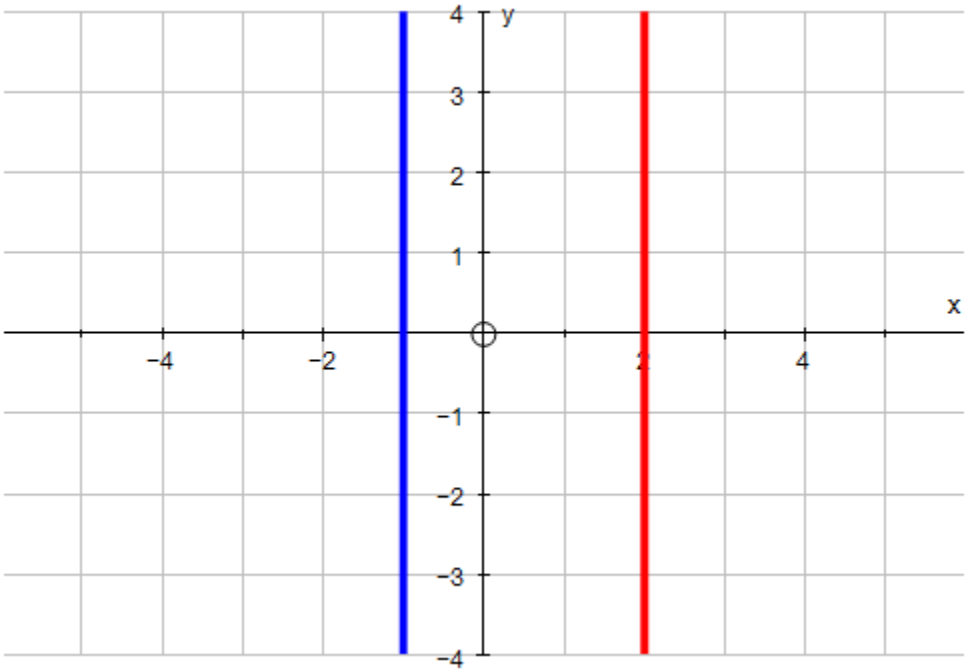
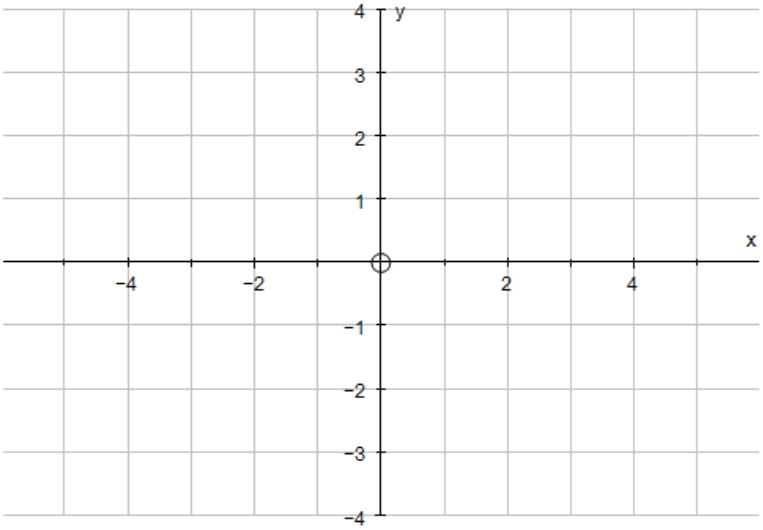
INEQUALITIES: SHADING REGIONS IN 2-D, KS3, KS4

