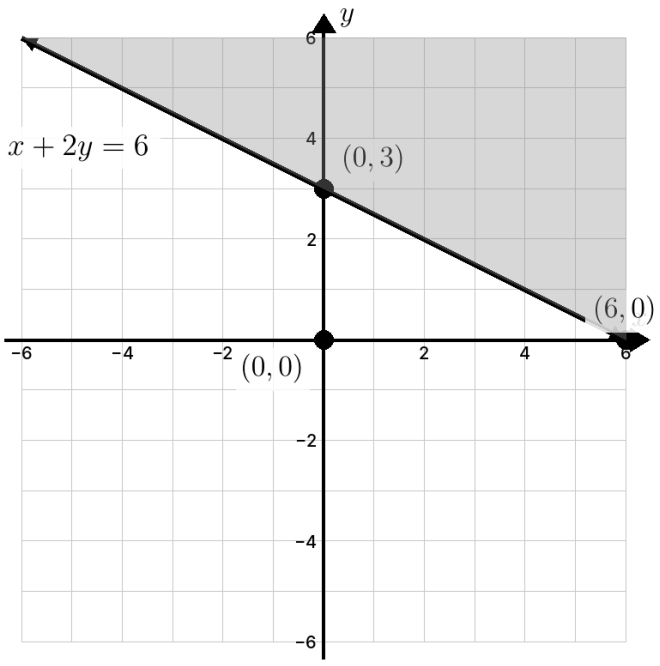
Half the Plane

IN09-V1 · storyboard · IN09 Graph an inequality in the plane. Read each picture with its sentences.

Picture 1



Graph $x + 2y \geq 6$.

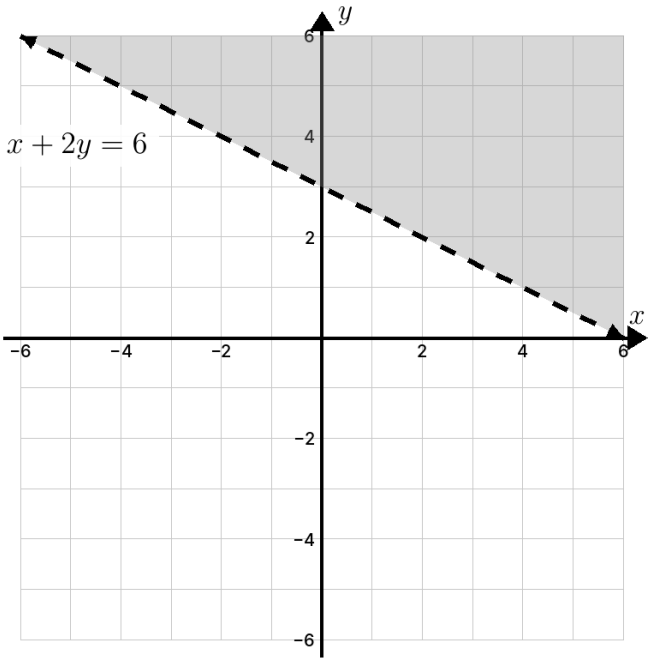
Boundary: $x + 2y = 6$

$\geq$: solid, the line is included.

Test $(0, 0)$: $0 \geq 6$ is false.

1. Graph x plus 2 y is greater than or equal to 6.
2. First, the boundary: the line x plus 2 y equals 6.
3. It crosses the axes at 6, 0, and at 0, 3.
4. The sign is greater than or equal to, so the points on the line are solutions: draw it solid.
5. Test 0, 0: 0 is greater than or equal to 6 is false.
6. The origin is not a solution, so shade the other side.

Picture 2



Graph $x + 2y > 6$.

$>$: dashed, the line is left out.

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

Picture 3

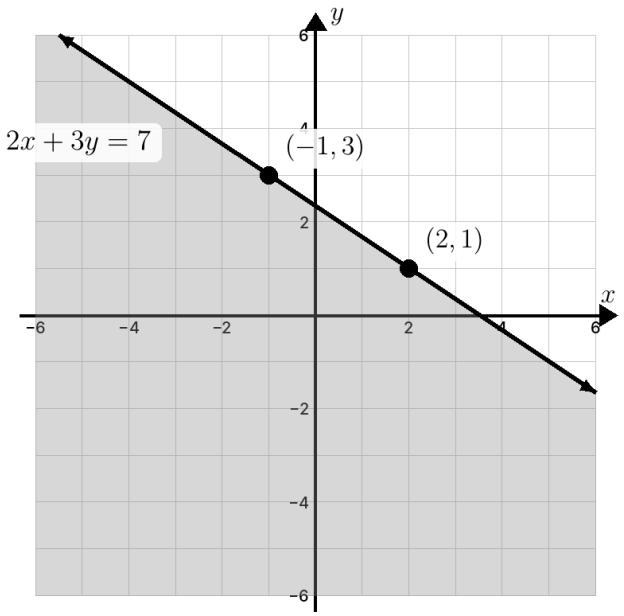
Trap $x - 3y \geq 9$

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

✓ $(0, 0)$: $0 \geq 9$ is false

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

Picture 4



Which inequality?

Line: $2x + 3y = 7$

$(0, 0)$ shaded, line solid: $2x + 3y \leq 7$

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