

## Tema 5: Sistemas de ecuaciones e inecuaciones.

NOTA: Si encuentras algún posible error en las soluciones de estos ejercicios comunica número de ejercicio y apartado a la dirección de correo sansamates@hotmail.com indicando en el asunto del mismo "Error en la relación de ejercicios del Tema 5 de 4º ESO Opción B"

1.- Resuelve los siguientes sistemas de ecuaciones lineales:

$$\text{a) } \left. \begin{array}{l} 22x + 17y = 49 \\ 31x - 26y = 101 \end{array} \right\}$$

$$\text{i) } \left. \begin{array}{l} \frac{x+y}{2} = 15 - \frac{x-y}{3} \\ x - \frac{2y}{5} = 12 \end{array} \right\}$$

$$\text{b) } \left. \begin{array}{l} 2x - y = 4 \\ 4x + 3y = -7 \end{array} \right\}$$

$$\text{j) } \left. \begin{array}{l} 3x + \frac{y}{5} = 15 \\ 4y - \frac{31}{4}x = 29 \end{array} \right\}$$

$$\text{c) } \left. \begin{array}{l} x + 2y = -1 \\ 3x - y = -\frac{5}{4} \end{array} \right\}$$

$$\text{k) } \left. \begin{array}{l} \frac{x}{2} - \frac{x+y}{6} = \frac{11}{6} \\ \frac{2x-3y}{5} - \frac{1}{10} = \frac{33}{10} \end{array} \right\}$$

$$\text{d) } \left. \begin{array}{l} 3x - 2y = 2 \\ x + 4y = -\frac{5}{3} \end{array} \right\}$$

$$\text{l) } \left. \begin{array}{l} 2x + 4y = 7 \\ \frac{x}{3} - \frac{2x-5y}{6} = \frac{5}{4} \end{array} \right\}$$

$$\text{e) } \left. \begin{array}{l} \frac{1}{3}(x+1) + y = 1 \\ \frac{1}{4}(x-3) + 2y = 1 \end{array} \right\}$$

$$\text{m) } \left. \begin{array}{l} 2x - \frac{3x-y}{5} = \frac{22}{5} \\ \frac{y}{3} + \frac{4x-3y}{4} = \frac{31}{12} \end{array} \right\}$$

$$\text{f) } \left. \begin{array}{l} \frac{1}{2}(x+1) + \frac{1}{4}(y-1) = \frac{3}{2} \\ \frac{1}{4}(x+1) - \frac{1}{2}(y-1) = \frac{3}{4} \end{array} \right\}$$

$$\text{n) } \left. \begin{array}{l} \frac{x}{2} - \frac{1}{3}(x-y) = \frac{1}{6} \\ \frac{1}{4} + y - \frac{1}{6}(2x-5y) = \frac{19}{12} \end{array} \right\}$$

$$\text{g) } \left. \begin{array}{l} \frac{x+3}{2} + \frac{y+3}{4} = 1 \\ \frac{1-x}{2} - \frac{2-y}{6} = 1 \end{array} \right\}$$

$$\text{ñ) } \left. \begin{array}{l} 2x + y = 5 \\ \frac{x}{2} - \frac{4x-y}{6} = \frac{1}{3} \end{array} \right\}$$

$$\text{h) } \left. \begin{array}{l} x + 3y = 9 \\ \frac{x^2 - 2y + 3}{x-1} = 3 + x \end{array} \right\}$$

$$\text{o) } \left. \begin{array}{l} \frac{x}{2} - \frac{1}{3}(x+3y) = \frac{3}{2} \\ \frac{1}{6}(2x+y) - \frac{x}{4} = \frac{1}{12} \end{array} \right\}$$

2.- Resuelve los siguientes sistemas de ecuaciones no lineales:

$$\text{a) } \begin{cases} x - y = 15 \\ x \cdot y = 100 \end{cases}$$

$$\text{b) } \begin{cases} x^2 + xy + y^2 = 21 \\ x + y = 1 \end{cases}$$

$$\text{c) } \begin{cases} 2x - y - 1 = 0 \\ x^2 - 7 = y + 2 \end{cases}$$

$$\text{d) } \begin{cases} x + y = 18 \\ xy = y + 6x + 4 \end{cases}$$

$$\text{e) } \begin{cases} y + 8 = x^2 \\ y - 2x = 0 \end{cases}$$

$$\text{f) } \begin{cases} x + y = 1 \\ xy + 2y = 2 \end{cases}$$

$$\text{g) } \begin{cases} 2x + y = 3 \\ x^2 + y^2 = 2 \end{cases}$$

$$\text{h) } \begin{cases} 2x + y = 3 \\ xy - y^2 = 0 \end{cases}$$

$$\text{i) } \begin{cases} x - y = 1 \\ x^2 + y^2 = 11 - 3x \end{cases}$$

$$\text{j) } \begin{cases} 2x + y = 2 \\ xy - y^2 = 0 \end{cases}$$

$$\text{k) } \begin{cases} \frac{x+y}{2} - x = 1 \\ \frac{x-y}{2} + x^2 = 0 \end{cases}$$

