicular bisector of the segment having endpoints A(4, 2) and B(-6, -2).

6 A farmer grows two kinds of corn. One side of the farmer's field is bound by points A(52, 39) and B(188, 73). Determine the equations for the following:

a) the perpendicular bisector of side AB

b) the two lines parallel to the perpendicular bisector that pass through point A and point B, respectively

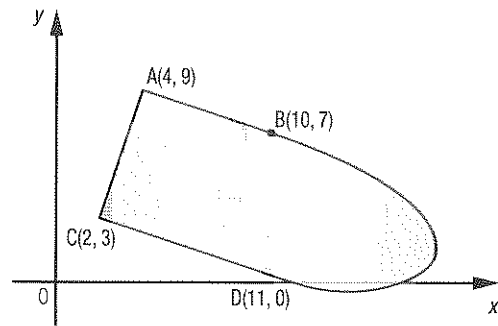
Name: _____

Group: _____ Date: _____

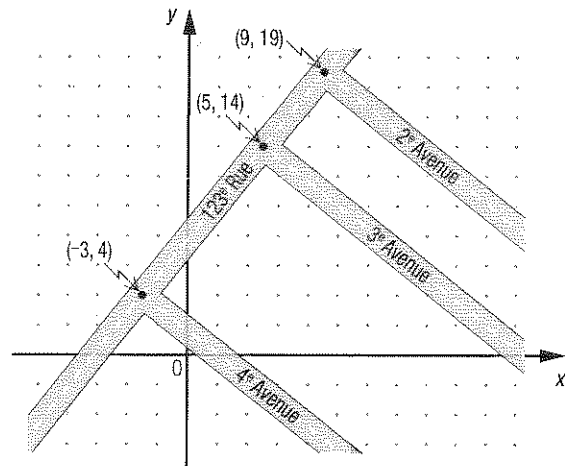
CONSOLIDATION 1.2

(cont'd)

- 7** A machinist for a company building wind turbines programs the cutting of one of its pieces. The segments AB and CD must be parallel while side AC must be perpendicular to segments AB and CD. Prove that the above requirements have been met using the coordinates provided in the adjacent graph.



- 8** In large cities, such as New York and Montreal, streets and avenues are sometimes numbered. Numbered avenues and streets are usually perpendicular. Write the equations, in function form, for the street and the avenues shown in the adjacent graph.



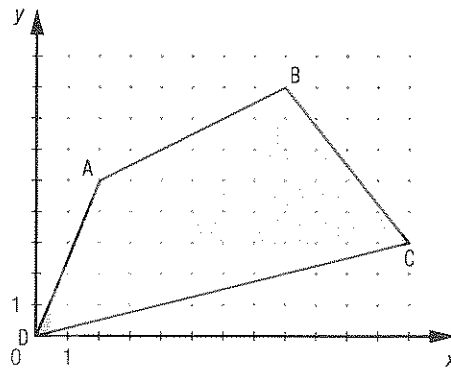
- 9** NASA represents the trajectory of two shuttles it is sending into space in a Cartesian plane. The trajectory of Shuttle **A** corresponds to the line which passes through points A(-25, 18) and B(-37, 42). The trajectory of Shuttle **B** corresponds to line with equation $4x + 2y + 60 = 0$. Show that the trajectory of each of the two shuttles will not result in a collision.

Name: _____

Group: _____ Date: _____

Lines in the Cartesian plane

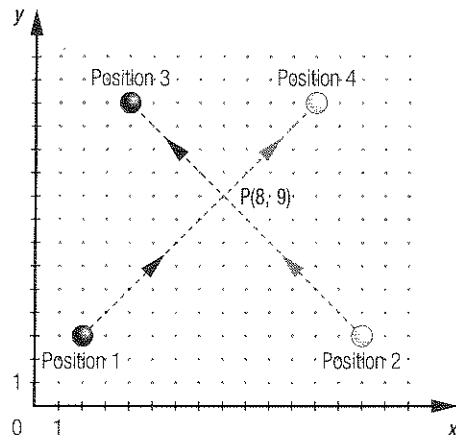
1 A seamstress programs her cutting machine to cut out three identical pieces of rectangular fabric she will use to make pockets. The piece of fabric from which the three rectangles will be cut is shown in the adjacent Cartesian plane. The scale is in decimetres (a decimetre is 10 cm). The length of each piece must be as long as possible and four cuts must be perpendicular to \overline{AB} .



a) Determine the equations for the five lines that must be programmed into the cutting machine in order to produce the three pieces of fabric.

b) What are the dimensions of the rectangles?

2 During a physics experiment, a black marble is launched from Position 1 and a white marble from Position 2 so that they cross perpendicularly at point $P(8, 9)$ and stop rolling at Positions 3 and 4. Both marbles leave the starting position at the same time, at a speed of 1.25 m/s. What are the equations that represent the trajectories of each of the marbles?



Systems of equations

1 Which algebraic method—comparison, substitution or elimination—is the most appropriate for solving the following systems of equations?

a) $y = 2x - 3$
 $4x - 6y = 7$

b) $3x - 4y - 12 = 0$
 $2x + 5y - 9 = 0$

c) $7y - 2x = 9$
 $2x + 4y = 1$

d) $x = 9y + 12$
 $y = 5x + 12$

e) $y = 6x - 9$
 $y = 4x - 7$

f) $-8x + 3y + 2 = 0$
 $12x + 7y = 10$

2 Do the following systems of equations represent intersecting, coinciding or non-coinciding parallel lines?

a) $y = 2x - 3$
 $y = 2x + 7$

b) $x - 2y + 5 = 0$
 $2x - 4y + 10 = 0$

c) $5y - 3x = 4$
 $5x - 3y = 4$

d) $y = \frac{5}{3}x + 4$
 $5x - 3y + 12 = 0$

e) $y = x + 8$
 $3x - 3y + 24 = 0$

f) $-2x + 5y + 12 = 0$
 $y = \frac{2}{5}x - 9$

3 Solve the following systems of equations using the substitution method.

a) $y = 2x - 3$
 $3x + y + 8 = 0$

b) $x - 2y + 5 = 0$
 $x = 3y - 6$

c) $5y - 3x = 4$
 $y = x - 2$

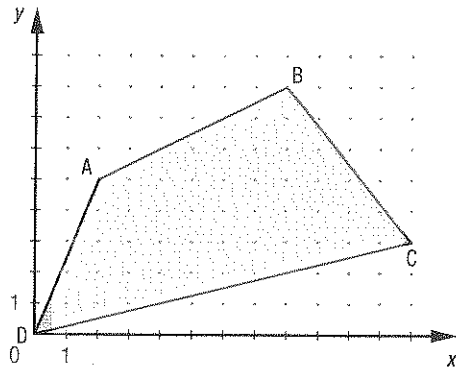
d) $y = \frac{5}{3}x + 4$
 $2x - 3y - 6 = 0$

