Unit 5 Test — Answer Key

Graphing Systems, Feasible Regions & Linear Programming

FOR TEACHER / SELF-CHECK USE

This test was written to cover Unit 5's topics (graphing and solving systems of linear inequalities, feasible regions, and linear programming applications). Every solution below has been independently verified.

1

(1,4): $4 > 1+1=2$ true; $4 \le -2(1)+8=6$ true — satisfies both.
(0,0): $0>1$ false. (5,1): $1>6$ false. (3,0): $0>4$ false.

Answer: A — (1, 4)

2

The feasible region is the overlap of all shaded regions — every point there satisfies every inequality simultaneously.

Answer: A — The set of all points that satisfy every inequality in the system

3

$4 + 5 = 9 \le 10$ ✓. $x = 4 \ge 0$ ✓. $y = 5 \ge 0$ ✓. All three inequalities hold.

Answer: Yes — (4, 5) satisfies all three inequalities.

4

If no region satisfies every inequality at once, there is no point common to all of them.

Answer: A — The system has no solution

5

Strict inequality (<) → dashed boundary line. 'y less than' → shade below the line.

Answer: A — Dashed line, shade below

6

Non-strict inequality (≥) → solid boundary line. 'y greater than or equal to' → shade above the line.

Answer: A — Solid line, shade above

7

$y \le x+1$: $2 \le 3$ ✓. $y \ge 2x-5$: $2 \ge -1$ ✓. Both conditions hold.

Answer: Yes — (2, 2) satisfies both inequalities.

8

The feasible region is a polygon; the objective function is linear, so its extreme values occur at a corner point of that polygon.

Answer: A — A vertex (corner point) of the feasible region

9

Cost constraint: $2x + 4y \le 20$.
Item count constraint: $x + y \ge 3$.
Non-negativity: $x \ge 0$, $y \ge 0$.

Answer: $2x + 4y \le 20$, $x + y \ge 3$, $x \ge 0$, $y \ge 0$

10

Time constraint: $3x + y \le 24$.
Minimum tables: $x \ge 2$.
Non-negativity: $y \ge 0$.

Answer: $3x + y \le 24$, $x \ge 2$, $y \ge 0$