$$\text{l) } \begin{cases} y = x^2 + 4x - 1 \\ y = 2x + 2 \end{cases}$$

$$\text{m) } \begin{cases} x + y = 5 \\ x^2 y^2 = 36 \end{cases}$$

$$\text{n) } \begin{cases} y^2 - 2y + 1 = x \\ \sqrt{x} + y = 5 \end{cases}$$

$$\text{ñ) } \begin{cases} x^2 + y^2 = 34 \\ x^2 - y^2 = 16 \end{cases}$$

$$\text{o) } \begin{cases} 2\sqrt{x+1} = y + 1 \\ 2x - 3y = 1 \end{cases}$$

3.- Resuelve los siguientes sistemas de inecuaciones con una incógnita:

$$\text{a) } \begin{cases} x - 2 > 0 \\ x + 3 > 0 \end{cases}$$

$$\text{b) } \begin{cases} 3 - x > 0 \\ 3 + x > 0 \end{cases}$$

$$\text{c) } \begin{cases} x + 1 > 0 \\ x - 5 \leq 0 \end{cases}$$

$$\text{d) } \begin{cases} x \geq 0 \\ 1 - x < 0 \end{cases}$$

$$\text{e) } \begin{cases} x - 4 \leq 0 \\ x + 1 > 0 \end{cases}$$

$$\text{f) } \begin{cases} x + 3 \geq 0 \\ 2x - 5 \leq 0 \end{cases}$$

$$\text{g) } \begin{cases} x + 4 > 0 \\ 2x - 3 \leq 1 \end{cases}$$

$$\text{h) } \begin{cases} x - 1 \geq 0 \\ x + 2 < 0 \end{cases}$$

4.- Resuelve los siguientes sistemas de inecuaciones con dos incógnitas:

$$\text{a) } \begin{cases} 1 < x + y < 5 \\ 2x - y < 3 \\ x > 0 \\ 1 < y < 4 \end{cases}$$

$$\text{b) } \begin{cases} x + 2y \geq 4 \\ 2x + y \geq 5 \end{cases}$$

$$\text{h) } \begin{cases} 2x + 3y > 6 \\ 2x - y < 6 \end{cases}$$

$$\text{i) } \begin{cases} 3x - y \geq -2 \\ 2x + y \geq 2 \end{cases}$$

$$c) \begin{cases} x + 4y < 16 \\ 3x - 2y < 6 \end{cases}$$

$$d) \begin{cases} x + y > 2 \\ x + y < 5 \end{cases}$$

$$e) \begin{cases} x \leq 0 \\ y \geq 0 \end{cases}$$

$$f) \begin{cases} x > 2 \\ y > 2 \\ x < 5 \\ y < 5 \end{cases}$$

$$g) \begin{cases} x - y \leq 3 \\ x + y \geq 5 \end{cases}$$

$$j) \begin{cases} x + y \geq 5 \\ x - y \leq 3 \end{cases}$$

$$k) \begin{cases} x \geq 0 \\ y \geq 0 \\ x + y \geq 2 \\ x + y \leq 5 \end{cases}$$

$$l) \begin{cases} y \geq 0 \\ 3x + 2y \geq 6 \\ -3x + 4y \leq 12 \end{cases}$$

$$m) \begin{cases} x + y \leq 4 \\ 3x + y \leq 6 \end{cases}$$

$$n) \begin{cases} x + 4y \leq 16 \\ 3x - 2y \geq 6 \end{cases}$$

5.- Resuelve los siguientes sistemas de ecuaciones no lineales:

$$a) \begin{cases} \sqrt{3(x+y)} + x = 12 \\ 2x - y = 6 \end{cases}$$

$$b) \begin{cases} \sqrt{x+3y} - 1 = \sqrt{4y+2x} \\ y + x = -5 \end{cases}$$

$$c) \begin{cases} xy = 6 \\ 3x - 2y = 0 \end{cases}$$

$$d) \begin{cases} xy = 4 \\ x^2 + y^2 = 17 \end{cases}$$

$$e) \begin{cases} y = x^2 - 6x + 7 \\ y = x - 3 \end{cases}$$

$$f) \begin{cases} x^2 + y^2 - 4x - 6y + 11 = 0 \\ x^2 + y^2 - 6x - 8y + 21 = 0 \end{cases}$$

$$g) \begin{cases} 2x + 2y = 22 \\ xy = 28 \end{cases}$$

$$h) \begin{cases} xy = 3 \\ x^2 + y^2 - 4x - 4y + 6 = 0 \end{cases}$$

6.- Resuelve los siguientes sistemas de inecuaciones:

$$a) \begin{cases} 2x + 3 > 1 \\ 4x + 5 \leq 9 + 3x \end{cases}$$

$$b) \begin{cases} -13x + 21 \leq 2 - 3(5x - 7) \\ x + 2(3x - 5) > 6x - 7 \end{cases}$$

$$d) \begin{cases} x < 0 \\ y > -1 \\ 2x - y \geq 0 \end{cases}$$

$$e) \begin{cases} x + y \geq 2 \\ x + y < 5 \\ x > 1 \\ y < 2 \end{cases}$$

$$\text{c) } \left. \begin{array}{l} x \geq 2 \\ 2x - y < 3 \end{array} \right\}$$

$$\text{f) } \left. \begin{array}{l} 2x - 3y \leq 3 \\ x - 5y > -2 \\ -8 < x < -3 \\ y < -1 \end{array} \right\}$$