Name: _____

Group: _____ Date: _____

Lines in the Cartesian plane

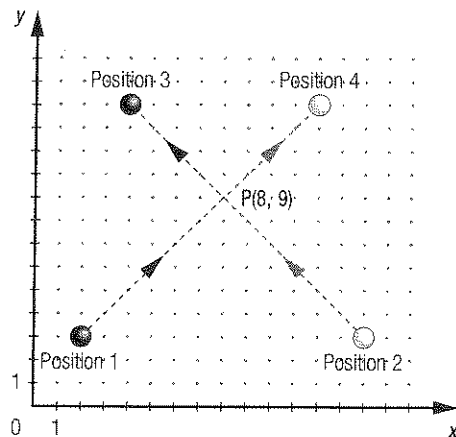
1 A seamstress programs her cutting machine to cut out three identical pieces of rectangular fabric she will use to make pockets. The piece of fabric from which the three rectangles will be cut is shown in the adjacent Cartesian plane. The scale is in decimetres (a decimetre is 10 cm). The length of each piece must be as long as possible and four cuts must be perpendicular to \overline{AB} .



a) Determine the equations for the five lines that must be programmed into the cutting machine in order to produce the three pieces of fabric.

b) What are the dimensions of the rectangles?

2 During a physics experiment, a black marble is launched from Position 1 and a white marble from Position 2 so that they cross perpendicularly at point $P(8, 9)$ and stop rolling at Positions 3 and 4. Both marbles leave the starting position at the same time, at a speed of 1.25 m/s. What are the equations that represent the trajectories of each of the marbles?



Name: _____

Group: _____ Date: _____

4 In each case, form an equivalent system of equations such that the coefficients of one of the variables have opposite signs.

a) ① $x + 3y - 8 = 0$
② $x - 2y + 5 = 0$

b) ① $3x + 4y + 6 = 0$
② $5x - y + 12 = 0$

c) ① $3x - 2y + 1 = 0$
② $4x - 6y - 7 = 0$

d) ① $-2x + 2y + 6 = 0$
② $x + 7y - 11 = 0$

5 Determine the solution for each of the following systems of equations using the elimination method.

a) $x - 2y + 4 = 0$
 $x + y + 7 = 0$

b) $3x - 4y - 12 = 0$
 $2x + 3y + 9 = 0$

c) $4x - 3y = 6$
 $2x - y = 6$

d) $5x + 2y = 2$
 $3x - 4y = -56$

Name: _____

Group: _____ Date: _____

Systems of equations

1 Determine the solution for the systems of equations shown below.

a) $8x - 3y - 10 = 0$
 $4x + 6y + 8 = 0$

b) $3x - 2y = 4$
 $x = 2y + 7$

c) $y = \frac{5x + 7}{3}$
 $3x - 2y = 12$

d) $4x + 5y = 8$
 $2x - 4y = -9$

e) $5x - 3y - 6 = 0$
 $x = \frac{3}{4}y - 2$

f) $y = \frac{2}{3}x + \frac{5}{4}$
 $2x = 5y - 8$

2 Determine the number of solutions for each of the following systems of equations.

a) $x - 2y + 4 = 0$
 $2x - 4y + 8 = 0$

b) $y = \frac{6x - 8}{3}$
 $y = 2x - 4$

c) $15x - 36y = 48$
 $10x - 24y = 32$

d) $5x - 2y = 2$
 $y = \frac{-5}{2}x + 2$

Name: _____

Group: _____ Date: _____

(cont'd)

3 Find an equation that, along with the equation $4x + 5y - 60 = 0$, forms a system of equations with:

- a) no solution _____
- b) an infinite number of solutions _____
- c) only one solution _____

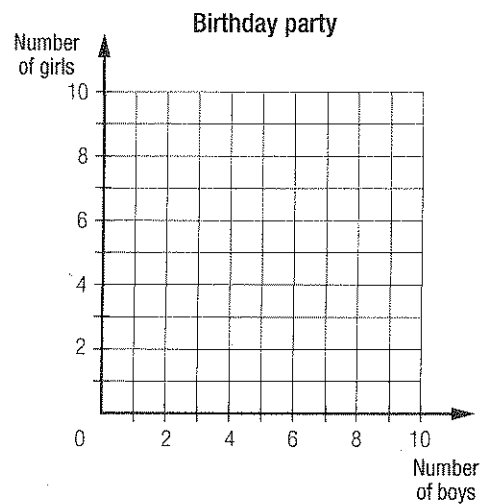
4 Three hundred people are watching a game of ringette. There are three times more men in the audience than women. If x equals the number of men in the audience and y the number of women:

- a) Find a system of equations that represents this situation.

- b) How many men and how many women are watching the game?

5 Six children attend a birthday party. If 18 is subtracted from three times the number of boys invited, the result is three times the number of girls.

- a) Represent this situation in the adjacent Cartesian plane.



- b) How many boys and how many girls attended the party?

Name: _____

Group: _____ Date: _____

6 A colour photocopy costs \$0.03 more than three times the price of a black-and-white photocopy. Eight colour photocopies and six black-and-white photocopies cost \$1.38. If x represents the price of a black-and-white photocopy and y represents the price of a colour photocopy, what are the two equations that describe this situation?

7 It is anticipated that four drinks will be given to each of 222 guests at a party. When taking inventory, the party organizers discovered that there were eight juice drinks more than quadruple the number of iced teas. What is the number of each type of drink?

8 A livestock farmer has 225 animals divided between chickens and sheep. If there are a total of 774 legs, how many animals are there of each type?

9 At a decoration store, six scented candles and five unscented candles cost \$10.15. Two unscented candles and four scented candles cost \$5.90. Considering that there is a single type of scented candle and a single type of unscented candle, what is the sale price for each type of candle?

Name: _____

Group: _____ Date: _____

Systems of equations

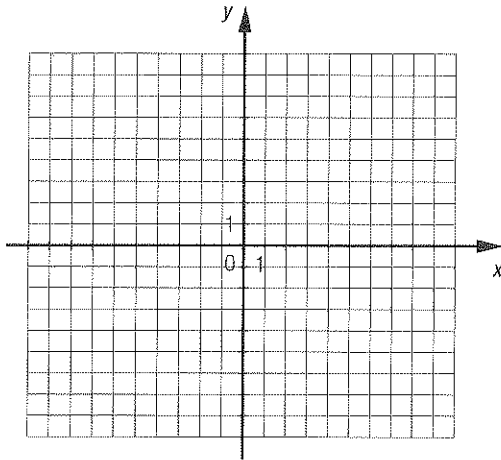
1 Judith bought two identical pairs of pants, four of the same vests and three of the same skirts at a total cost of \$201. The amount of money spent to buy the vests and the skirts is double the amount spent on the pants. A vest costs \$1 more than half the price of a skirt. Calculate the unit price of each type of clothing.

2 Two cars in a grand prix race, starting in first place and 23rd place, travel at the same speed at all times that both are on the race track. Is it possible for the driver of the 23rd-place car to win the race without the lead car dropping out? Explain your answer.