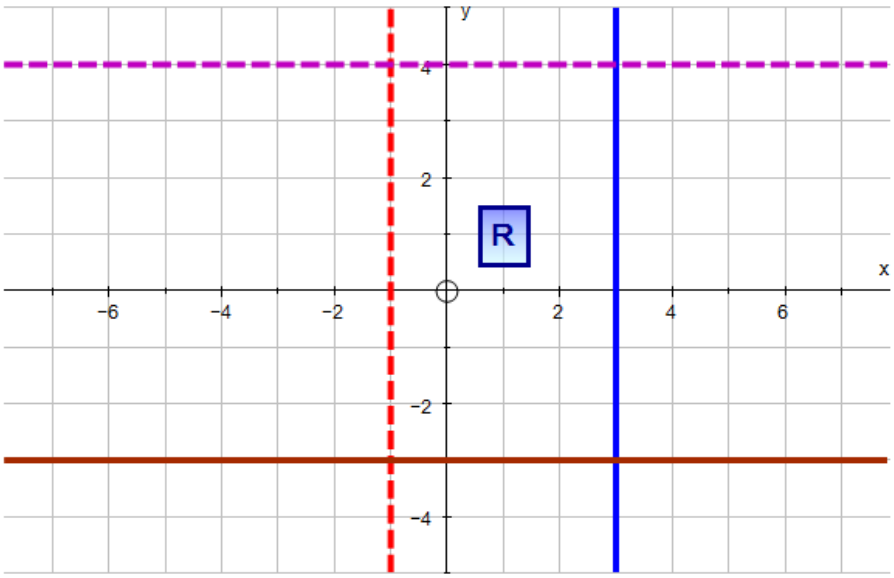
1. On the diagram below, shade the region represent by the inequality:
   (i) $x \leq -1$. Label the region R.
   (ii) $x \geq 2$. Label the region S.
   (iii) $-1 \leq x \leq 2$. Label the region T.



2. On the diagram below, shade the region represent by the inequality:
   $-2 \leq y \leq 3$ Label the region R.

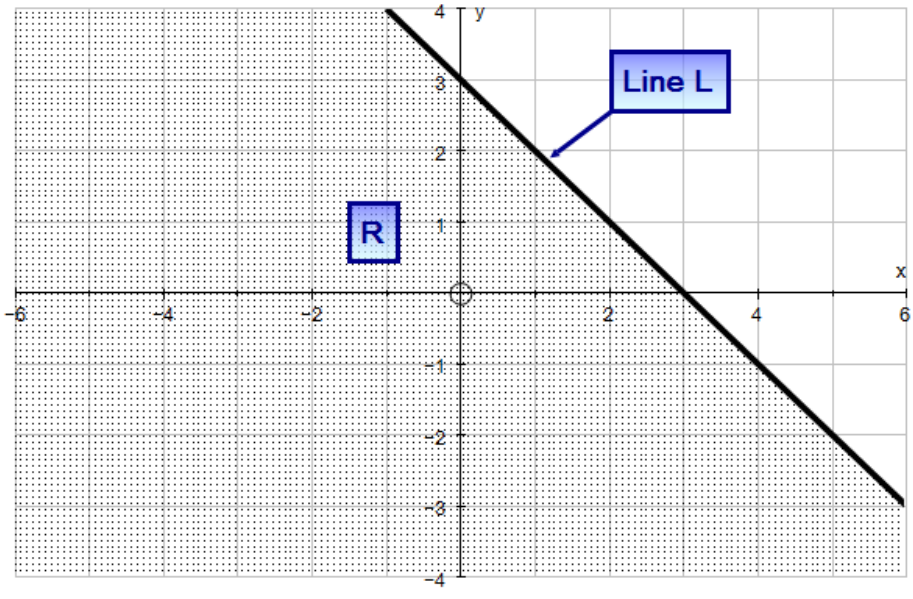


3. Write down **two** inequalities that would represent the rectangular region labelled R.



4. (a) Write down the equation of the line L shown in the diagram below.

   (b) Write down the inequality that represents the region shaded, labelled R.