SOLUCIONES:

1.-

a)  $x = \frac{2291}{1099}; y = -\frac{703}{1099}$

b)  $x = \frac{1}{2}; y = -3$

c)  $x = \frac{1}{2}; y = -\frac{1}{4}$

d)  $x = \frac{1}{3}; y = -\frac{1}{2}$

e)  $x = -1; y = 1$

f)  $x = 2; y = 1$

g)  $x = -2; y = -1$

h)  $x = 0; y = 3$

i)  $x = 24; y = 30$

j)  $x = 4; y = 15$

k)  $x = 4; y = -3$

l)  $x = \frac{1}{2}; y = \frac{3}{2}$

m)  $x = 3; y = 1$

n)  $x = -\frac{1}{3}; y = \frac{2}{3}$

ñ)  $x = 1; y = 3$

o)  $x = 3; y = -1$

2.-

a)  $x_1 = 20; y_1 = 5$   
 $x_2 = -5; y_2 = -20$

b)  $x_1 = -4; y_1 = 5$   
 $x_2 = 5; y_2 = -4$

c)  $x_1 = -2; y_1 = -5$   
 $x_2 = 4; y_2 = -9$

d)  $x_1 = 2; y_1 = 16$   
 $x_2 = 11; y_2 = 7$

e)  $x_1 = 4; y_1 = 8$   
 $x_2 = -2; y_2 = -4$

f)  $x_1 = 0; y_1 = 1$   
 $x_2 = -1; y_2 = 2$

g)  $x_1 = \frac{7}{5}; y_1 = \frac{1}{5}$   
 $x_2 = 1; y_2 = 1$

h)  $x_1 = \frac{3}{2}; y_1 = 0$   
 $x_2 = 1; y_2 = 1$

$x_1 = 2; y_1 = 1$   
i)  $x_2 = -\frac{5}{2}; y_2 = -\frac{7}{2}$

$x_1 = 1; y_1 = 0$   
j)  $x_2 = \frac{2}{3}; y_2 = \frac{2}{3}$

k)  $x_1 = 1; y_1 = 3$   
 $x_2 = -1; y_2 = 1$

l)  $x_1 = -3; y_1 = -4$   
 $x_2 = 1; y_2 = 4$

m)  $x_1 = 2; y_1 = 3$   
 $x_2 = 3; y_2 = 2$

n)  $x = 4; y = 3$

$x_1 = 5; y_1 = 3$   
ñ)  $x_2 = 5; y_2 = -3$   
 $x_3 = -5; y_3 = 3$   
 $x_4 = -5; y_4 = -3$

o)  $x_1 = 8; y_1 = 5$   
 $x_2 = -1; y_2 = -1$

3.-

a)  $x \in (2, \infty)$

b)  $x \in (-3, 3)$

c)  $x \in (-1, 5]$

d)  $x \in [1, \infty)$

e)  $x \in (-1, 4]$

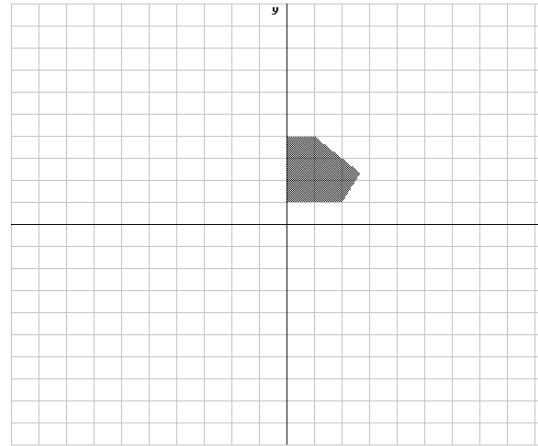
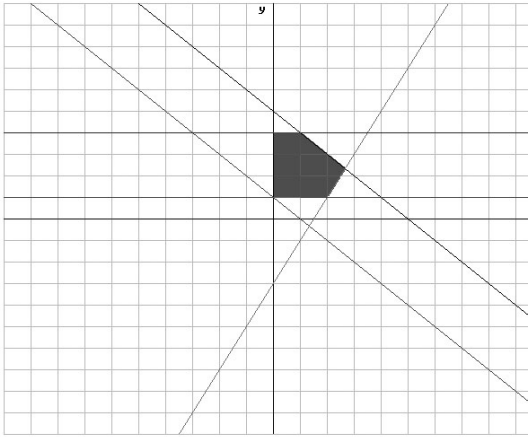
f)  $x \in \left[-3, \frac{5}{2}\right]$