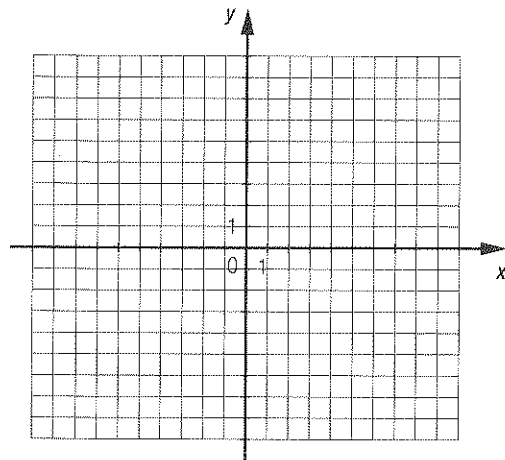
Half-planes in the Cartesian plane

1 Graphically represent the solution set for each of the following inequalities.

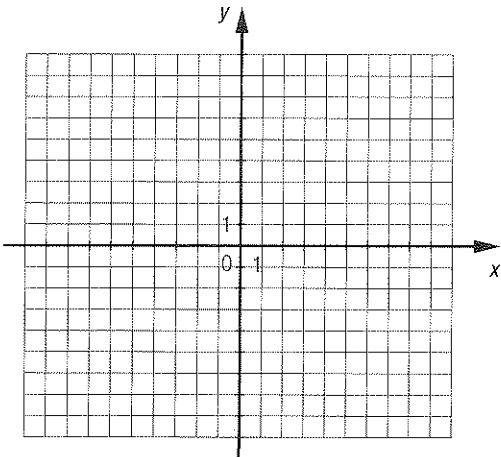
a) $y < 4$



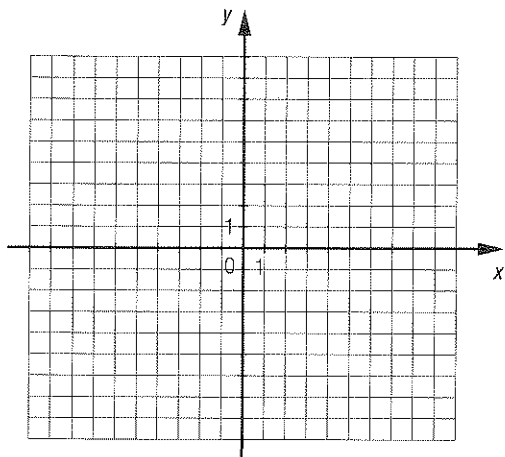
b) $x \geq -2$



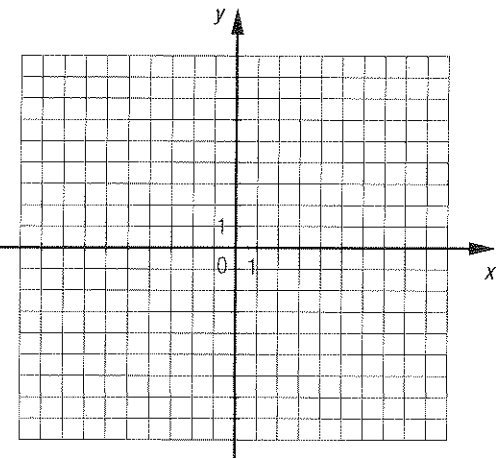
c) $y \leq x + 3$



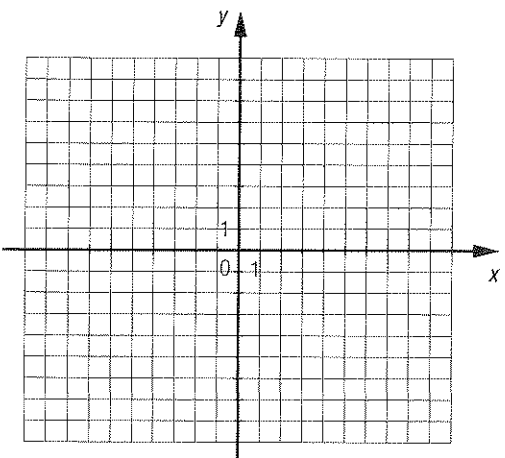
d) $y > \frac{5}{3}x - 4$



e) $2x - 3y + 5 < 0$



f) $-2x + 5y - 12 \geq 0$



Name: _____

Group: _____ Date: _____

2 Use a first-degree inequality with two variables to describe each of the following expressions.

- a) x is at least y . _____
- b) y is at most four less than three times x . _____
- c) The difference of five times y and two times x is greater than 234. _____
- d) There is at least two times more of x than of y . _____
- e) Three times x is less than two times y . _____
- f) The quotient of x divided by y is less than three. _____

3 Write the following inequalities in the form $y \geq ax + b$, $y \leq ax + b$, $y > ax + b$ or $y < ax + b$.

- a) $4x + y - 8 < 0$ _____
- b) $5x - y + 12 \geq 0$ _____
- c) $4x + 2y - 6 > 0$ _____
- d) $-2x - 2y + 8 \leq 0$ _____
- e) $3x - \frac{3y}{5} + 4 \leq 0$ _____
- f) $\frac{x - 2y}{7} > 3$ _____

4 For each situation do the following:

- 1) Identify the unknown quantities and represent them by different variables.
 - 2) Use an inequality to describe it.
- a) Jade has at least three times more \$0.25 coins in her wallet than \$2 coins.
- 1) _____
 - 2) _____
- b) During a hockey game, the local team's goalie let in at most two times fewer goals than the opposing team's goalie.
- 1) _____
 - 2) _____

