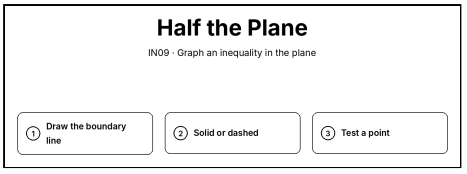
Half the Plane: teacher script

IN09-V1 · IN09 Graph an inequality in the plane · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 86 seconds as a video.

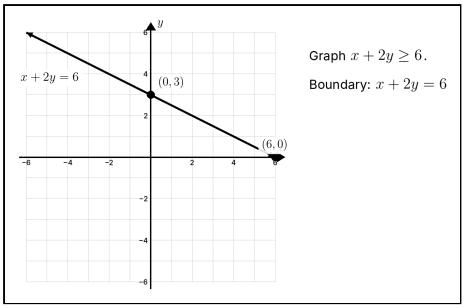
01



Say. Inequalities in x and y. Draw the boundary line. Make it solid or dashed. Then test a point to choose the side to shade.

Draw. Write the title “Half the Plane” and the steps: 1. Draw the boundary line; 2. Solid or dashed; 3. Test a point.

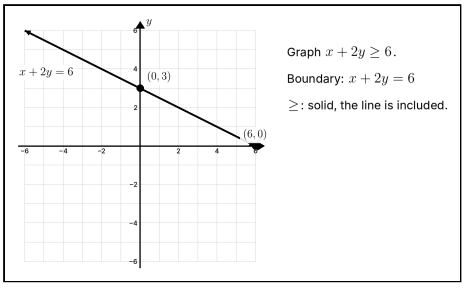
02



Say. Graph x plus 2 y is greater than or equal to 6. First, the boundary: the line x plus 2 y equals 6. It crosses the axes at 6, 0, and at 0, 3.

Draw. Clear the board and draw a grid with axes from -6 to 6. Plot (6, 0) and label it “(6, 0)”. Plot (0, 3) and label it “(0, 3)”. Draw the line x + 2y = 6, labelled “x + 2y = 6”. Beside the grid, write “Graph x + 2y \ge 6.”. Beside the grid, write “Boundary: x + 2y = 6”.

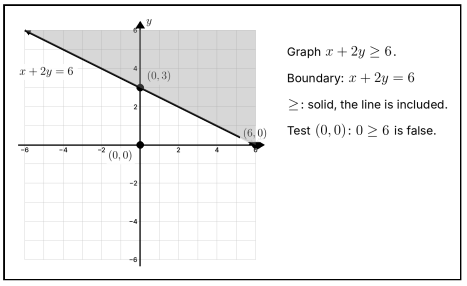
03



Say. The sign is greater than or equal to, so the points on the line are solutions: draw it solid.

Draw. Beside the grid, write “\ge: solid, the line is included.”.

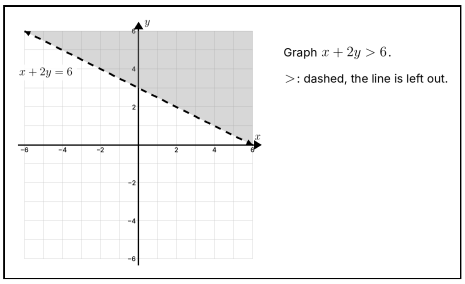
04



Say. Test 0, 0: 0 is greater than or equal to 6 is false. The origin is not a solution, so shade the other side.

Draw. Plot (0, 0) and label it “(0, 0)”. Shade the region where x + 2y ≥ 6. Beside the grid, write “Test (0, 0): 0 \ge 6 is false.”.

05



Say. For x plus 2 y is greater than 6, the points on the line are not solutions, so the line is dashed. The shading stays the same.

Draw. Clear the board and draw a grid with axes from -6 to 6. Draw the line x + 2y = 6 dashed, labelled “x + 2y = 6”. Shade the region where x + 2y > 6. Beside the grid, write “Graph x + 2y > 6.”. Beside the grid, write “>: dashed, the line is left out.”.

06

Trap $x - 3y \geq 9$

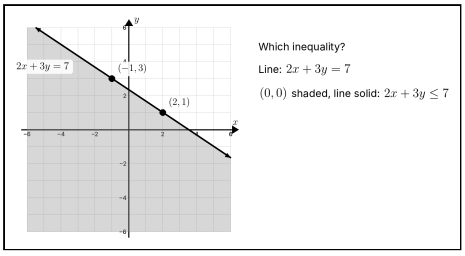
$\times$ $\geq$, so shade above

✓ $(0, 0)$: $0 \geq 9$ is false

Say. Watch for the trap: don't shade by the sign alone. In x minus 3 y is at least 9, greater than does not mean above. Test a point: 0 is at least 9 is false, so shade away from the origin.

Draw. Clear the board. Write “Trap” and x − 3y \ge 9. Below, write \ge, so shade above and cross it out ×. Then write (0, 0): \ 0 \ge 9 is false with a tick ✓.

07



Say. Reading a graph works backwards. The line goes through 2, 1, and negative 1, 3: it is 2 x plus 3 y equals 7. The origin is shaded, and the line is solid. So the inequality is 2 x plus 3 y is less than or equal to 7.

Draw. Clear the board and draw a grid with axes from -6 to 6. Plot (2, 1) and label it “(2, 1)”. Plot (-1, 3) and label it “(−1, 3)”. Draw the line 2x + 3y = 7, labelled “2x + 3y = 7”. Shade the region where 2x + 3y ≤ 7. Beside the grid, write “Which inequality?”. Beside the grid, write “Line: 2x + 3y = 7”. Beside the grid, write “(0, 0) shaded, line solid: 2x + 3y \le 7”.

08

Your turn

Boundary line: solid or dashed.
Test a point, then shade.

Say. Now it is your turn. Draw the boundary line, solid or dashed, then test a point and shade.

Draw. Point to today’s activity: Boundary line: solid or dashed. Test a point, then shade.