Draw a Generic Ship: Cutaway Hull, Deck, and Mast Construction

Original task 1 / complete key

Task 1

In a cutaway side view, draw a hull 16 cm long and 5 cm deep. Place the deepest point on the vertical midline. Check the hull curve’s horizontal position at three stations (bow quarter, midship, stern quarter) relative to the midline and state your measured deviations.

Answer: A closed hull with the deepest point on the vertical midline and bow and stern endpoints on the baseline; report the measured horizontal deviation of the hull curve from the vertical midline at each of the three stations (bow quarter, midship, stern quarter), and confirm the deepest point (midship) lies on the vertical midline.

Reason: The hull is built from three arcs with the deepest point on the vertical midline; the check confirms the hull curve stays centered on that midline and the hull closes between bow and stern.

Check: Measure the horizontal distance of the hull curve from the vertical midline at the bow quarter, midship, and stern quarter stations, confirm the deepest point (midship) is on the vertical midline, and confirm the hull is closed between bow and stern; do not require 0 cm at all stations.

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Original task 2 / complete key

Task 2

In a labeled cutaway side view, place an upper interior deck line 2 cm below baseline at the stern and 2.5 cm below at the bow inside a hull of depth 5 cm. Add a second deck line 1 cm below and connect with short verticals. Measure spacing at three points.

Answer: A labeled cutaway with both interior deck lines inside the hull and spacing variation under 0.3 cm at three measured deck stations. Bow and stern deck stations are inset within the end regions; they are not the hull tips on the baseline. Choose the insets so that the lower deck and its end connectors remain inside the closed hull.

Reason: The view label makes clear that these lines are interior deck levels. The lower line is kept inside the hull section, and the three-point check tests whether its spacing from the upper deck stays consistent.

Check: At the inset bow deck station, the middle, and the inset stern deck station, measure the vertical gap between the deck lines; the largest difference should be under 0.3 cm. Confirm the 2.5 cm bow and 2 cm stern upper-deck offsets from the baseline and the 1 cm lower-deck offset are all inside the hull. Do not measure positive interior offsets at the zero-depth closed hull tips.

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Original task 3 / complete key

Task 3

In the same cutaway convention, draw a mast on the midline from the upper interior deck to 10 cm above it as two parallel lines 0.4 cm apart with a dashed centreline. Add a boom 4 cm long at 3 cm above the upper deck. Check verticality.

Answer: Mast vertical within 0.5 cm of the vertical midline at base and top, boom attached at 3 cm above deck, dashed centreline present.

Reason: The mast is placed on the vertical midline and checked by measuring horizontal distance from the vertical midline at base and top.

Check: Measure horizontal distance from the vertical midline at mast base and top; both should be 0.5 cm or less.

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Original task 4 / complete key

Task 4

In a labeled cutaway side view, use local coordinates with mast base (0,0), x increasing toward the stern, and y upward. The upper deck passes through forward point (-2,-0.25), mast base (0,0), and aft point (2,0.25). Draw the mast on x=0 and a 4 cm-high, 5 cm-long boom from (0,4) to (5,4). Draw thin lines from the boom end to those two deck points. Measure the vertical separation of the lines at x=3.5 and x=4 cm and check whether the difference between those gaps is under 0.5 cm. Do not measure at x=0.

Answer: Draw straight boom-end segments from (5,4) to (-2,-0.25) and (2,0.25). Both segments are present at x=3.5 and x=4. At x=3.5, the forward line is at y=173/56≈3.089 cm and the aft line at y=17/8=2.125 cm, giving a gap of 27/28≈0.964 cm. At x=4, they are at y=95/28≈3.393 cm and y=11/4=2.75 cm, giving a gap of 9/14≈0.643 cm. The gap difference is 9/28≈0.321 cm, so it is under 0.5 cm and passes. The aft segment exists only from x=2 to x=5, so no paired gap is defined at mast centerline x=0.