Half-planes in the Cartesian plane

1 Match each inequality in the left-hand column with an equivalent inequality in the right-hand column.

① $2x - 3y < 8$

② $3x > 2y + 6$

③ $4x - 8 \geq 7 + 2y - x$

④ $\frac{x - 2y}{4} \geq -x + 5$

⑤ $\frac{3x - 6}{5} \leq \frac{2y - 3}{4}$

⑥ $\frac{x + y}{3} \leq \frac{2x - 3y - 4}{5}$

Ⓐ $x \geq \frac{2y}{5} + 3$

Ⓑ $x \geq \frac{2y}{5} + 4$

Ⓒ $y \leq \frac{x}{14} - \frac{6}{7}$

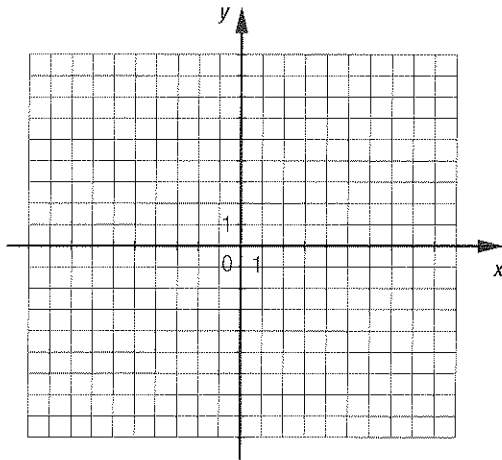
Ⓓ $y < \frac{3x}{2} - 3$

Ⓔ $y > \frac{2x - 8}{3}$

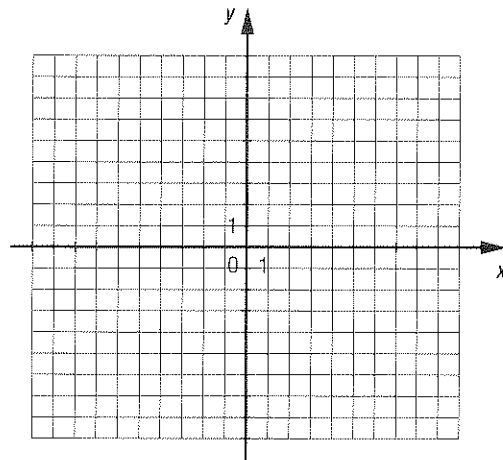
Ⓕ $x \leq \frac{5y}{6} + \frac{3}{4}$

2 Graphically represent the solution set for each of the following inequalities.

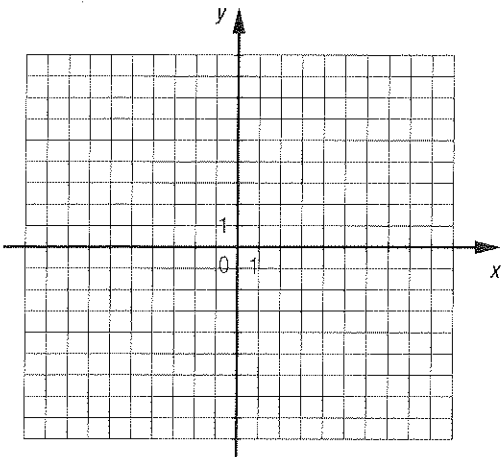
a) $x < 8$



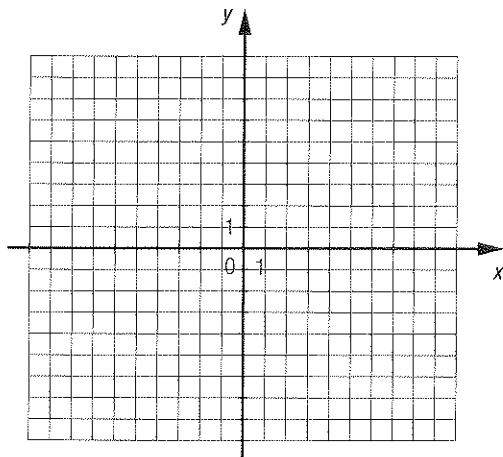
b) $2x + y \geq -2$



c) $x - 3y + 3 \leq 0$



d) $\frac{y + 3}{2} > \frac{5x + 4}{3}$



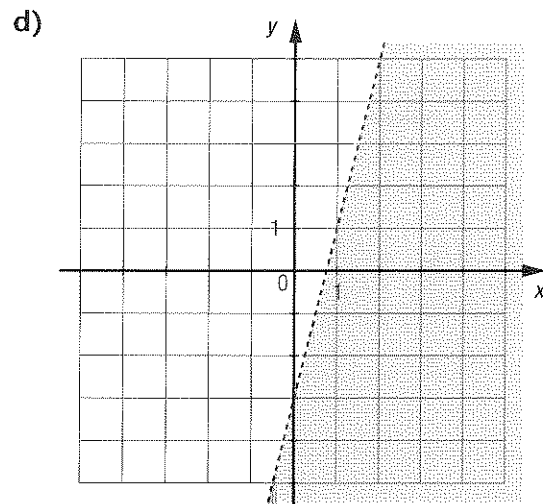
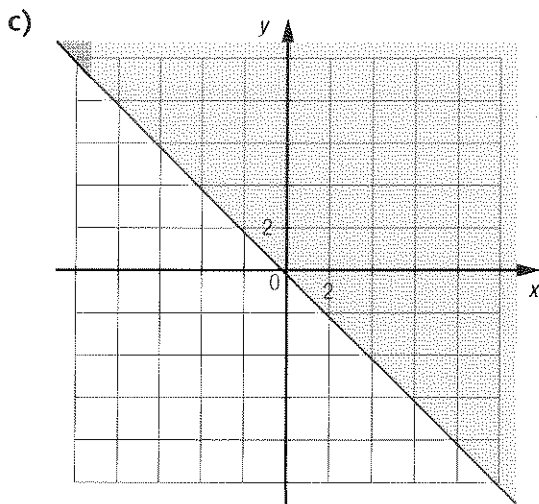
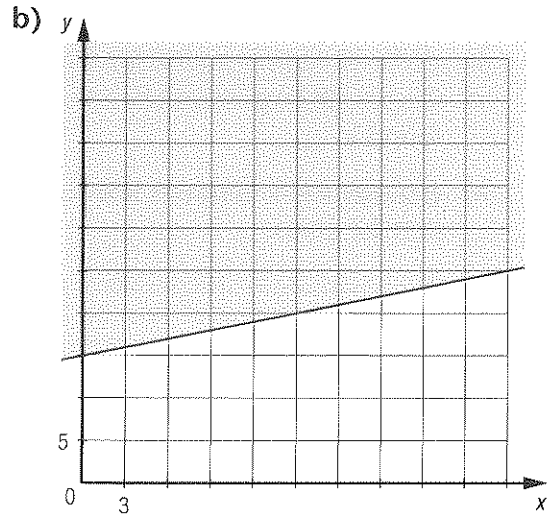
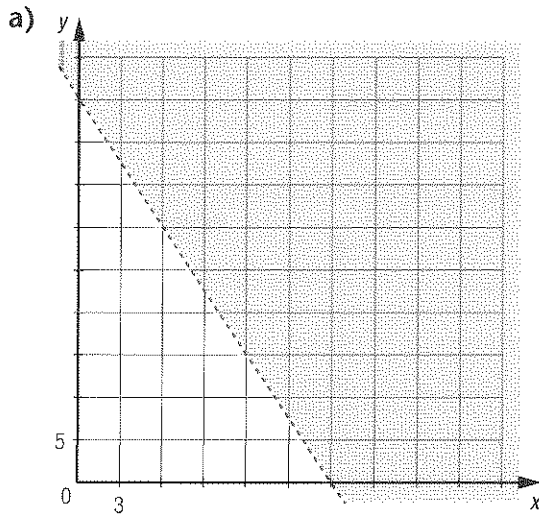
Name: _____

Group: _____ Date: _____

CONSOLIDATION 1.4

(cont'd)

3 For each graph, represent the situation with an inequality.



4 Two types of ceramic tiles are used to cover the floor of a store. One type measures 30.5 cm on each side, the other 40.6 cm. The surface area to be covered is at least 715,000 cm².

a) Identify the unknowns and represent them using different variables.

b) Write an inequality which describes this situation.

