Guide to:
Inequalities on graphs

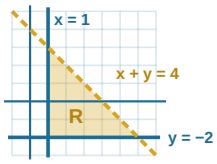
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Explanation:

To represent inequalities on a graph, first draw each boundary line by replacing the inequality sign with **=**. Use a **solid line** for inclusive inequalities (**≤** or **≥**) and a **dashed line** for strict inequalities (**<** or **>**).

To decide which side of a line satisfies the inequality, substitute a simple **test point** not on the line—such as **(0, 0)** or **(1, 1)**—into the inequality and check if it is true.

Example 1: Write down the three inequalities that define the region **R** (containing **(2, 0)**) bounded by solid lines **x = 1** and **y = −2**, and dashed line **x + y = 4**.



Solution:

Right of solid x = 1 → **x ≥ 1**; above solid y = −2 → **y ≥ −2**
Below dashed x + y = 4 (test (2,0): 2 + 0 < 4) → **x + y < 4**
Answer: x ≥ 1, y ≥ −2, and x + y < 4

Example 2: Find all integer coordinates **(x, y)** that satisfy **x > 1**, **y > 2**, and **2x + y ≤ 7**.

Solution:

Since x and y are integers: **x ≥ 2** and **y ≥ 3**
Try x = 2: 2(2) + y ≤ 7 → y ≤ 3, so **y = 3** works → **(2, 3)**
Try x = 3: 2(3) + y ≤ 7 → y ≤ 1 (no integers with y > 2)
Answer: (2, 3)

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ken@mathslinks.co.uk