

Lesson 6

GCSE : Algebra of Inequalities

6.1 Graphs Of Inequalities

In this Lesson we:

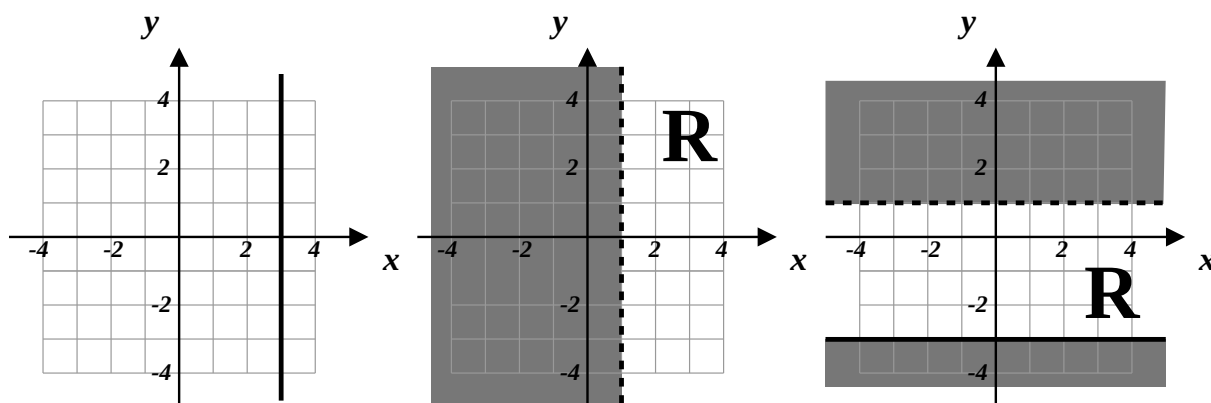
- Look at the graph of an inequality and write down its algebraic description.
- Start with the algebraic description of an inequality and draw its graph.

6.2 Example

The Question

Look at the one equality and two inequality graphs, given below.

- (i) Give the equation of the line on the first graph.
- (ii) Give the inequality that describes the region marked with an **R** on each of the second and third graphs.



The Answer

- (i) The first graph is of the equality $x = 3$.

- (ii) The second graph is of the inequality $x > 1$.

The region **R** is *wanted*.

R in this question is the unshaded part of the graph.

In words; "More than 1 across"

The boundary line is broken, so the boundary itself is NOT wanted.

That is why the inequality $>$ is used rather than $\geq$.

The third graph of the inequality $-3 \leq y < 1$.

The region **R** is *wanted*.

R in this question is the unshaded part of the graph.

In words; "Heights between -3 and 1, -3s included, 1s not".

