# Boat on Grid Paper: Cell-by-Cell Drawing Guide

Original tasks 1, 2, 3 / complete keys

Task 1

A reference boat has hull rows of 5, 7, and 3 filled cells from bottom to top, and sail rows of 1, 3 above the hull. What is the total filled cell count?

Answer: Hull: 5 + 7 + 3 = 15. Sail: 1 + 3 = 4. Total = 19 filled cells.

Reason: Add hull rows separately from sail rows, then sum the two totals.

Check: Recount each row and confirm the sum is 19; verify no diagonal-only cells were included.

Task 2

On an 8-column grid, a student uses column 4 as the mast. Is the boat centered? Explain using cell counts.

Answer: Column 4 is not the exact center of 8 columns; columns 4 and 5 are the middle pair. The boat is centered only if left and right counts around column 4 are equal, which requires stating the convention. A valid answer must name the middle pair and compare counts.

Reason: Even-column grids have two middle columns, so centering depends on the stated mast column and symmetric counts.

Check: Count cells left and right of column 4; if unequal, the drawing is asymmetric or the mast choice must be explained.

Task 3

A sail has row counts 1, 3, 5, 7 from top to bottom. The hull's widest row has 6 cells. Is the sail base wider than the hull?

Answer: Yes. The sail base is 7 cells, which is wider than the hull's widest row of 6 cells. This violates the simple proportion check.

Reason: Compare the last sail row count to the hull's widest row count directly.

Check: Subtract 6 from 7 to get 1; a positive difference means the sail base is wider.

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Original tasks 4 / complete keys

Task 4

A drawing has 12 hull cells, 6 sail cells, and 4 diagonal-only cells. A checker counts 20 total cells. Is the checker correct?

Answer: No. Total = 12 + 6 + 4 = 22 cells, not 20.

Reason: Add all three categories: hull, sail, and diagonal-only.

Check: Recount each category and confirm 12 + 6 + 4 = 22.

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Source rubric / reflection

- [ ] Convention is written and followed: filled hull, diagonal sail edge, blank empty.
- [ ] Hull row counts are recorded and match the drawing.
- [ ] Sail row counts are recorded and match the drawing.
- [ ] Mast column is stated and centered or lean is stated in cell counts.
- [ ] Total filled cells equal hull plus sail counts.
- [ ] Left and right counts around the mast are compared and explained.
- [ ] Valid alternative cell maps are accepted if counts and convention are consistent.

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