g)  $x \in \left(-4, \frac{3}{2}\right]$

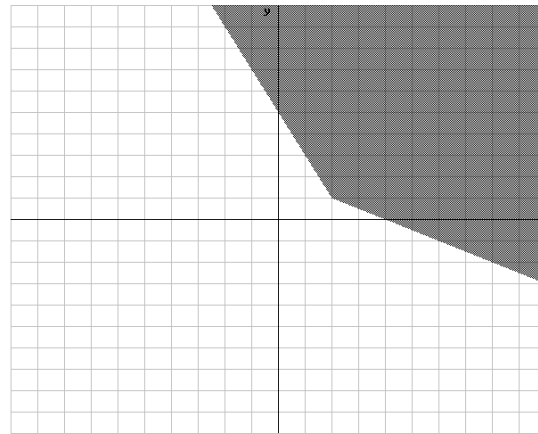
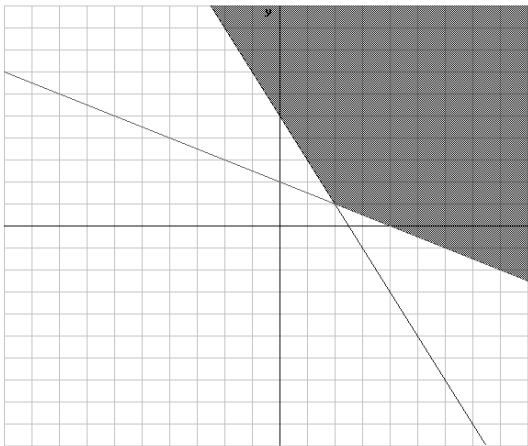
h)  $x \in \emptyset$

4.-

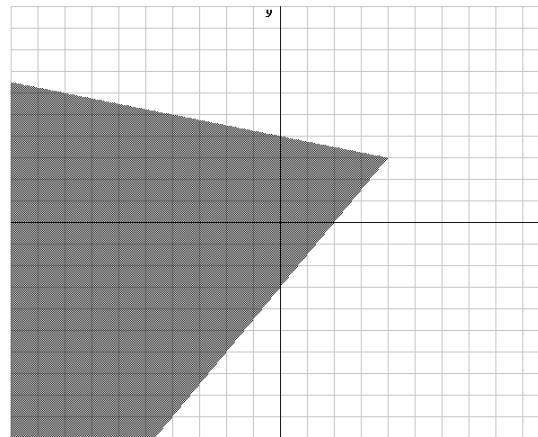
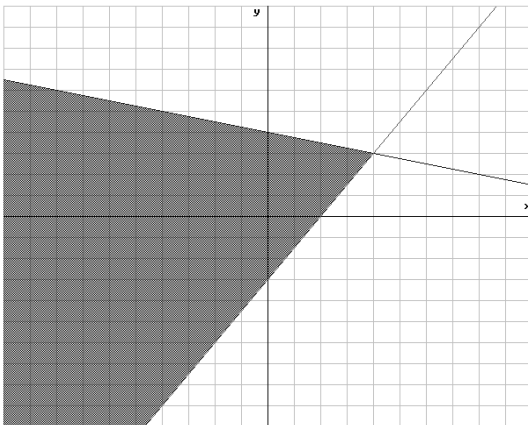
a)



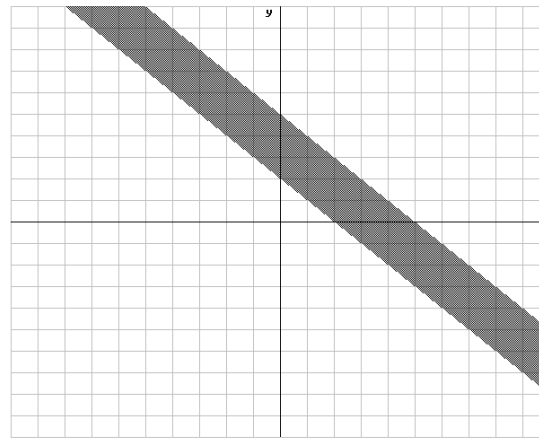
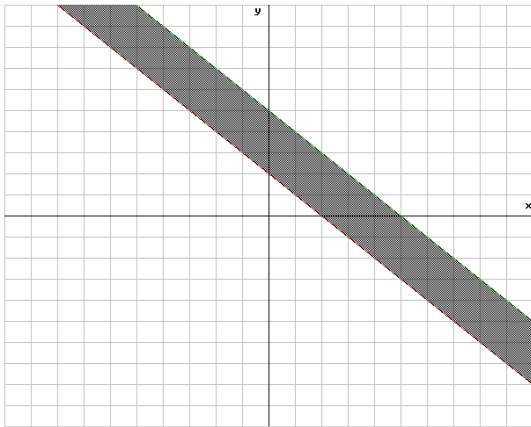
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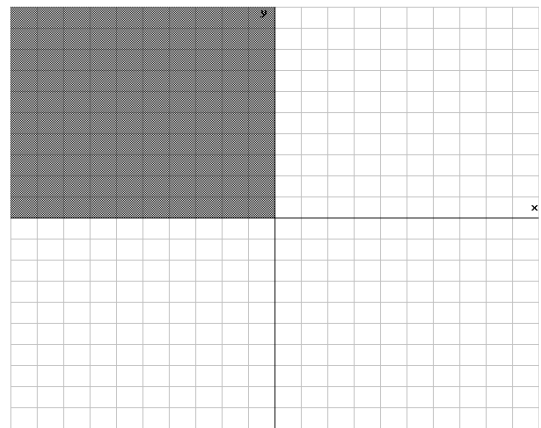
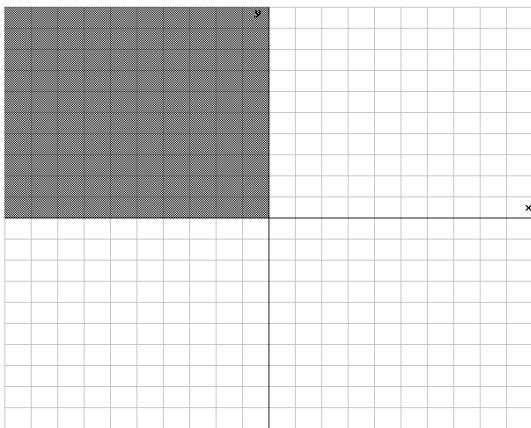
c)



