

1. Solve the following systems using the appropriate method.

a)
$$\begin{cases} 3x + 2y = -5 \\ 5x + 3y = -7 \end{cases}$$

$S = \{(1, -4)\}$

b)
$$\begin{cases} x = 3y - 8 \\ x = \frac{1}{2}y - 3 \end{cases}$$

$S = \{(-2, 2)\}$

c)
$$\begin{cases} 3x + y = -4 \\ x = 2y - 13 \end{cases}$$

$S = \{(-3, 5)\}$

d)
$$\begin{cases} y = -2x - 3 \\ 5x + y = -3 \end{cases}$$

$S = \{(0, -3)\}$

e)
$$\begin{cases} y = 4x + \frac{1}{2} \\ y = 2x + 1 \end{cases}$$

$S = \left\{ \left(\frac{1}{4}, \frac{3}{2} \right) \right\}$

f)
$$\begin{cases} 4x + 3y = -28 \\ 3x - 2y = 13 \end{cases}$$

$S = \{(-1, -8)\}$

2. In each of the following situations,

1. identify the variables;
2. write a system of two-variable first degree equations;
3. determine the solution of the system.

a) In a real estate project, there are three times as many condominiums as single-family houses. There is a total of 240 homes. How many condominiums are there?

<i>x</i> : number of condominiums	$x = 3y$
<i>y</i> : number of single-family houses	$x + y = 240$

There are 180 condominiums.

b) In a warehouse, there are 1250 boxes. Each small box occupies a volume of 7 dm³ and each large box occupies a volume of 45 dm³. The total volume occupied by the boxes is 42 950 dm³. How many boxes of each size are there?

<i>x</i> : number of small boxes	$x + y = 1250$
<i>y</i> : number of large boxes	$7x + 45y = 42\,950$

There are 350 small boxes and 900 large boxes.

c) Determine the area of a rectangle if its length is 5 m more than twice its width and the perimeter of the rectangle is equal to 37 m.

<i>x</i> : length	$x = 2y + 5$
<i>y</i> : width	$2x + 2y = 37$

The area of the rectangle is equal to 63 m².

d) A car rental agency offers two options. The 1st one consists in paying a \$30 fixed amount and a \$0.08 amount per kilometre. The 2nd consists in paying a \$20 fixed amount and a \$0.10 amount per kilometre. Determine the number of kilometres that we must travel so that both options carry the same cost.

<i>x</i> : number of kilometres	$y = 0.08x + 30$
<i>y</i> : rental cost	$y = 0.10x + 20$

The number of kilometres traveled so that the cost is the same is 500.