Name: _____

Group: _____ Date: _____

CONSOLIDATION 1.4

(cont'd)

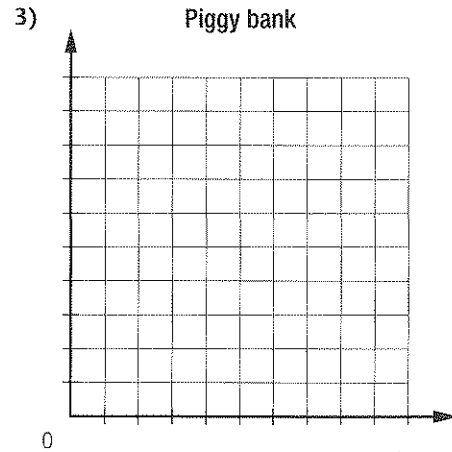
5 For each of the following situations, do the following:

- 1) Identify the unknown quantities associated with the situation and represent them using different variables.
- 2) Write an inequality which describes the situation.
- 3) Graphically represent the solution set of the inequality found in 2).

a) A piggy bank contains less than \$6 in \$1 and \$2 coins.

- 1) _____

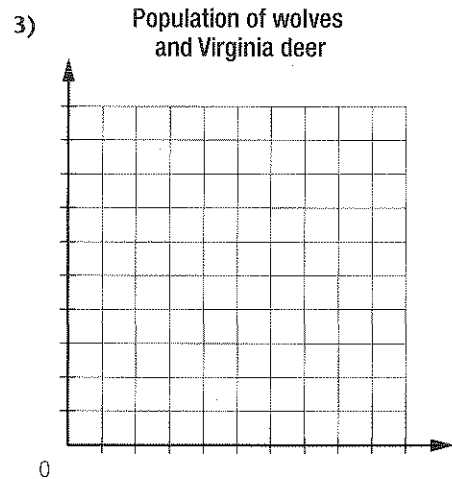
- 2) _____



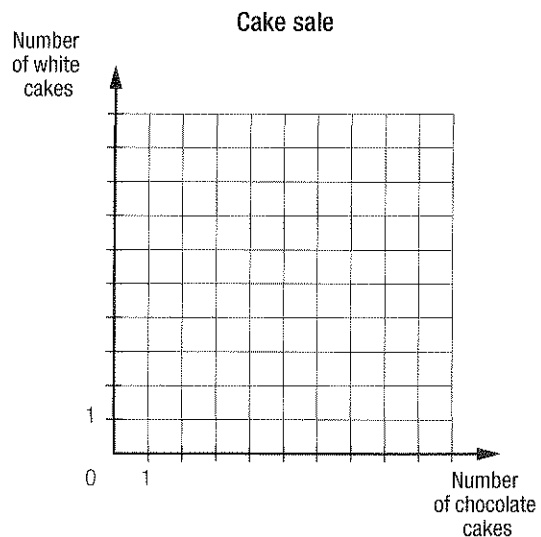
b) For a forest to be in a state of ecological balance, there should be at least three times more Virginia deer than wolves.

- 1) _____

- 2) _____



6 A pastry maker sells two kinds of cakes: chocolate cakes and white cakes. If the pastry maker sells a chocolate cake for \$20 and a white cake for \$10, her sales will be less than \$60. Find all the solutions which correspond to this situation.



Name: _____

Group: _____ Date: _____

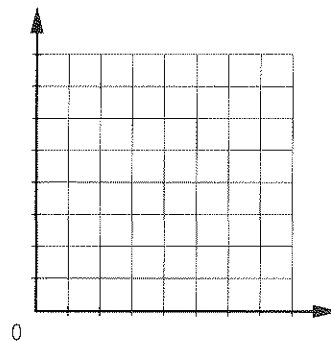
Half-planes in the Cartesian plane

1 A furniture maker sells birch dining room tables for \$800 each and matching chairs for \$200 each. The sets are always made up of four chairs and a table. The production costs are \$120 per chair and \$570 per table. Last week, production costs were \$7350. To ensure the survival of the company, the furniture maker's total sales need to amount to at least \$10,000/week.

a) How many chairs and tables were produced last week?

b) If all the furniture made over the last week has been sold, does the furniture maker ensure the survival of the company? Explain your answer.

2 A sushi counter primarily uses red tuna at a cost of \$35/kg and smoked salmon at a cost of \$24/kg. A maximum of \$120/week is budgeted for the purchase of these perishables. The sushi sold during a week uses at least 3 kg of fish. Using the adjacent Cartesian plane, illustrate the region that represents these two constraints.

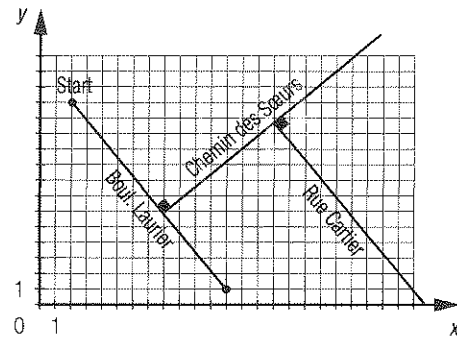


Name: _____

Group: _____ Date: _____

1 **A STROLL THROUGH TOWN** The adjacent graph shows a section of a city's streets. Your task is to determine the distance between the starting point and the intersection of rue Cartier and Chemin des Sœurs. The information regarding the three streets is as follows:

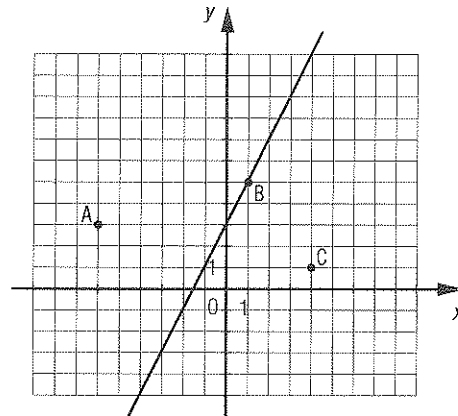
- Chemin des Sœurs divides Boulevard Laurier in a ratio of 3:2.
- Chemin des Sœurs is perpendicular to Boulevard Laurier.
- The x -coordinate of the intersection of rue Cartier and Chemin des Sœurs is 15.



Name: _____

Group: _____ Date: _____

2 **A FLYOVER BY PLANE** Three airplanes depart from a city following parallel trajectories. In the adjacent diagram, scaled in kilometres, points A, B and C represent the positions of the airplanes. The line represents the trajectory of Plane B. A region of the city is graphically defined by the inequality $-2x + 3y \leq 6$. What distance does the plane currently flying over the city have to travel before it leaves the city limits?



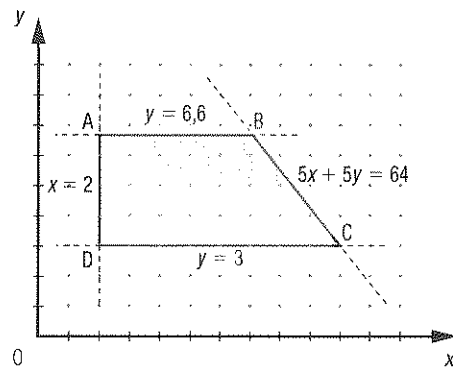
Name: _____

Group: _____ Date: _____

3 **A CLASSROOM CEILING** A classroom ceiling, in the shape of a right trapezoid, is bound by lines corresponding to the equations represented in the adjacent diagram. Tracking, perpendicular and parallel to side BC, is installed to support the suspended ceiling panels. The tracks will divide side AB into four congruent segments and side BC into five congruent segments.