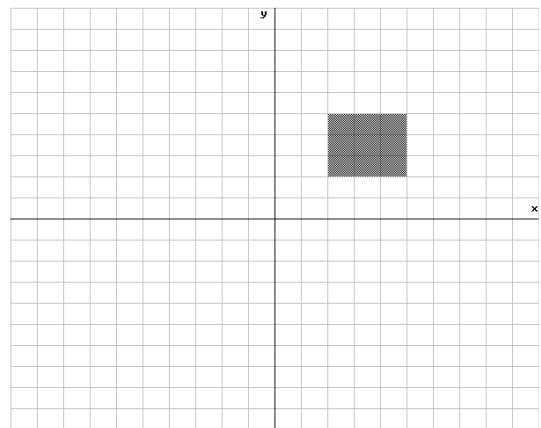
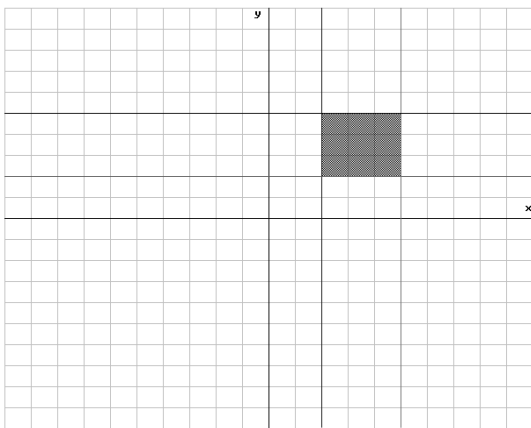
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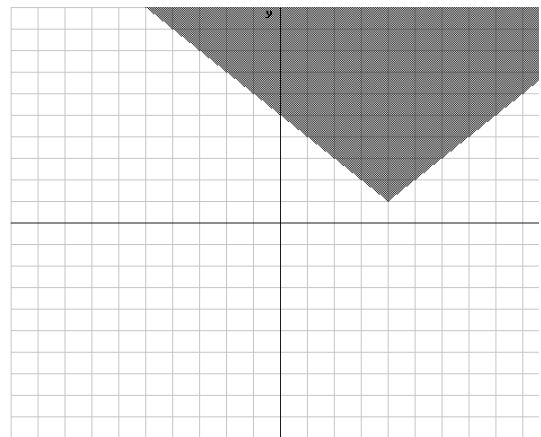
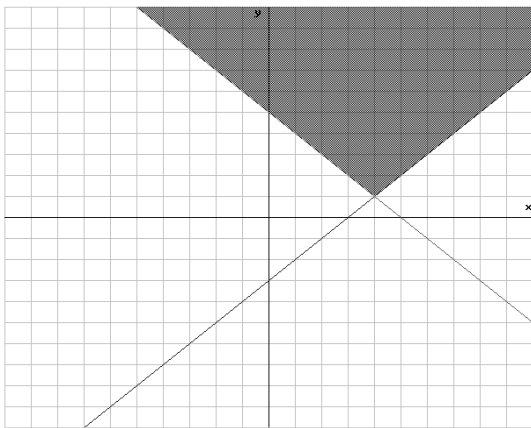
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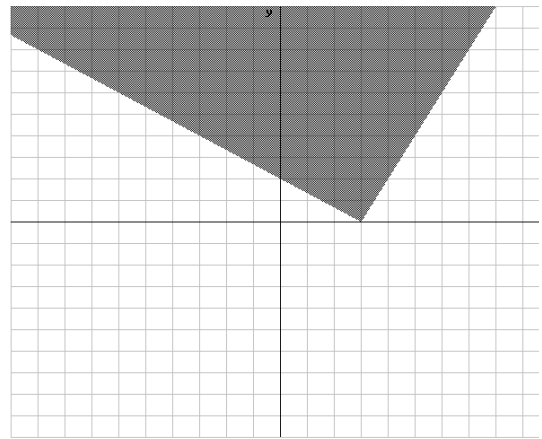
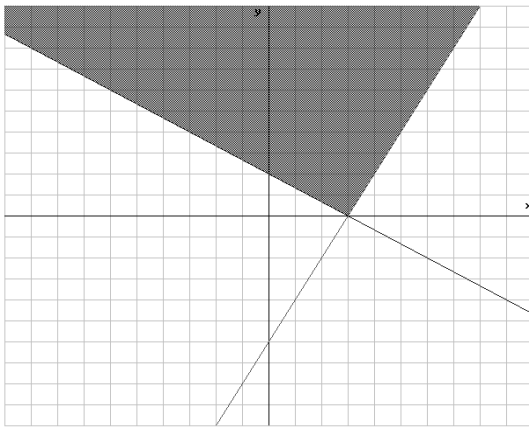
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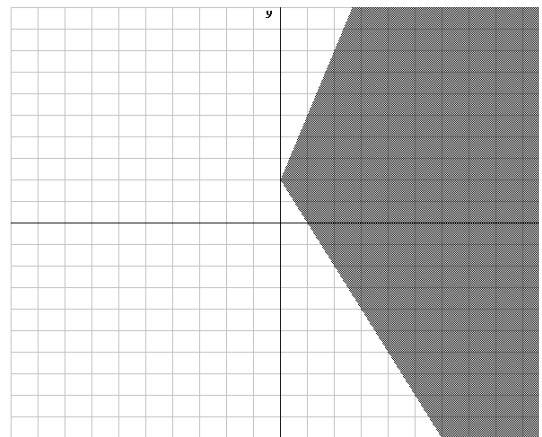
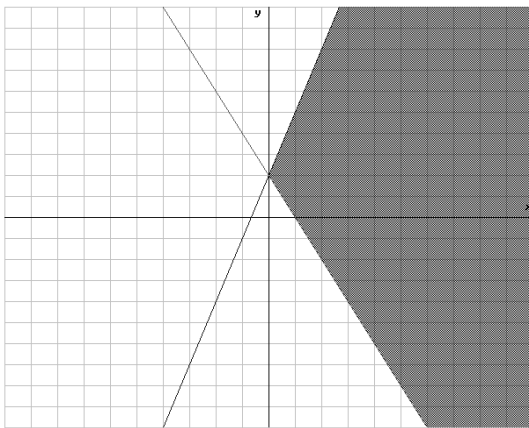
g)