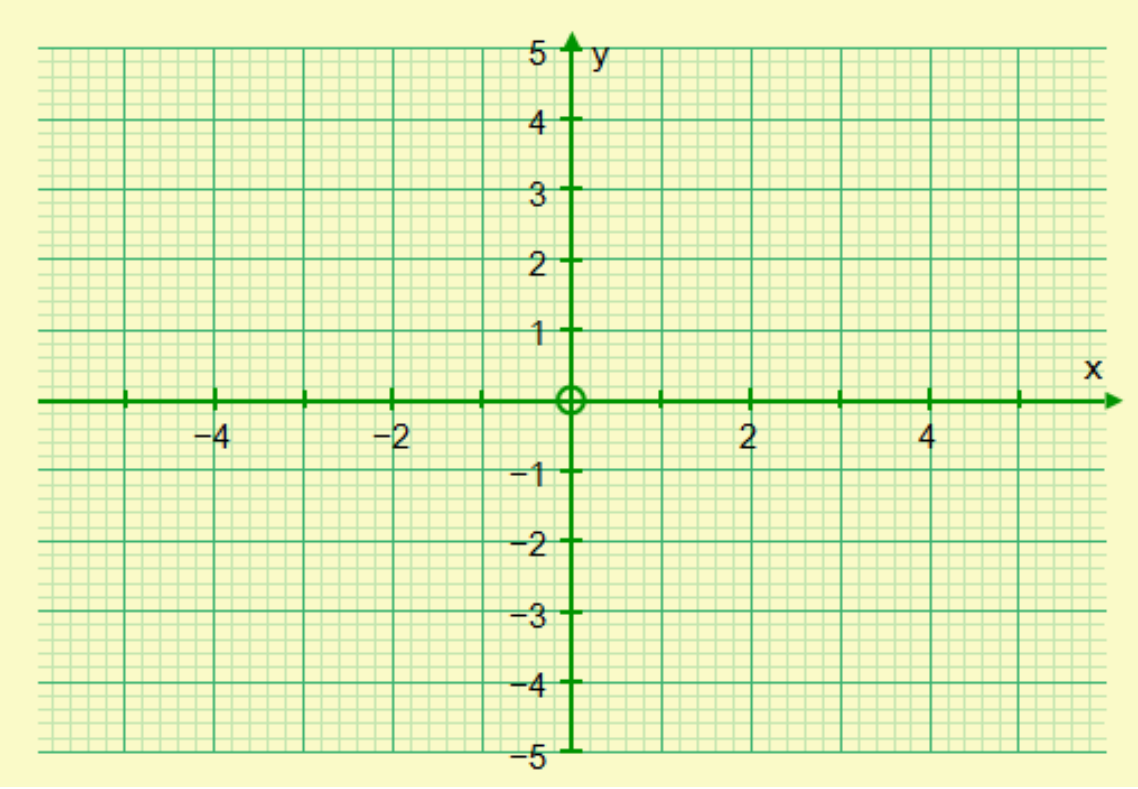
5. (i) On the diagram below, draw the line $x + y = 4$.

(ii) Shade the region that represents all three inequalities given below:

$$x \geq 0, \quad y \geq 0 \quad and \quad x + y \leq 4$$

Label the region R.

(iii) Write down the coordinates of all the points (*a*,*b*), where *a* and *b* are integers, that satisfy all three inequalities.



6. (a) Write down the equation of the lines L, M and N.

(b) Write down three inequalities that represent the region within the triangle OAC.

(c) Repeat (b) with triangle OAD, labelled R.

