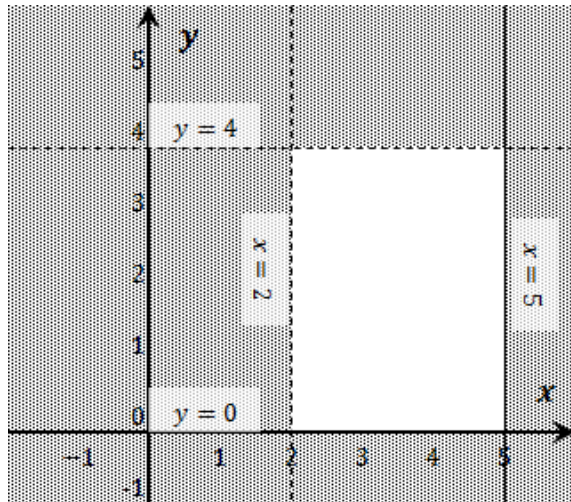


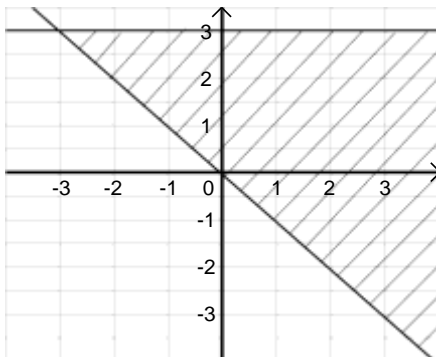
# 15 Inequalities

## Simultaneous linear inequalities in one variable

2009-21.



2008-20.



2004-11.

Find the equations of 3 lines

$$y = 0$$

$$x = -1$$

$$y = -x$$

$$\therefore \begin{cases} y \geq 0 \\ x \geq -1 \\ y \leq -x \end{cases} \dots \text{Answer}$$

## Simultaneous linear inequalities in two variable

2012-18.

$$(i) x \geq 1$$

$$(ii) y \geq 0$$

$$(iii) (0,3), (3,0)$$

This line passes through (0,3), (3,0)

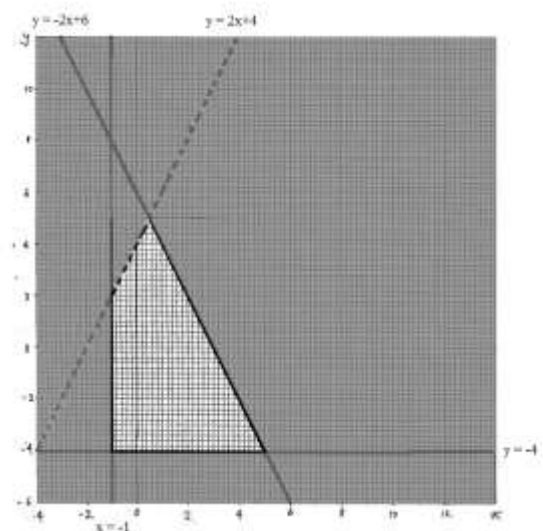
$$\text{So, gradient} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3}{3} = -1$$

$$y = mx + c$$

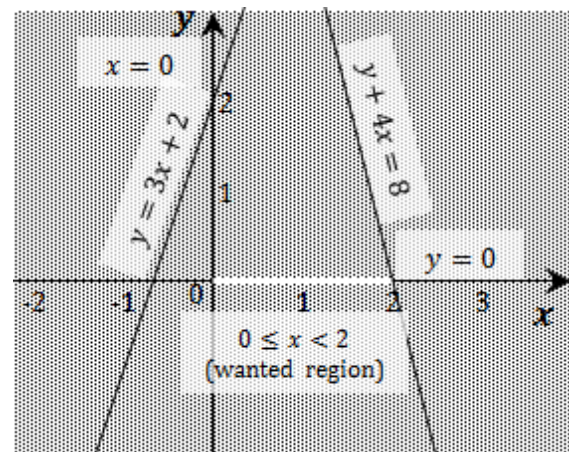
$$y = -x + 3$$

$$\therefore \begin{cases} x \geq 1 \\ y \geq 0 \\ y < -x + 3 \text{ (or } x + y < 3) \end{cases} \dots \text{Answer}$$

2011-18.