The dimensions of the shape formed by the tracks that are closest to point B are believed to be approximately 1.05 u by 1.02 u by .74 u by 1.76 u.

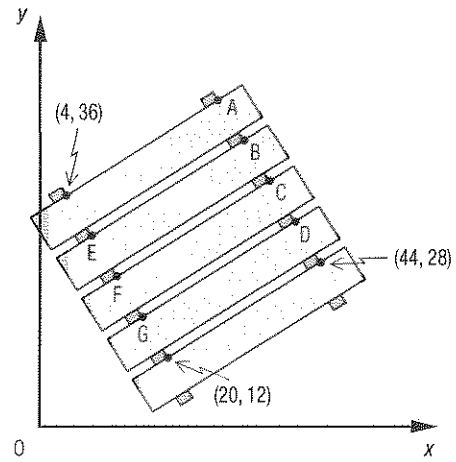
Confirm or refute this statement and justify your answer.



Name: _____

Group: _____ Date: _____

4 **A STRAIGHT FENCE** A manufacturer of wooden fence panels controls production requirements using a computer-controlled laser. This ensures that the spacing between the planks is even and that the boards are parallel to each other and perpendicular to the pieces of wood which support them. What are the coordinates of points A, B, C, D, E, F and G if production is to meet the manufacturer's requirements?



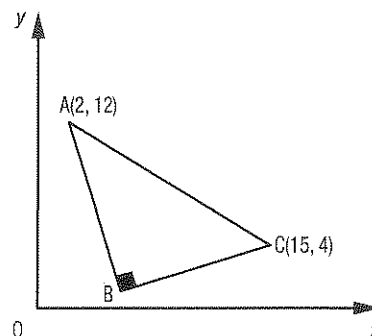
Name: _____

Group: _____ Date: _____

5 **A RIGHT-ANGLED GARDEN** The information concerning a garden, represented in the adjacent Cartesian plane, is as follows:

- The rows in which seeds will be sown are perpendicular to side AC.
- The slope of segment AB is -3 , and angle B is a right angle.

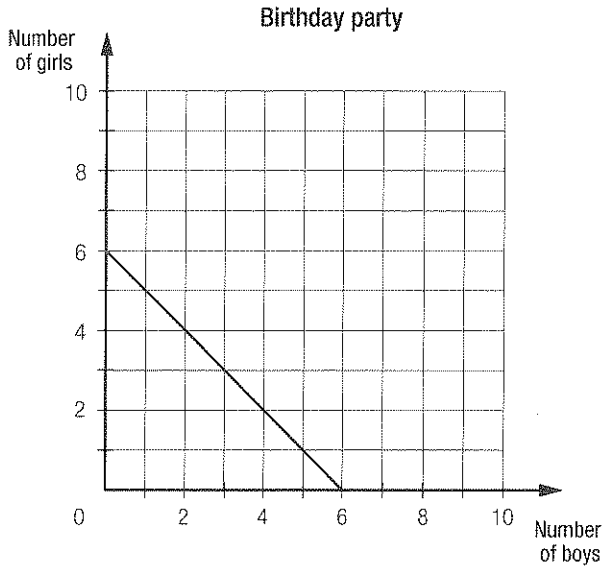
Show that the length of the garden's longest seeded row is approximately 7.51 u.



4. a) $x + y = 300$
 $x = 3y$
 b) There were 225 men and 75 women watching the game.

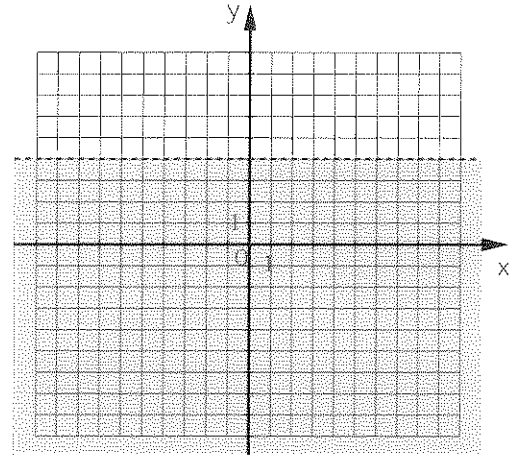
Support 1.4

5. a)

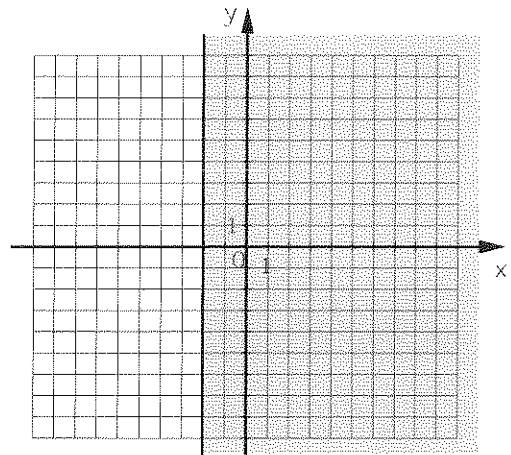


- b) Because the system of equations consists of two coinciding parallel lines, there are seven possible answers:
- 0 girls and 6 boys
 - 1 girl and 5 boys
 - 2 girls and 4 boys
 - 3 girls and 3 boys
 - 4 girls and 2 boys
 - 5 girls and 1 boy
 - 6 girls and 0 boys

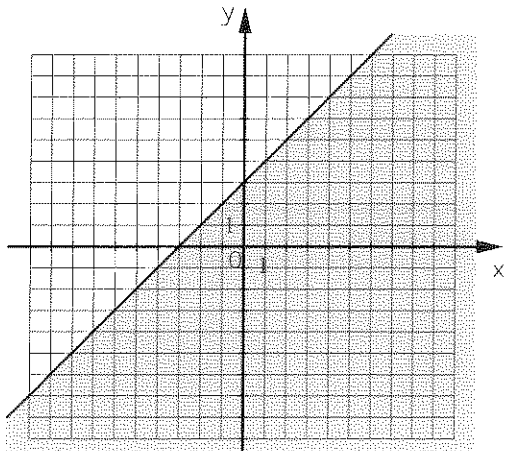
1. a)



b)



c)

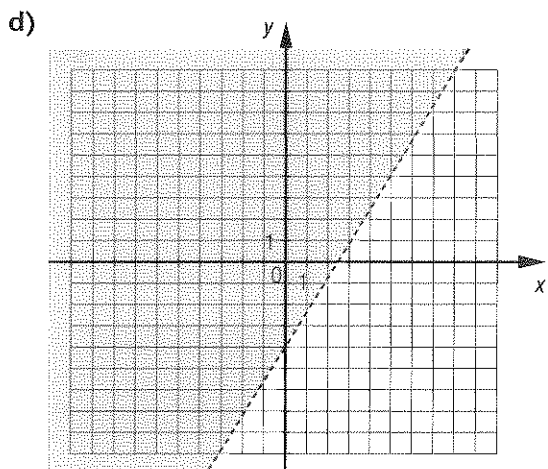


Consolidation 1.3 (cont'd)

6. $y = 3x + 0.03$ $6x + 8y = 1.38$
 7. 712 juices and 176 iced teas.
 8. 63 chickens and 162 sheep.
 9. A scented candle costs \$1.15 and an unscented candle costs \$0.65.