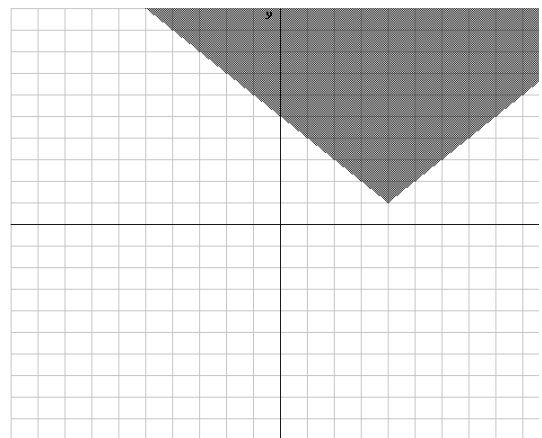
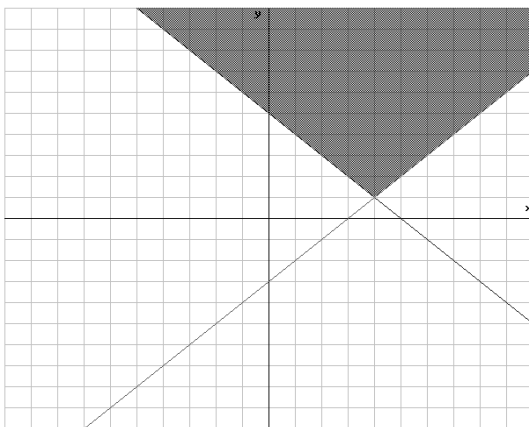
h)



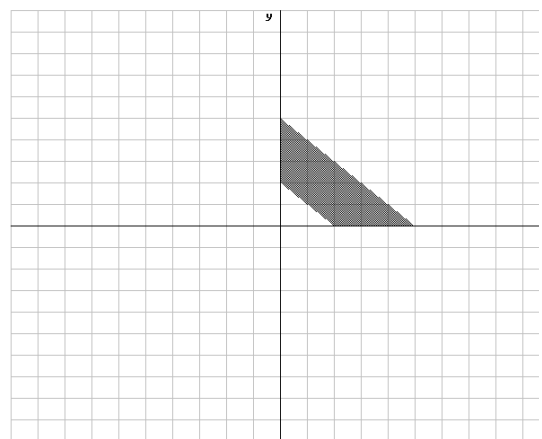
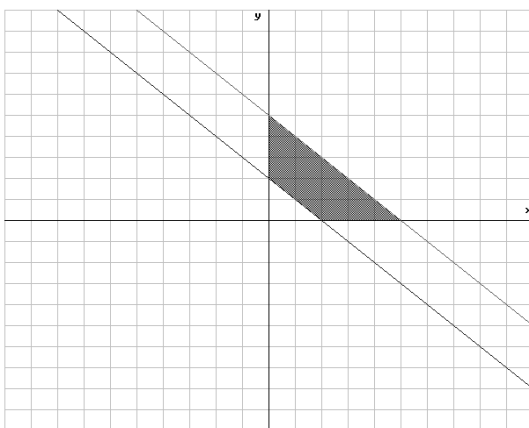
i)



j)