2010-19.



**2007-20.**

From graph,

$$\begin{cases} y \geq 0 \\ y \leq 4 - 2x \\ y \leq x \end{cases} \quad \dots \text{ Answer}$$

“ $x \geq 0$ ” is unnecessary. Because , in this question , “Write the 3 inequalities” is written.

**2005-14.**

Chikins = hens + cocks

Now, let hens be  $x$  ,and let cocks be  $y$ .

$$\therefore \begin{cases} x + y \leq 70 \\ 0 \leq x < 30 \\ 0 \leq y \leq 70 \end{cases} \quad \dots \text{ Answer}$$

### Linear programming

**2007-17.**

Let the maximum value of  $5x - 4y + 8$  to be  $C_{max}$

$$\Leftrightarrow 5x - 4y + 8 = C_{max}$$

$$\Leftrightarrow 4y = 5x + 8 - C_{max}$$

$$\Leftrightarrow y = \frac{5}{4}x + \frac{1}{4}(8 - C_{max})$$

The  $y$  – intercept of this line is  $\frac{1}{4}(8 - C_{max})$  .

When the value of  $\frac{1}{4}(8 - C_{max})$  is minimum ,  $C_{max}$  is maximum .

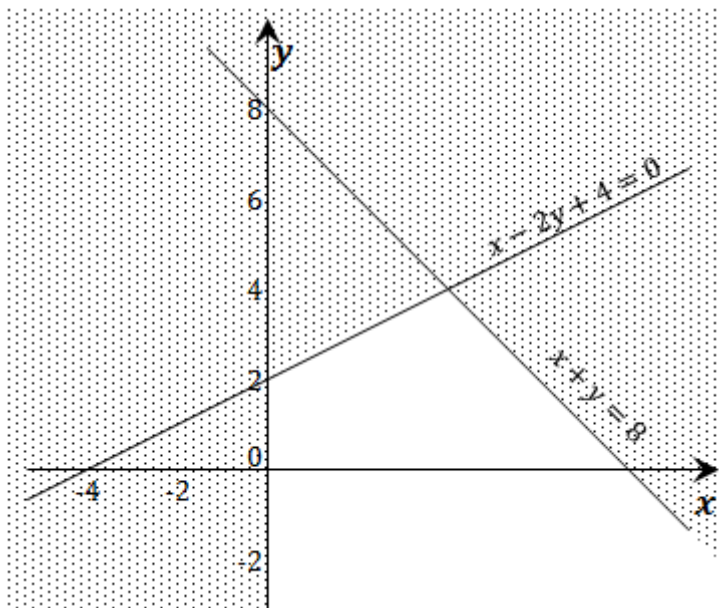
This line has a positive gradient.

So , when this line passes through the point ( 4 , 1 ) , it gets the maximum value.

Therefore, when  $x = 4$  ,  $y = 1$  ,

$$5 \times 4 - 4 \times 1 + 8 = 24 \quad \dots \text{ Answer}$$

**2006-18.**



**2003-18.**

(i) Make a scale of 2 cm to represent 1 units on the x-axis and y-axis

(ii) Make  $y$  the subject for  $x + y < 2$ .

$$x + y < 2$$

$$y < -x + 2$$

(iii) Draw the three graphs for  $x = -1$ ,  $y = -2$ ,  $y = -x + 2$

\*Use the dot-line to draw them in order to show that the answer is excluding the values on the lines.

(iv) Fill the area for the following condition.

$$x > -1 \quad (\text{Right side of } x = -1)$$

$$y > -2 \quad (\text{Above } y = -2)$$

$$y < -x + 2 \quad (\text{Under } y = -x + 2)$$