Reason: The two straight segments share x=2..5. Interpolating between the stated endpoints gives vertical gaps 27/28 cm at x=3.5 and 9/14 cm at x=4; their difference is 9/28≈0.321 cm, below the stated limit.

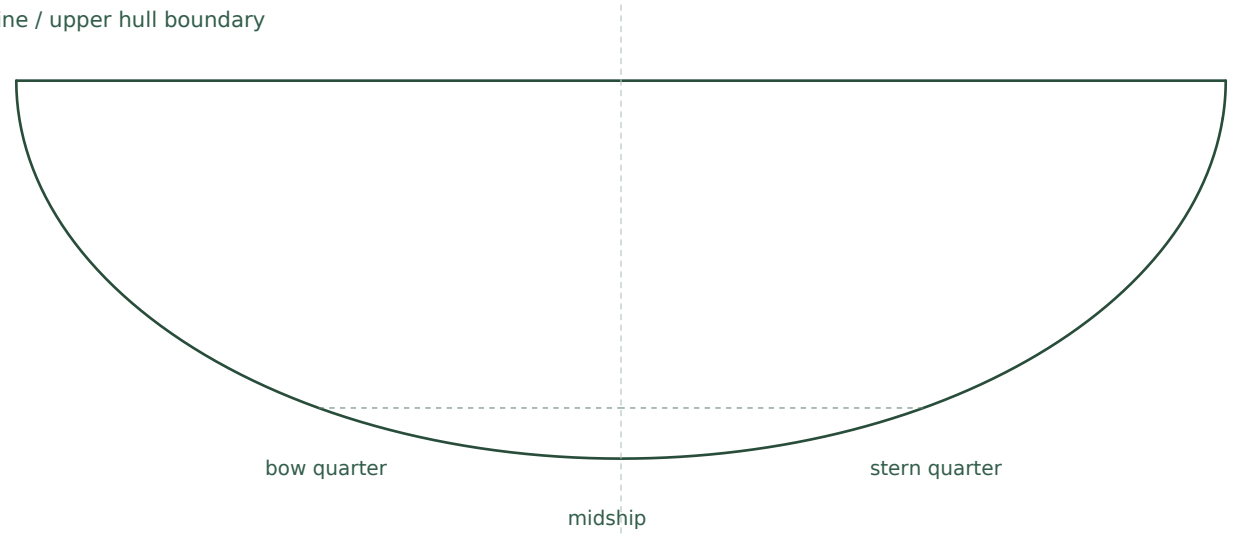
Check: At x=3.5, confirm gap 27/28≈0.964 cm; at x=4, confirm gap 9/14≈0.643 cm. Subtract: 27/28−9/14=9/28≈0.321 cm<0.5 cm. Confirm both stations lie in shared x-range [2,5] and do not measure at x=0.