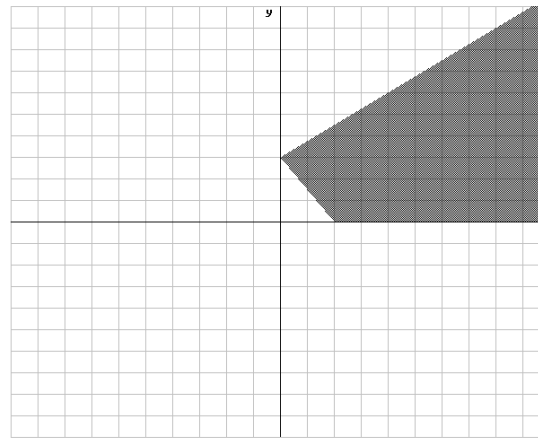
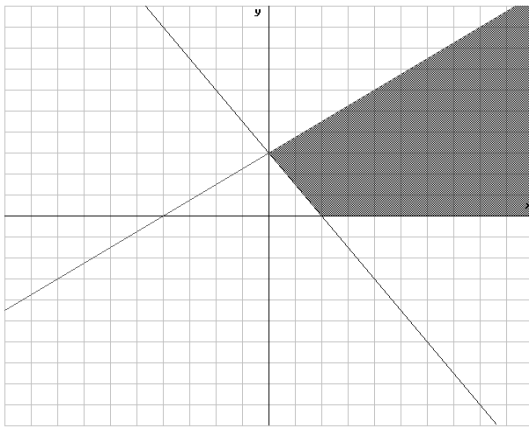


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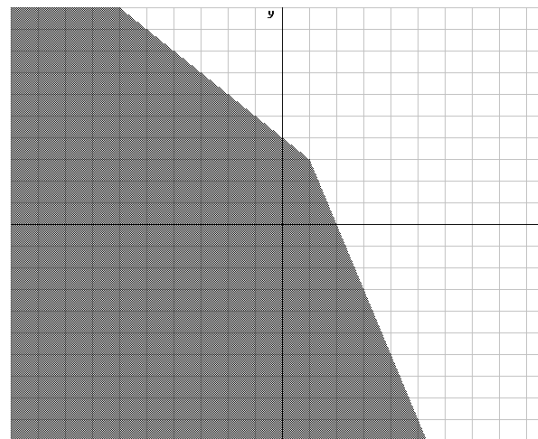
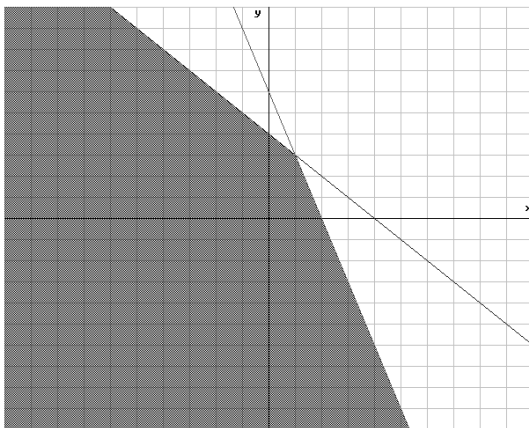




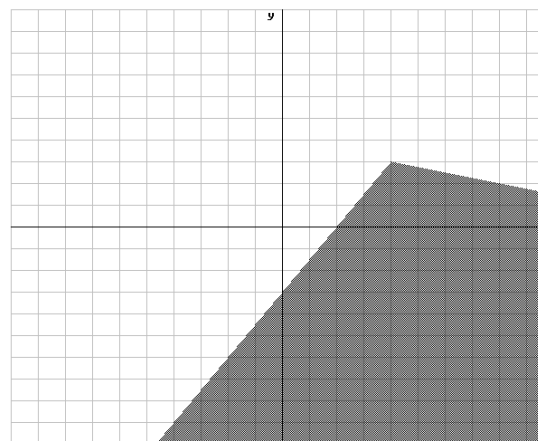
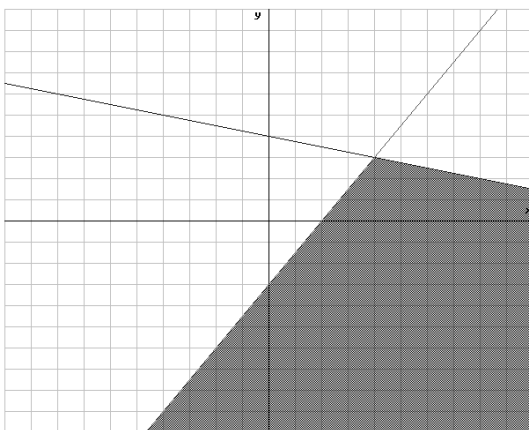
l)



m)



n)



