Draw a Maze: Wall Spacing, Path Continuity, and Entrance/Exit Layout

Original tasks 1, 2 / complete keys

Task 1

On a 6 by 6 grid with wall spacing one cell, entrance on the top edge at column 3 and exit on the bottom edge at column 3, describe a route that uses 5 vertical moves and 0 horizontal moves. State one wall segment you must leave open.

Answer: A valid route goes straight down column 3 from the top gap to the bottom gap using 5 down moves. The vertical edges between the cells in column 3 must stay open; for example, the edge between row 1 and row 2 in column 3 must not be walled.

Reason: The grid is 6 cells tall, so a straight vertical route needs 5 moves. Each move crosses a horizontal grid edge between adjacent cells in column 3, so those edges must be open.

Check: Count the down moves: 5. Confirm each move stays in column 3 and crosses an open edge. Confirm the entrance and exit gaps are one cell wide.

Task 2

A 5 by 5 grid has wall spacing one cell. The entrance is on the left edge at row 2 and the exit is on the right edge at row 2. A proposed route uses 4 right moves and 1 up move. Is the move count consistent with the grid width? Explain.

Answer: Yes. A route from the left edge to the right edge on a 5-cell-wide grid needs exactly 4 horizontal moves. Adding 1 up move gives 5 total moves, and the horizontal count remains 4; the up move does not replace a right move. The route is valid only if it includes 4 right moves and 1 up move, for 5 total moves.

Reason: Horizontal displacement from left to right spans 5 cells, so 4 right moves are required. The up move changes row but not column, so it adds one move without reducing the horizontal requirement.

Check: Write the moves as R, R, R, R, U. Count rights: 4. Count total: 5. Confirm the final cell is in the rightmost column and row 1 or row 3 depending on the up move.

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Original tasks 3, 4 / complete keys

Task 3

On an 8 by 8 grid with spacing one cell, you want a route with 7 right moves and 2 down moves. What is the total move count, and what is the minimum number of open edges the route must cross?

Answer: Total moves are 7 plus 2 equals 9. The route must cross 9 open edges, one for each move.

Reason: Each move crosses exactly one shared edge between adjacent cells. The total number of moves equals the number of edges crossed.

Check: Add 7 and 2 to get 9. Trace the route and count each edge crossed; the count should be 9.

Task 4

A maze on a 7 by 7 grid has entrance on the left edge at row 4 and exit on the right edge at row 4. A wall segment blocks the edge between column 4 and column 5 in row 4. Can a route still connect entrance to exit without diagonal moves? Describe one way to check.

Answer: Yes, a route can still connect if it goes around the blocked edge, for example by moving up or down before column 4 and returning to row 4 after column 5. To check, trace from the entrance cell and mark every reachable cell using only adjacent open edges; if the exit cell is marked, the maze is solvable.

Reason: Blocking one edge removes one direct step but does not necessarily disconnect the grid. A detour through another row can preserve continuity.

Check: Use a flood-fill check: start at the entrance cell, mark it, then repeatedly mark unmarked adjacent cells reachable through open edges. If the exit cell is marked, a continuous route exists.

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Source rubric / reflection

- [ ] Grid cells are equal and wall spacing is stated on the page.
- [ ] All walls lie on grid edges, not through cell centers.
- [ ] Entrance and exit are one-cell gaps in the outer boundary with arrows outside the grid.
- [ ] At least one continuous route connects entrance to exit using only adjacent cell moves.
- [ ] A separate solution key shows the route as a dashed line and states the move count.
- [ ] Valid alternatives are accepted if spacing is consistent and the route is continuous.

Reflection: What did you check, what did you change, and what will you try next?