(d) Repeat (b) with triangle ADC

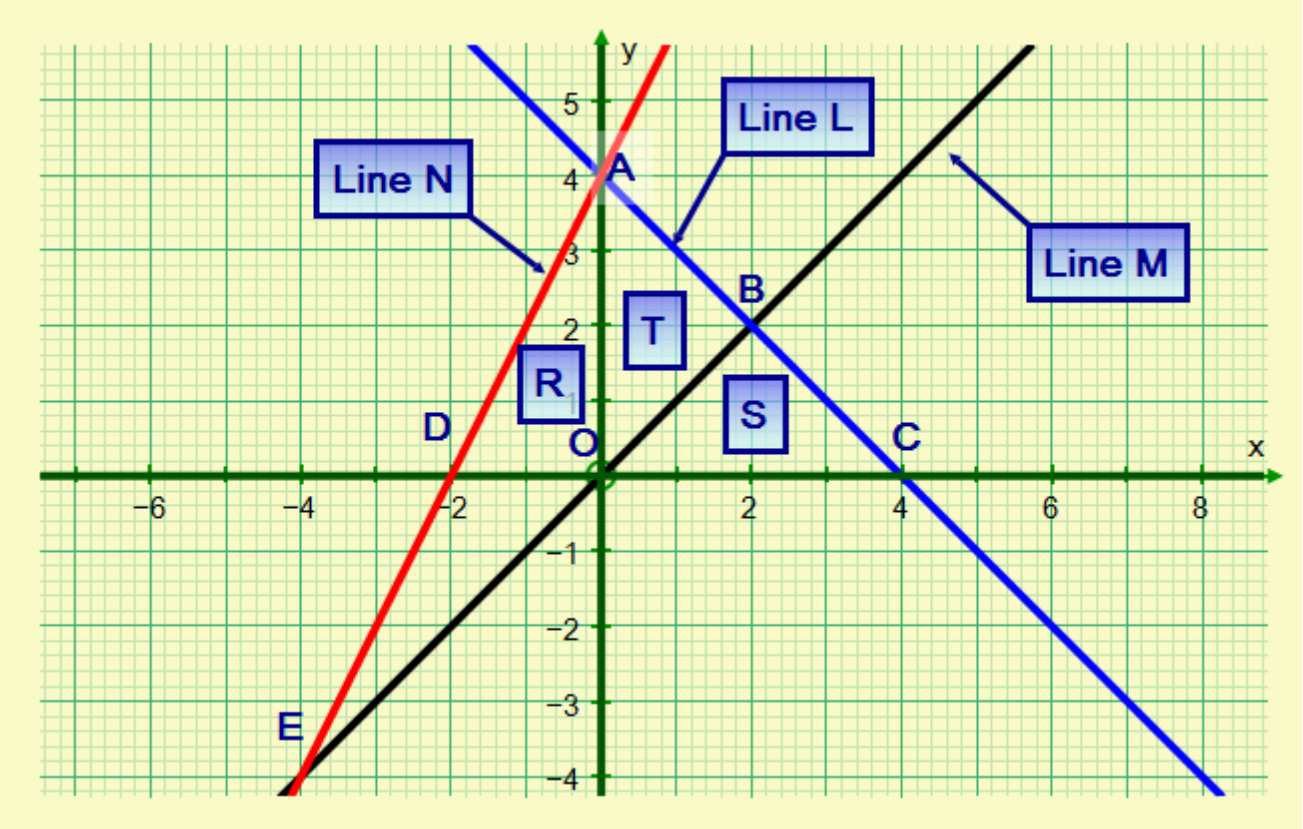
*(e) Repeat (b) with triangle OBC, labelled S

* (f) Repeat (b) with triangle OAB, labelled T.

* (g) Repeat (b) with triangle OAE.