Enrichment 1.3

1. The pair of pants cost \$33.50, the vest costs \$14 and the skirt costs \$26.
 2. Yes, the number and duration of stops could change the positions of the cars during the race.
Several answers possible.



3. a) $y < -4x + 8$ b) $y \leq 5x + 12$
 c) $y > -2x + 3$ d) $y \geq -x + 4$
 e) $y \geq 5x + \frac{20}{3}$ f) $y < \frac{x-21}{2}$

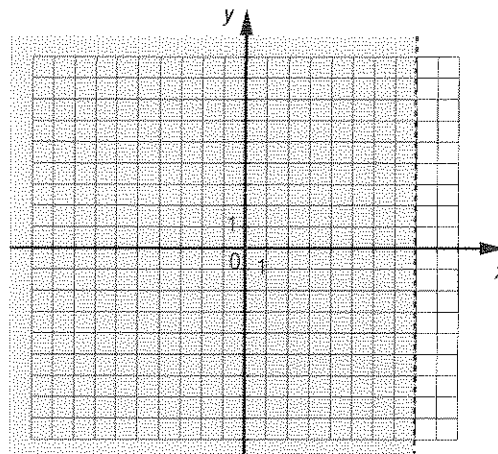
4. a) 1) x : number of \$0.25 coins
 y : number of \$2 coins
 2) $x \geq 3y$
 b) 1) x : number of goals let in by the local team's goalie
 y : number of goals let in by the opposing team's goalie
 2) $x \leq \frac{y}{2}$

$5 \leq \frac{10}{2}$ $5 < \frac{4}{2}$ $3 \leq \frac{6}{2}$

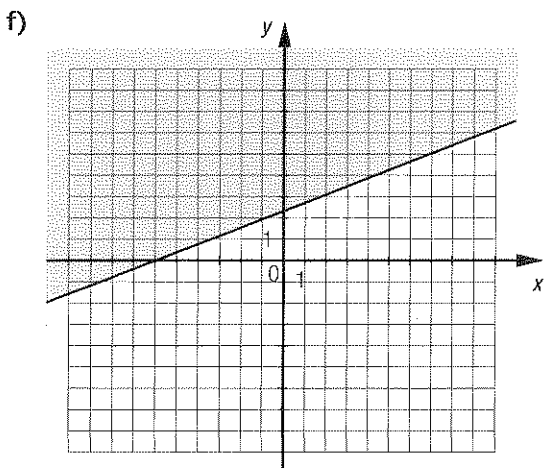
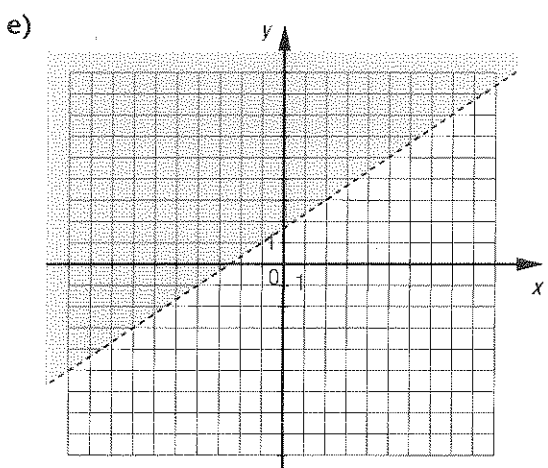
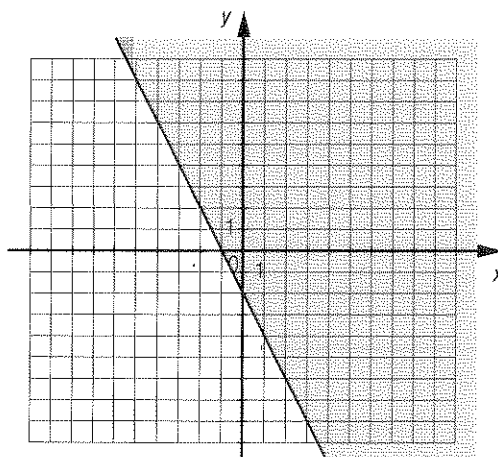
Consolidation 1.4

1. 1 E, 2 D, 3 A, 4 B, 5 F, 6 C

2. a)

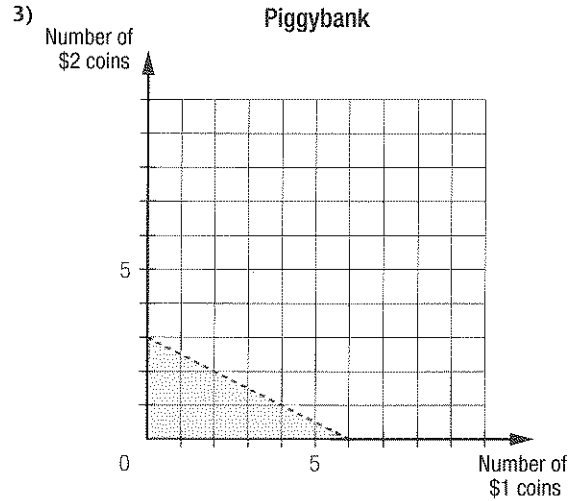
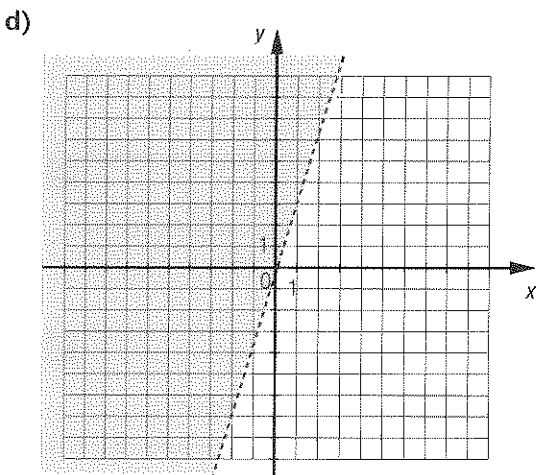
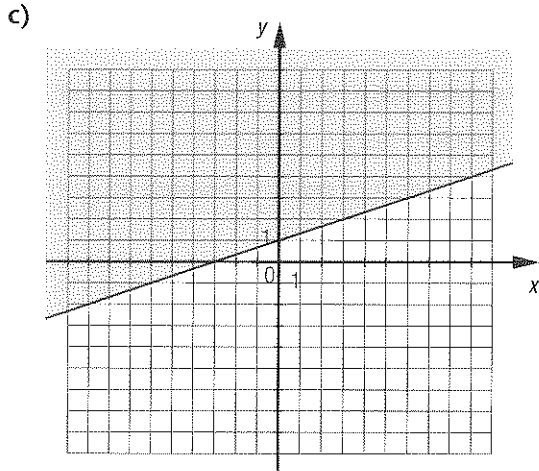


