

### A3.8 – Sketching regions

The quickest and easiest way to graph the solution of a linear inequation, is to plot its intercepts and then draw the line passing through these points, then test a point for the required region or half-plane.

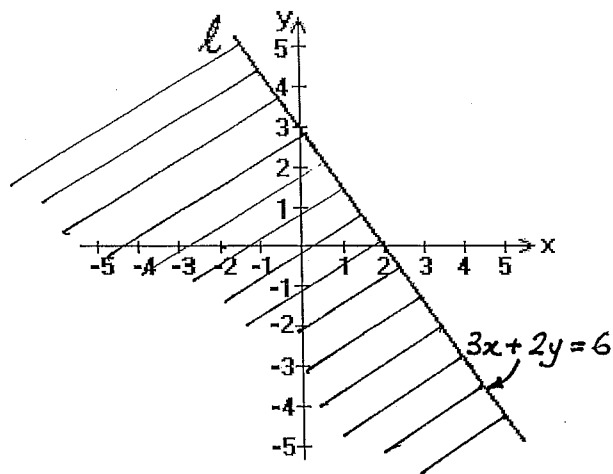
For the linear inequation:  $3x + 2y \leq 6$

1<sup>st</sup> place your pen or finger over the term containing  $y$  (set  $y = 0$ )  $3x + \text{finger} = 6$

- this gives you the  $x$ -intercept  $x = 2$

2<sup>nd</sup>, place your pen or finger over the term containing  $x$  (set  $x = 0$ )  $\text{finger} + 2y = 6$

- this gives you the  $y$ -intercept  $y = 3$



3<sup>rd</sup> Then simply get your ruler and draw a line through these two points.

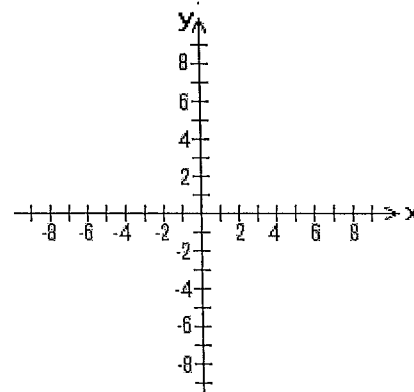
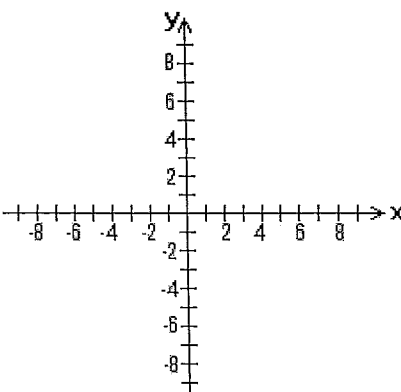
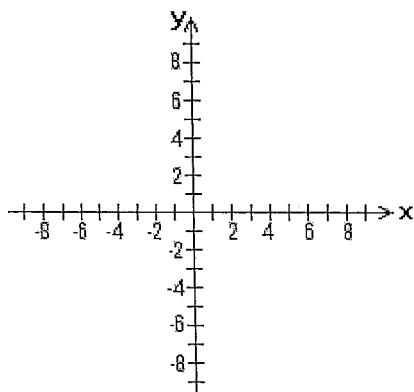
4<sup>th</sup> Now choose a convenient point, e.g.  $(0,0)$  to test the inequation above i.e.  $3(0) + 2(0) \leq 6$  is true, therefore shade the lower half plane.

Draw the graphs of the solutions to the following linear inequations:

(1)  $2x + y \geq 8$

(2)  $x + 3y \leq 6$

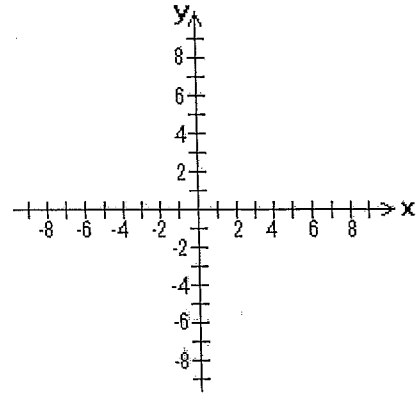
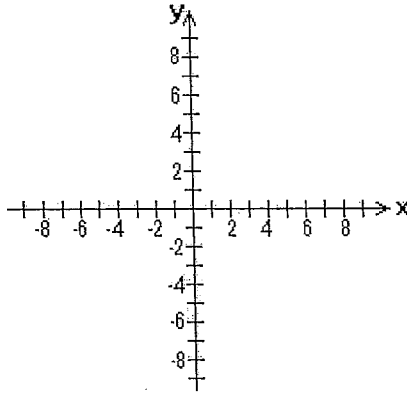
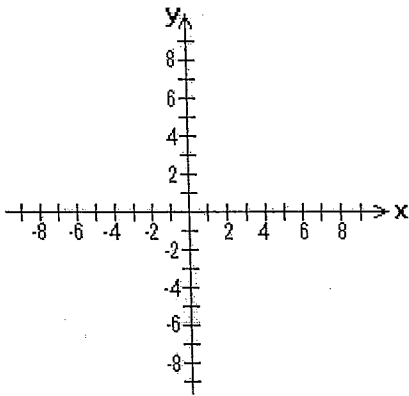
(3)  $2x - y > 8$