5.-

a)  $x = 6; y = 6$

b)  $x = -12; y = 7$

c)  $x_1 = -2; y_1 = -3$   
 $x_2 = 2; y_2 = 3$

e)  $x_1 = 5; y_1 = 2$   
 $x_2 = 2; y_2 = -1$

f)  $x_1 = 3; y_1 = 2$   
 $x_2 = 1; y_2 = 4$

g)  $x_1 = 7; y_1 = 4$   
 $x_2 = 4; y_2 = 7$

$$x_1 = -4; y_1 = -1$$

$$d) \quad x_2 = 4; y_2 = 1$$

$$x_3 = -1; y_3 = -4$$

$$x_4 = 1; y_4 = 4$$

$$h) \quad x_1 = 3; y_1 = 1$$

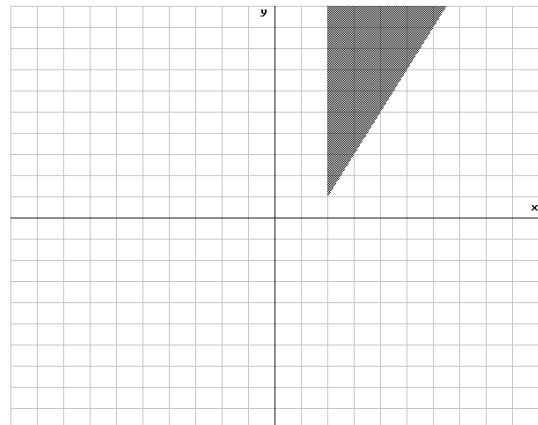
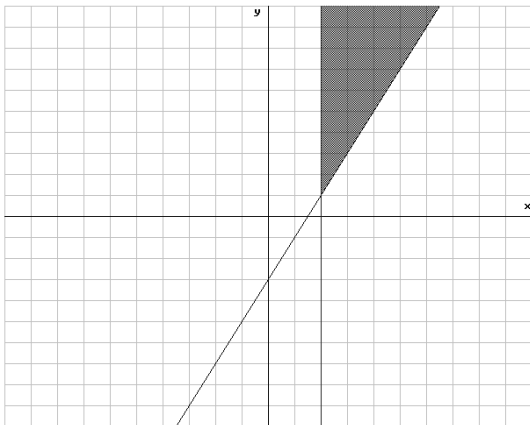
$$x_2 = 1; y_2 = 3$$

6.-

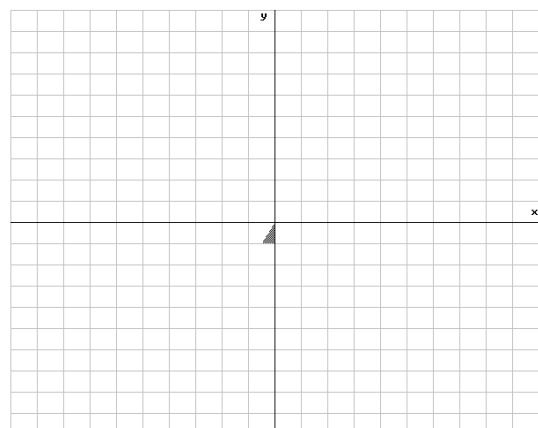
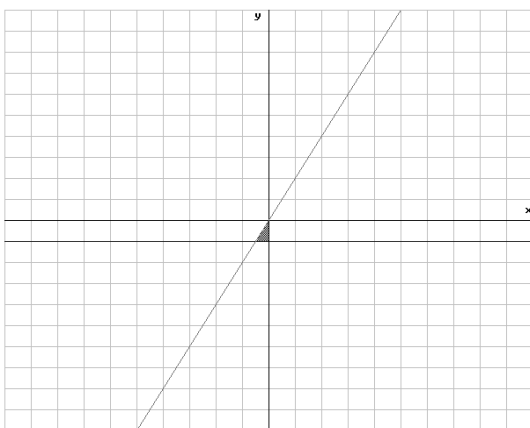
$$a) \quad x \in (-1, 4]$$

$$b) \quad x \in \emptyset$$

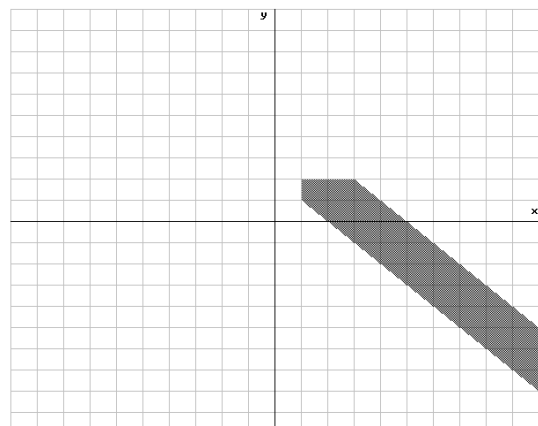
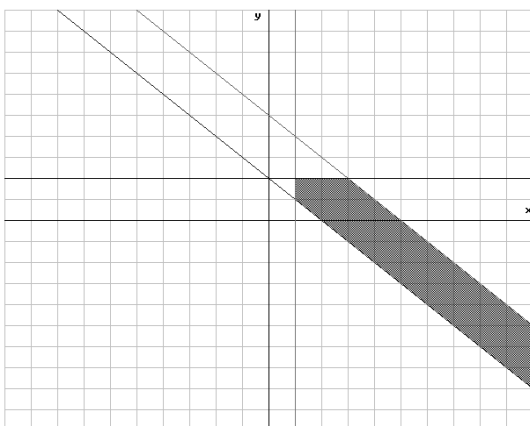
c)



d)



e)



f)