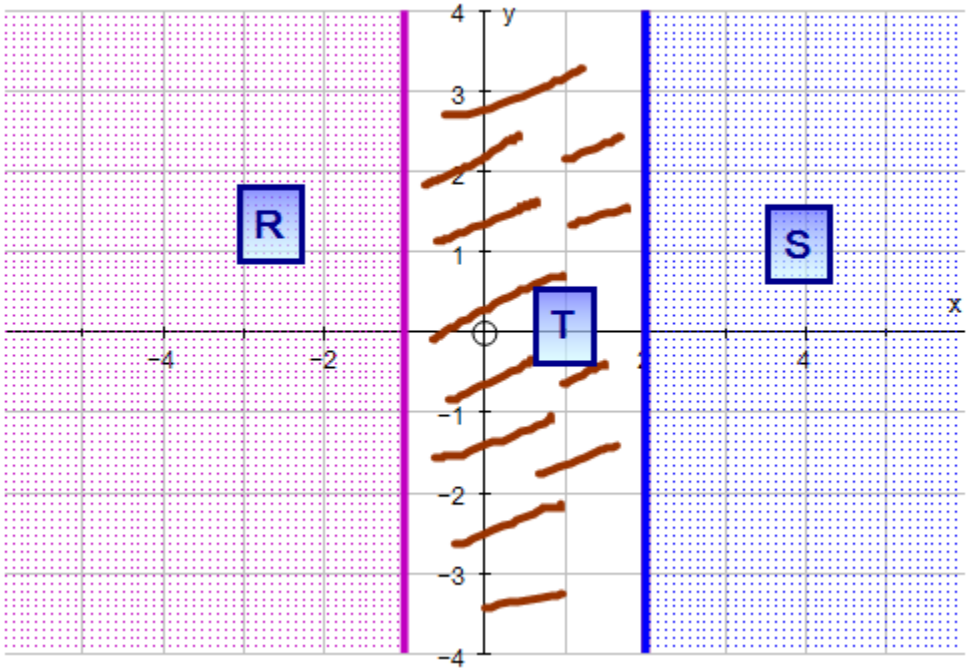
* (h) Repeat (b) with triangle ODE.

* (i) Repeat (b) with triangle ABE.

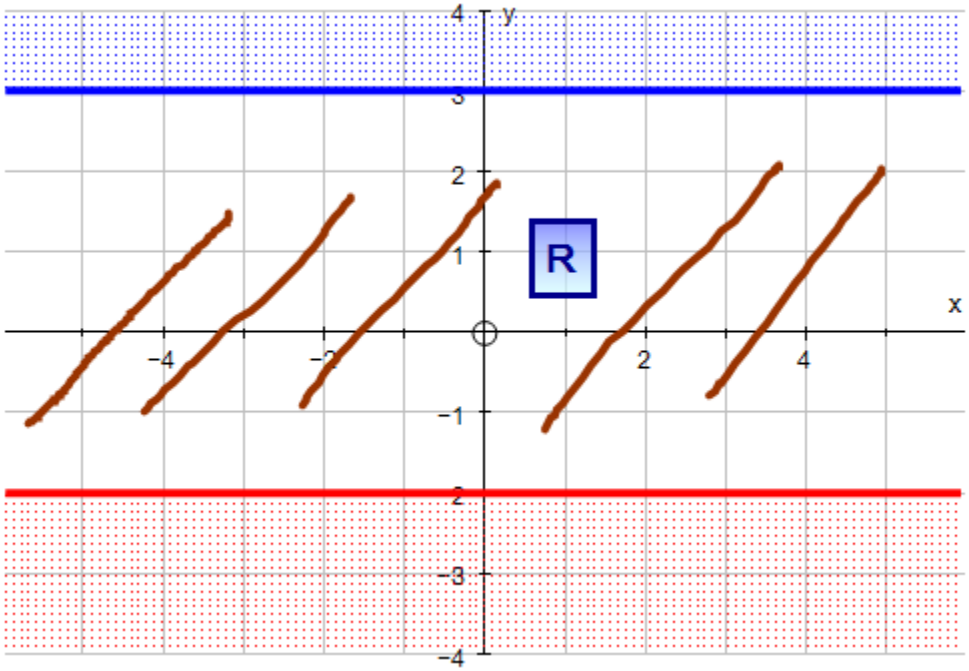


Answers:

1.