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Task 1 / answers

CUTAWAY SIDE VIEW / named interior deck stations / hypothetical dimensions

PRINT 1:1 / hull 16 cm / depth 5 cm



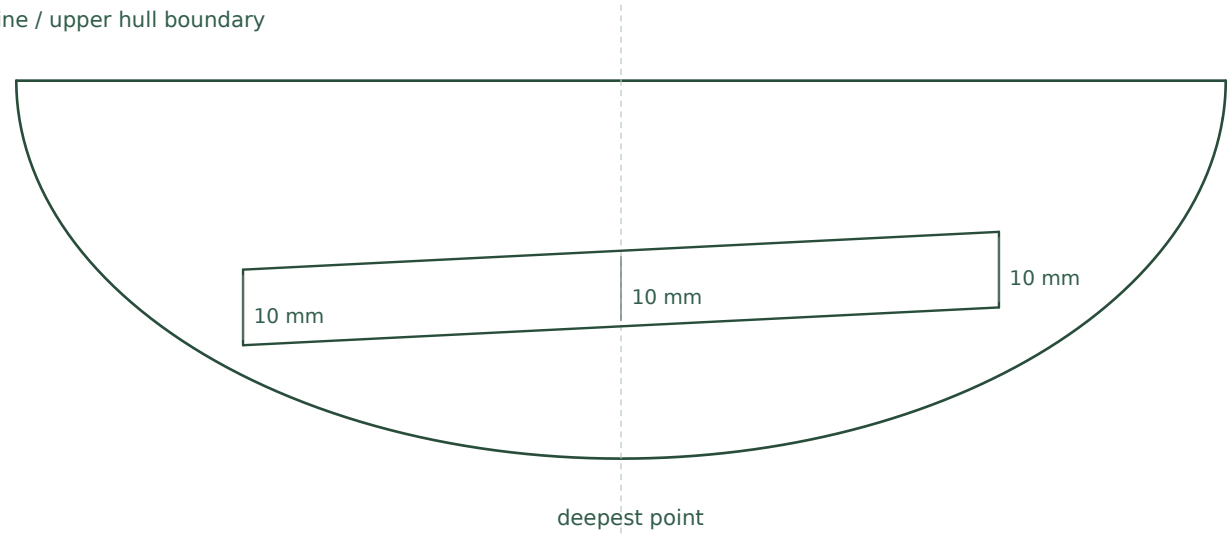
A closed selected hull is built from three joined arcs plus its top baseline. Bow/stern DECK stations are inset, not the zero-depth tips. All lower-deck sampled points lie inside the actual hull. Quarter-station deviations in this symmetric example are 40, 0, 40 mm; only the deepest midship point must be on the midline.

