Feasible regions

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Find vertices for $x, y \geq 0$ and $x + y \leq 6$. [2 marks]

The boundary meets both axes at 6.

Answer: $(0, 0), (6, 0), (0, 6)$.

2. Find vertices for $x, y \geq 0$, $x \leq 4$, $x + y \leq 7$. [2 marks]

At $x = 4$ the sloping boundary gives $y = 3$; check each corner.

Answer: $(0, 0), (4, 0), (4, 3), (0, 7)$.

3. Find where $3x + y = 15$ meets $x + y = 9$. [2 marks]

Subtract to obtain $2x = 6$, then substitute.

Answer: $(3, 6)$.

4. Is $(6, 2)$ feasible for $x + y \leq 9$ and $2x + y \leq 12$? [2 marks]

The first sum is 8, but the second is 14.

Answer: No.

5. Is the region $x, y \geq 0$, $x + y \geq 5$ bounded? [2 marks]

The feasible points $(t, 0)$ exist for arbitrarily large t.

Answer: No.

6. Why do $x \geq 4$ and $x \leq 2$ produce no feasible region? [2 marks]

A value cannot be at least 4 and at most 2.

Answer: No real x meets both bounds.