Solving inequalities graphically for IGCSE

1. **Understand the Inequality Sign:** Make sure you understand the meaning of the inequality sign. For example, ">" means "greater than," "<" means "less than," ">=" means "greater than or equal to," and "<=" means "less than or equal to."
2. **Identify the Boundary Line:** For linear inequalities (those involving linear equations), the first step is to identify the boundary line. If the inequality is strict (>, <), the boundary line should be dashed. If the inequality includes equality (≥, ≤), the boundary line should be solid. If you forget this, you can still have a chance in number 7
3. **Plot the Boundary Line:** Plot the boundary line on the graph. If the inequality is in the form of $y>mx+c$ or $y<mx+c$,
4. **Determine the Shading:** Decide which side of the boundary line to shade. This depends on the inequality sign. For example, if the inequality is
5. $y>mx+c$ shade the region **above the line.**

   If the inequality is $y<mx+c$, shade the region **below the line**.
6. **Test a Point:** To confirm which side of the boundary line to shade, you can choose a test point not on the boundary line and substitute its coordinates into the original inequality. If it satisfies the inequality, shade the region containing that point; otherwise, shade the other region.
7. **Indicate the Solution Set:** Finally, indicate the solution set by shading the appropriate region on the graph. If the inequality is strict (>, <), the shading should not include the boundary line. If the inequality includes equality (≥, ≤), the shading should include the boundary line.
8. **Label the Axes:** Don't forget to label the x-axis and y-axis with appropriate scales to ensure your graph is accurate.
9. **Check your Solution:** After graphing the inequality, double-check your solution by choosing a few points in the shaded region and verifying whether they satisfy the original inequality.

Let's apply it to our example

Example 1

y < 2x -3

Understand the Inequality Sign: y is SMALLER than 2x-3

Plot the Boundary Line:

If x is 0

Y < 0-3

Y < -3 or (0,-3)

If y is 0

0 < 2x-3

3 < 2x

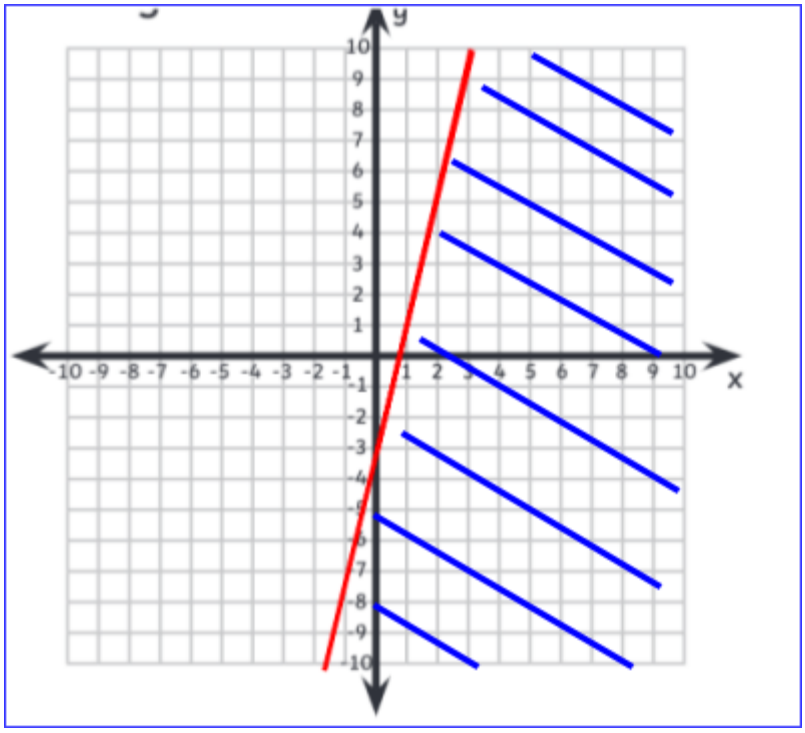
3/2 < X or (1.5,0)

Plot the point (0,-3) and (1.5,0) on the graph and draw a dotted line

Determine the Shading: Decide which side of the boundary line to shade. This depends on the inequality sign. For example, if the inequality is

$y>mx+c$ shade the region **above the line.**
If the inequality is $y<mx+c$,

shade the region **below the line**.



Test a Point: To confirm which side of the boundary line to shade, you can choose a test point not on the boundary line and substitute its coordinates into the original inequality. If it satisfies the inequality, shade the region containing that point; otherwise, shade the other region.

Randomly, we pick (-1,-1) to see if it falls under $y < 2x - 3$

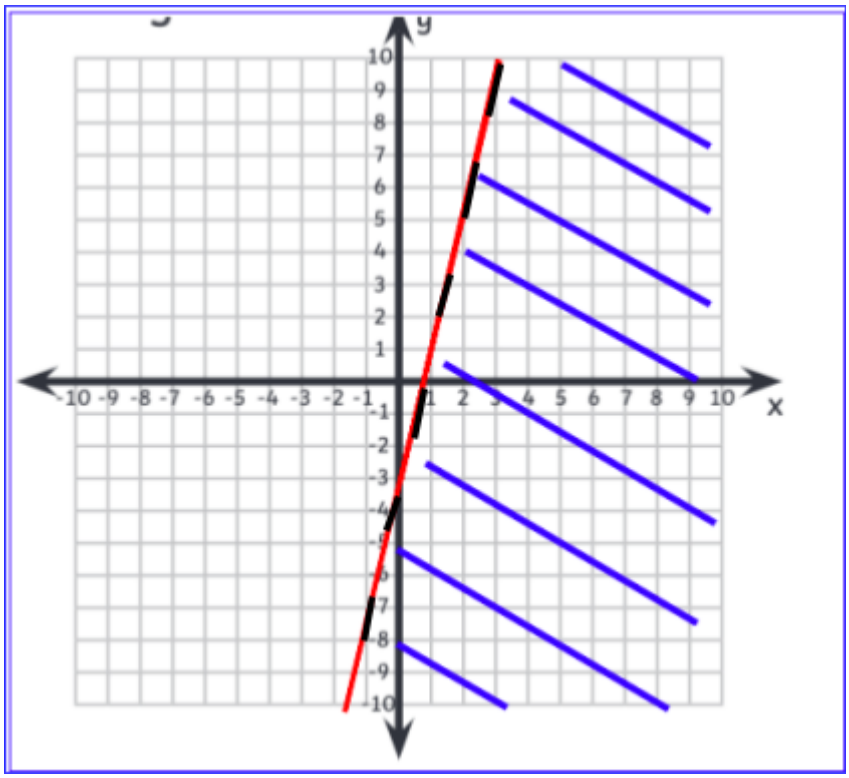
If $x = -1$, $y = 2*(-1) - 3$

$= -2 - 3 = -5$

Testing $y < 2x-3$, -5 is lower than -1

Therefore the condition is TRUE, and it is within the region to highlight.

Indicate the Solution Set: Finally, indicate the solution set by shading the appropriate region on the graph. If the inequality is strict (>, <), the shading should not include the boundary line. If the inequality includes equality (≥, ≤), the shading should include the boundary line. Bt rechecking our picture, we realise the straight line, should be a dotted line



Label the Axes: Don't forget to label the x-axis and y-axis with appropriate scales to ensure your graph is accurate.

Check your Solution: After graphing the inequality, double-check your solution by choosing a few points in the shaded region and verifying whether they satisfy the original inequality.

Take the point (2,2)

If x is 2, y = 2(2) -3 = 1

Y is < than 2x-3, the shaded area is correct again.
