Two-variable inequalities and shaded regions

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

1. Decide whether $(3, 2)$ satisfies $2x + y \leq 9$. [2 marks]

$2(3) + 2 = 8 \leq 9$.

Answer: Yes.

2. Is the boundary of $y > 3x - 2$ solid or dashed? Which side is allowed? [2 marks]

Equality is excluded and larger y values are required.

Answer: Dashed; above the line.

3. Find the intercepts of the boundary $2x + y = 8$. [2 marks]

Set each variable to zero in turn.

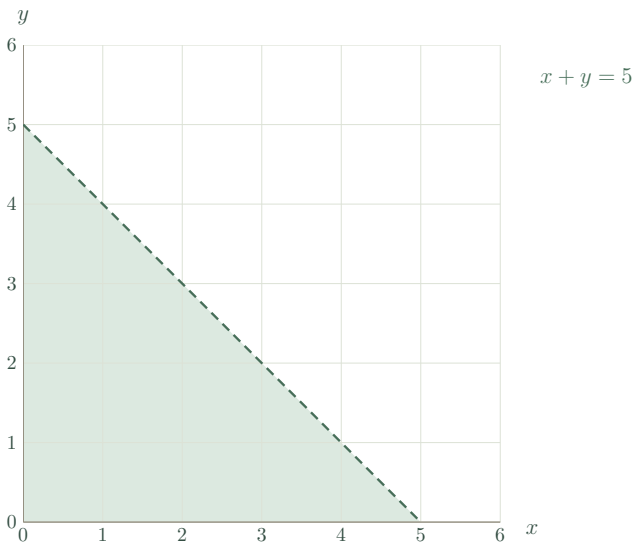
Answer: $(4, 0)$ and $(0, 8)$

4. Give the vertices of the feasible region $x \geq 0$, $y \geq 0$, $2x + y \leq 8$. [3 marks]

The boundary intercepts and origin form the triangle.

Answer: $(0, 0), (4, 0), (0, 8)$

5. On the supplied grid, shade the region $x \geq 0$, $y \geq 0$, $x + y < 5$. [3 marks]



The origin passes the inequality test.

Answer: The first-quadrant triangle below the dashed line from $(0, 5)$ to $(5, 0)$; the sloping boundary is excluded.

6. A stall sells necklaces for 5 dollars and bracelets for 3 dollars. Write inequalities for buying at least 4 items using no more than 24 dollars. Define the variables. [3 marks]

Let x count necklaces and y count bracelets; total items and total cost give the two conditions.

Answer: $x + y \geq 4$, $5x + 3y \leq 24$, with x, y nonnegative integers.