The boundary line $y = -3$ is solid, so that boundary is wanted. Thus, $\leq$

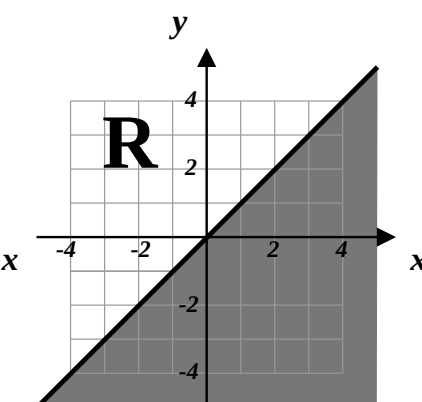
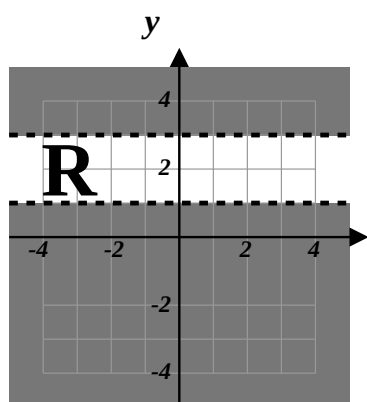
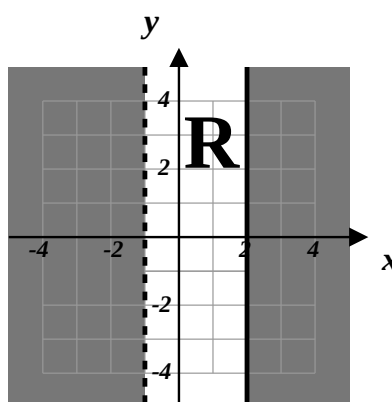
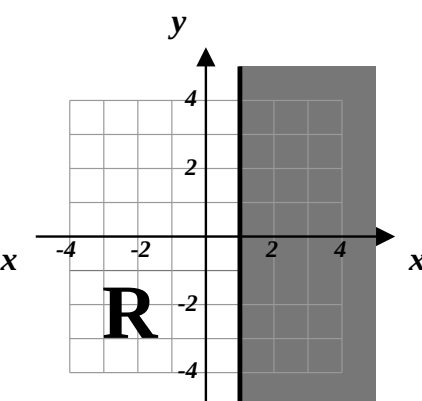
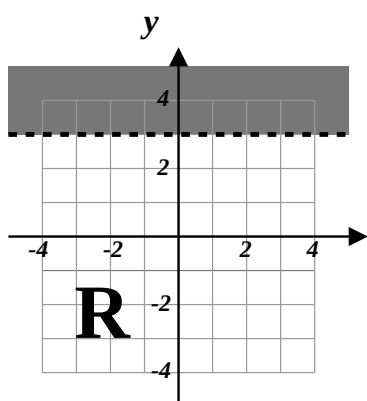
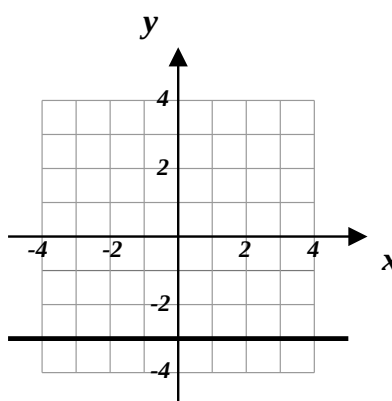
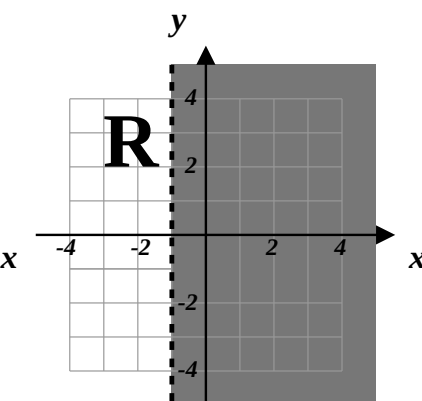
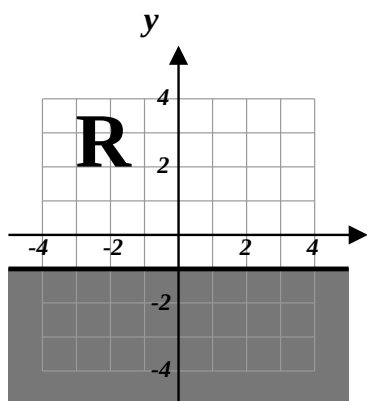
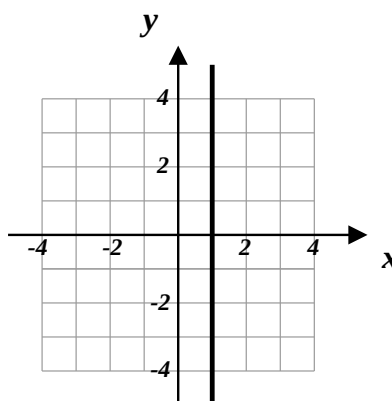
The boundary line $y = 1$ is broken, so that boundary is NOT wanted. Thus, $<$

6.3 Exercise

Question 1

For each graph, write down the algebraic equation or inequality shown.

Regions unshaded are marked **R** and contain the points *wanted*.

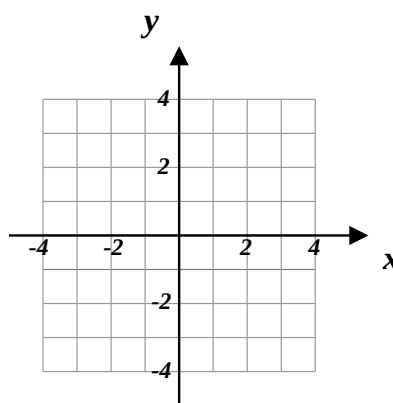


Question 2

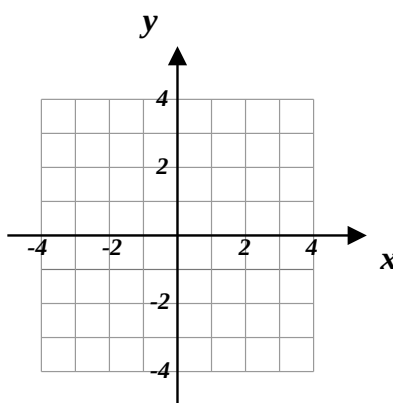
Draw the graph of the equation or inequality specified.