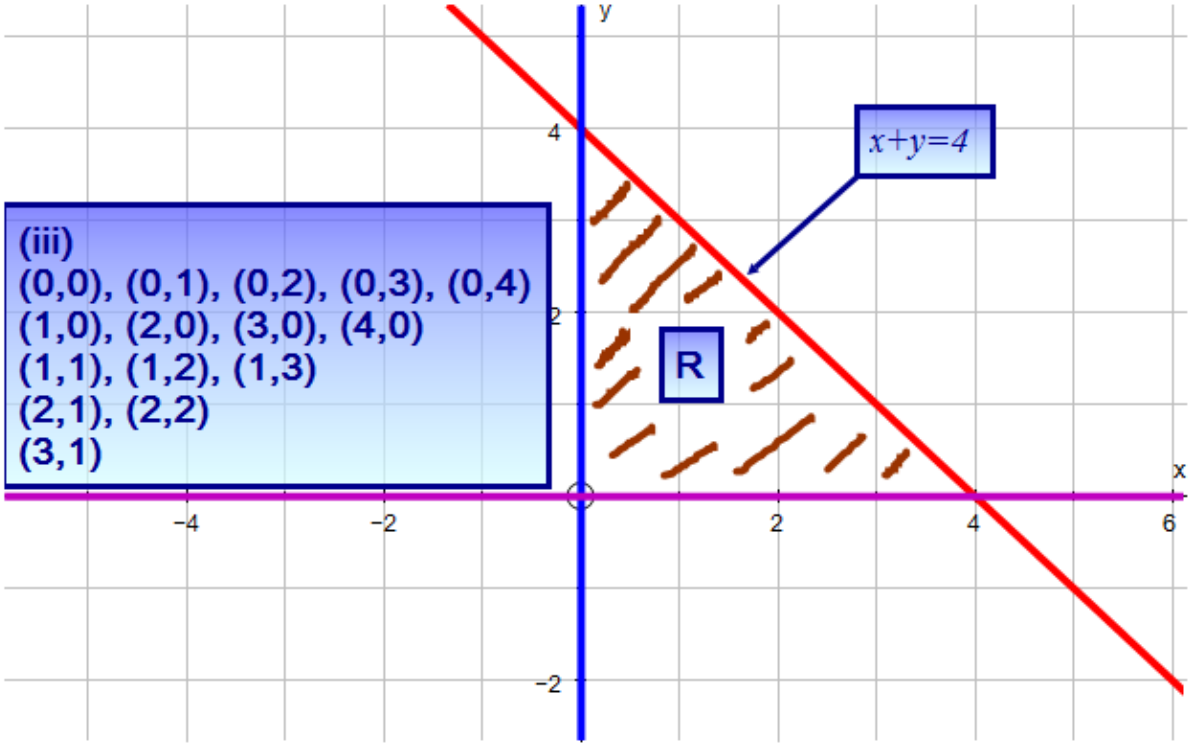
2. If you shade the unwanted regions, the unshaded region is the region you want.



3. $-3 \leq y < 4 \qquad -1 < x \leq 3$

4. (a) $x + y = 3$ *or* $y = -x + 3$ (b) $x + y \leq 3$ or $y \leq -x + 3$

5.



6. (a) *Line* L: $x + y = 4$ *or* $y = -x + 4$, *Line* M: $y = x$, *Line* N: $y = 2x + 4$

(b) Triangle OAC includes boundaries: $x \geq 0,\ y \geq 0,\ x + y \leq 4$

(c) Region R: Triangle OAD: $x \leq 0,\ y \geq 0,\ y \leq 2x + 4$

(d) Triangle ADC: $x \geq 0,\ x + y \leq 4,\ y \leq 2x + 4$

(e) Region S: Triangle OBC: $y \geq 0,\ y \leq x,\ x + y \leq 4$

(f) Region T: triangle OAB: $x \geq 0,\ x + y \leq 4,\ y \geq x$

(g) Triangle OAE: $x \leq 0,\ y \geq x,\ y \leq 2x + 4$

(h) Triangle ODE: $y \leq 0,\ y \geq x,\ y \leq 2x + 4$

(i) Triangle ABE: $x + y \leq 4,\ y \leq 2x + 4,\ y \geq x$

All inequalities, include boundaries

I hope you find this useful. If you find any errors, please let me know. Thank you.