- b)



Support 1.4 (cont'd)

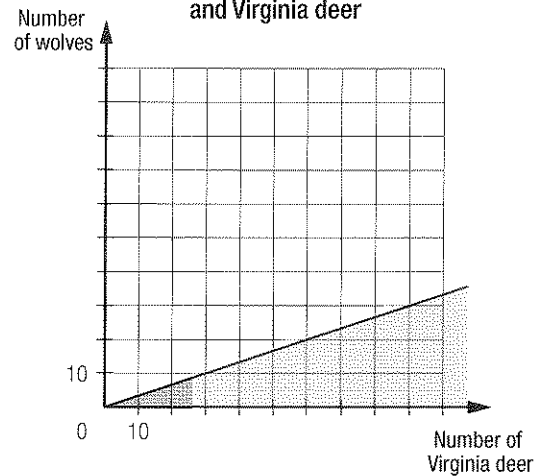
2. a) $x \geq y$ b) $y \leq 3x - 4$
 c) $5y - 2x > 234$ d) $x \geq 2y$
 e) $3x < 2y$ f) $\frac{x}{y} < 3$



b) 1) x : number of Virginia deer
 y : number of wolves

2) $x \geq 3y$

3) Population of wolves and Virginia deer



Consolidation 1.4 (cont'd)

Page 25

3. a) $y > -2.5x + 45$

b) $y \geq \frac{1}{3}x + 15$

c) $x + y \geq 0$

d) $y < 4x - 3$

4. a) x : number of 30.5 cm^2 tiles
 y : number of 40.6 cm^2 tiles

b) $930.25x + 1648.36y \geq 715,000$

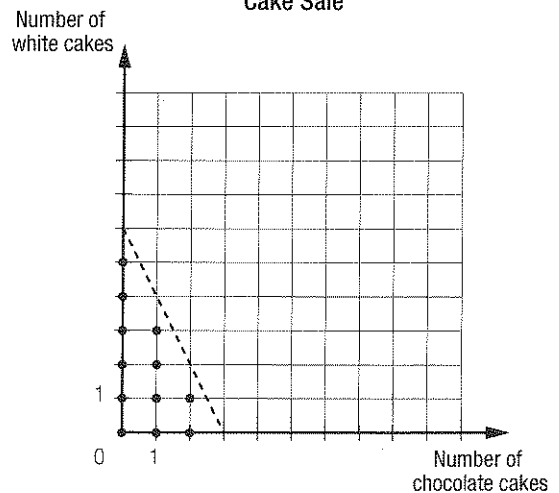
Consolidation 1.4 (cont'd)

Page 26

5. a) 1) x : number of \$1 coins
 y : number of \$2 coins

2) $x + 2y < 6$

6. Cake Sale

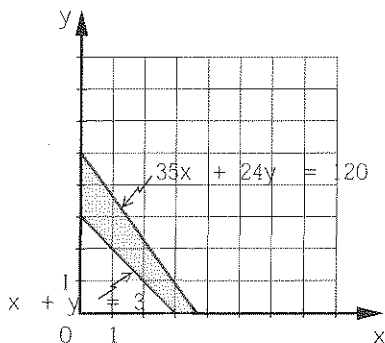


The solutions are (0, 0), (0, 1), (0, 2), (0, 3), (0, 4), (0, 5), (1, 0), (1, 1), (1, 2), (1, 3), (2, 0) and (2, 1).

Enrichment 1.4

Page 27

- 28 chairs and 7 tables were made in the last week.
 - Sales were \$11,000 which is more than the \$10,000 required to ensure the survival of the company.
- x : amount, in kg, of red tuna
 y : amount, in kg, of smoked salmon
 $x + y \geq 3$
 $35x + 24y \leq 120$.



Snapshot 1

Page 28

- ≈ 18.48 u

Snapshot 1 (cont'd)

Page 29

- ≈ 6.15 km

Snapshot 1 (cont'd)

Page 30

- The statement is true.

Several answers possible. Example:

The coordinates of points A, B and C are A(2, 6.6), B(6.2, 6.6) and C(9.8, 3).

$m \overline{AB}$ is equal to 4.2 u.

$m \overline{BC}$ is equal to $\sqrt{25.92}$ u.

The lengths of the four congruent line segments on \overline{AB} are equal to $4.2 \div 4 = 1.05$ u.

The x -coordinate at point P_1 located at $\frac{3}{4}$ of \overline{AB} is:

$$2 + \frac{3}{4}(6.2 - 2) = 5.15.$$

The y -coordinate at point P_1 located at $\frac{3}{4}$ of \overline{AB} is:

$$6.6 + \frac{3}{4}(6.6 - 6.6) = 6.6.$$

The lengths of the five congruent segments on \overline{BC} are: $25.92 \div 5 \approx 1.02$ u.

The x -coordinate at point P_2 located at $\frac{1}{5}$ of \overline{BC} is:

$$6.2 + \frac{1}{5}(9.8 - 6.2) = 6.92.$$

The y -coordinate of point P_2 located at $\frac{1}{5}$ of \overline{BC} is:

$$6.6 + \frac{1}{5}(3 - 6.6) = 5.88.$$

The equation of the line perpendicular to \overline{BC} and passing through point P_2 is $y = x - 1.04$.

The equation of the line parallel to \overline{BC} and passing through point P_1 is $y = -x + 11.75$.

The coordinates of the point of intersection P_3 of lines $y = x - 1.04$ and $y = -x + 11.75$ is (6.395, 5.355).

The distance between P_1 and P_3 is about 1.76 u.

The distance between P_2 and P_3 is about 0.74 u.

Snapshot 1 (cont'd)

Page 31

- A(28, 52), B(32, 46), C(36, 40), D(40, 34), E(8, 30), F(12, 24), G(16, 18)

Snapshot 1 (cont'd)

Page 32

- Several answers possible. Example:

The equation for segment AB is $y = -3x + 18$.

The equation for segment BC is $y = \frac{1}{3}x - 1$.

The coordinates of point B are $(\frac{57}{10}, \frac{9}{10})$.

The equation for segment AC is $y = \frac{8}{13}x + \frac{172}{13}$.

The equation of segment BD is $y = \frac{13}{8}x - \frac{669}{80}$,

where D is located on segment AC such that segment BD is perpendicular to line segment AC.

The coordinates of point D are

$$(\frac{22\ 457}{2330}, \frac{110\ 552}{15\ 145}).$$

The distance from point B to point D is about 7.51 u.

Snapshot 1 (cont'd)

Page 33

- It is possible to make 2 parking spaces.