Shade the region **unwanted**.

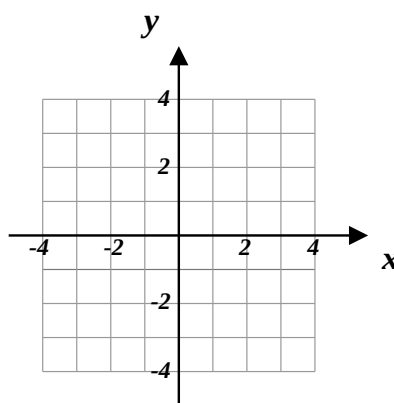
Mark the region specified by the inequality with an **R**.



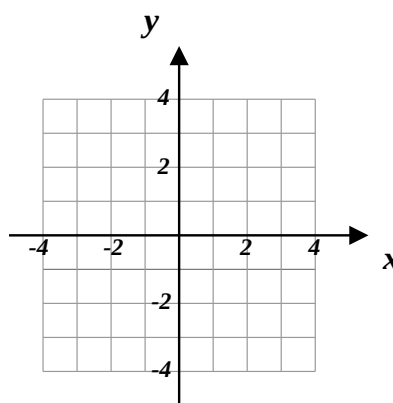
$$y = 3$$



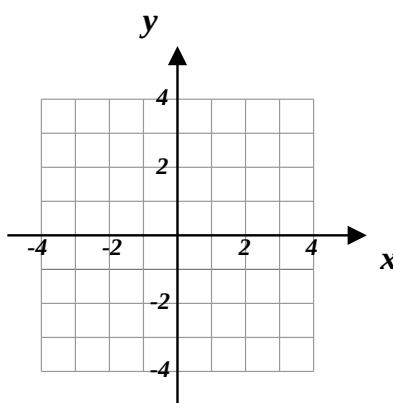
$$y \leq -1$$



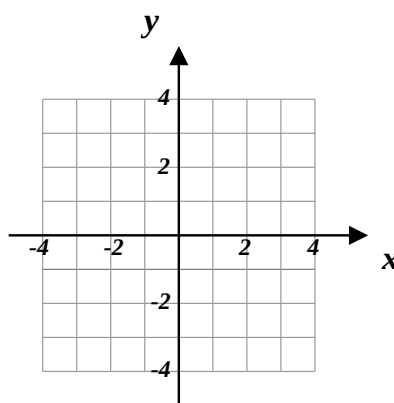
$$x < 3$$



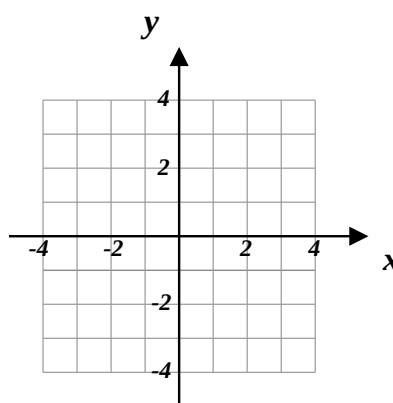
$$x > 2$$



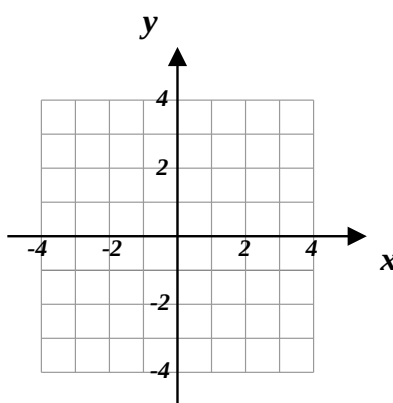
$$x = -2$$



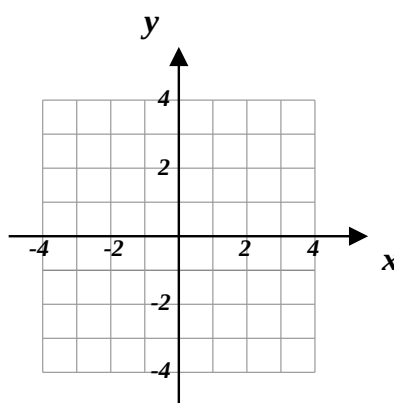
$$y \leq 0$$



$$-3 < x \leq -1$$



$$-2 \leq y < 1$$



$$y < x$$