(4)  $3x - 4y < 12$

(5)  $y = 2x - 5$

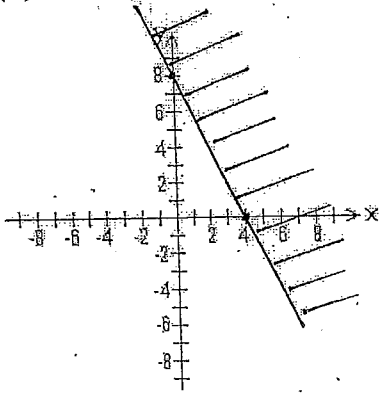
(6)  $\frac{x}{3} - y = 2$



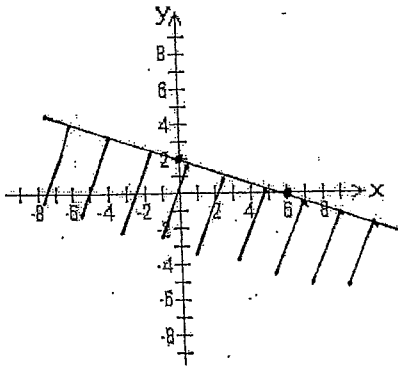
- (7) Check whether the following pairs of coordinates  $(1,5)$ ,  $(5,3)$ ,  $(-1,4)$ ,  $(7,-2)$ ,  $(0,5)$ ,  $(9,5)$  would lie in the shaded region given by  $x + y < 7$ .

- (8) Graph the regions formed by inequalities such as  $x + y < 7$ ,  $y < 2(x - 3)$  and  $y \geq 0$ .

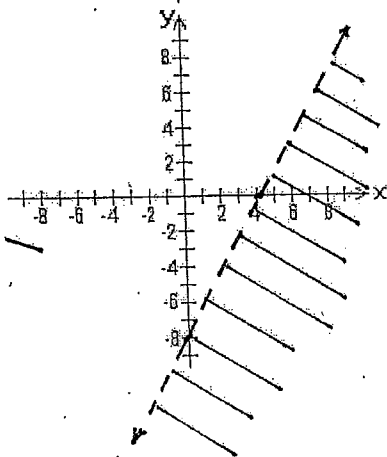
(1)  $2x + y < 8$



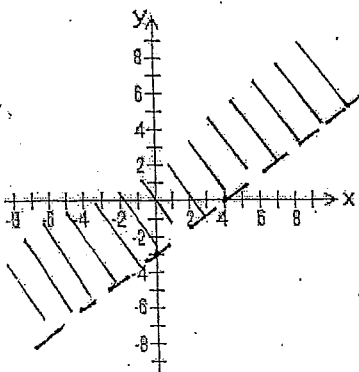
(2)  $x + 3y \leq 6$



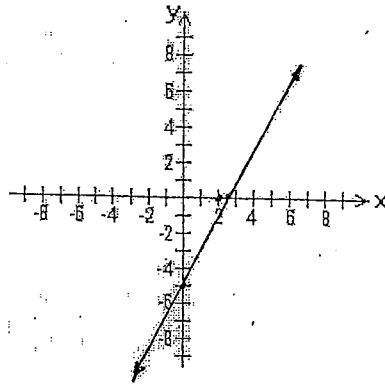
(3)  $2x - y > 8$



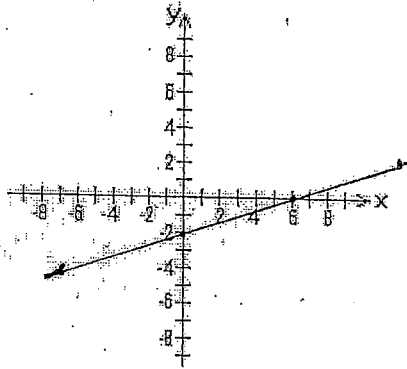
4)  $3x - 4y < 12$



(5)  $y = 2x - 5$



(6)  $\frac{x}{3} - y = 2$



(7) Only points (5,3) and (9,5) would not lie in the region.

(8)

