

2.2.3 Inequality Regions

Name: _____ Class: _____ Date: _____

KEY WORDS boundary line

<!-- Session 2 native-skill companion -->

Objective

Practise inequality regions within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Quadratic inequalities and two-variable regions · Higher

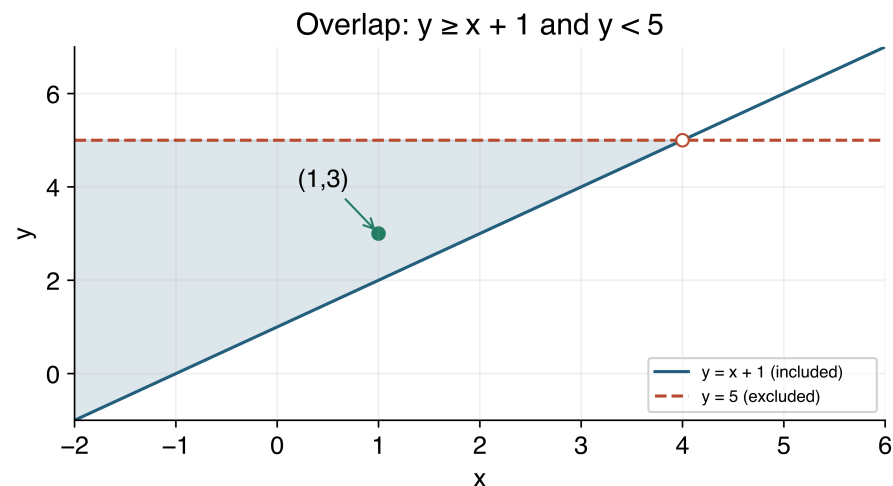
For a quadratic inequality, locate roots and test the sign in each interval. For a two-variable inequality, draw its equality boundary; use a dashed line if equality is excluded and a solid line if included. Test a point on each side and intersect the allowed regions. Write the domain or set notation clearly.

$$(x - 3)(x - 7) \leq 0 \iff x \in [3, 7]$$

$(x-3)(x-7) \leq 0$ holds on $3 \leq x \leq 7$, since the factors have opposite signs between the roots and the endpoints give zero. For $y \geq x+1$ and $y < 5$, shade on/above the solid line $y=x+1$ and below the dashed line $y=5$. Their meeting input is $x=4$, but $(4,5)$ is excluded by $y < 5$. The point $(1,3)$ satisfies both inequalities.

For an upward-opening quadratic, positive values lie outside the roots, not between them. A boundary intersection is not necessarily included. Use a test point not on the boundary itself.

AQA A22 Higher includes quadratic inequalities in one variable and linear inequalities in two variables. The graphical overlap is the solution region, not one selected point.



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Higher) Find the lower endpoint of $(x-3)(x-7) \leq 0$.

2.2 (Higher) Find its upper endpoint.

2.3 (Higher) Find the x-coordinate where $y=x+1$ meets $y=5$.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A dashed inequality boundary includes every point on its line.

Solutions

2.1 The smaller zero is 3, and it is included.

2.2 The larger zero is 7, and it is included.

2.3 Set $x+1=5$, giving $x=4$.

3.1 False. The boundary $y=5$ for $y<5$ is dashed because points with $y=5$ fail the strict inequality. Only a non-strict inequality includes its boundary.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.