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Task 2 / answers

CUTAWAY SIDE VIEW / named interior deck stations / hypothetical dimensions

PRINT 1:1 / hull 16 cm / depth 5 cm

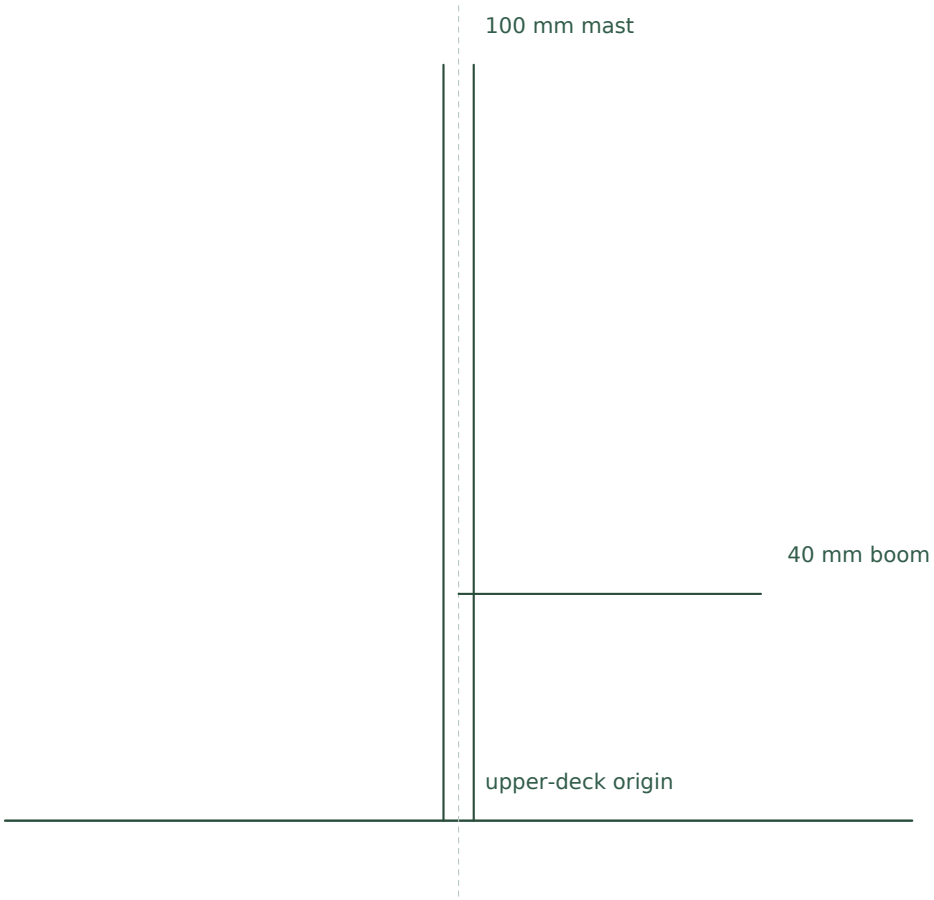


A closed selected hull is built from three joined arcs plus its top baseline. Bow/stern DECK stations are inset, not the zero-depth tips. All lower-deck sampled points lie inside the actual hull. Both decks print at 1:1; all three measured vertical gaps are 10 mm, so variation is 0 mm, less than the hypothetical 3 mm limit. Hull length 160 mm and 30 mm insets are selected illustration values.

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Task 3 / answers

CUTAWAY SIDE VIEW / named interior deck stations / hypothetical dimensions

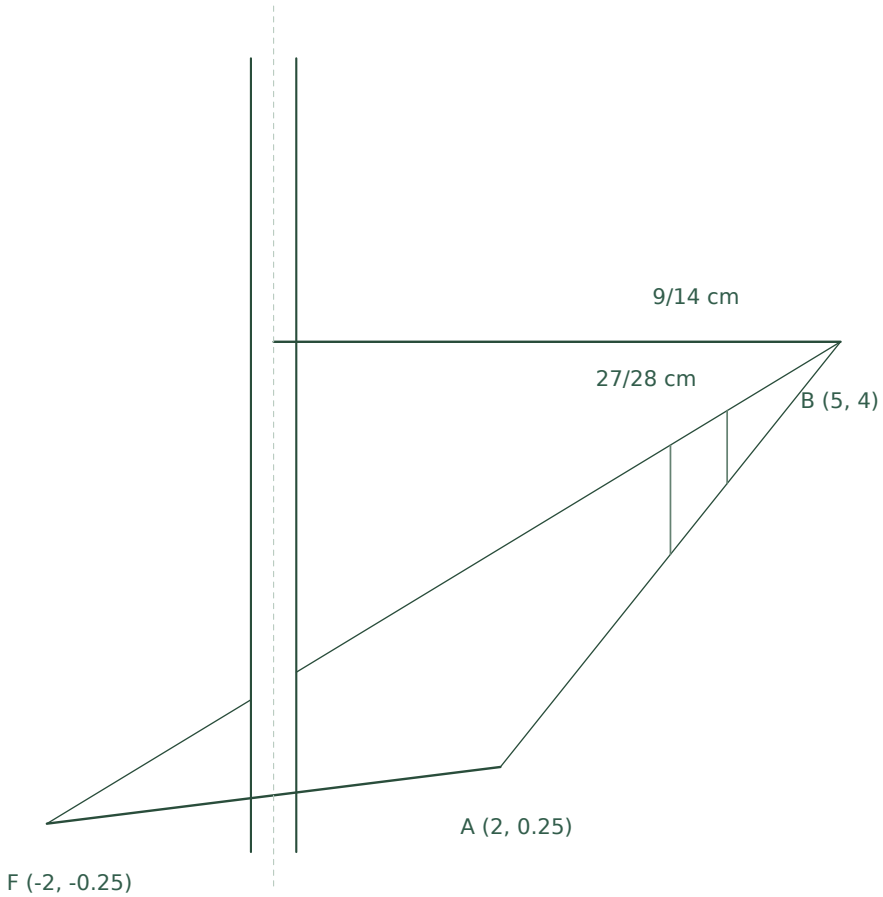


PRINT 1:1 / the upper-deck excerpt is the local origin. The mast is 100 mm above it, with two edges 4 mm apart and a separate dashed centreline. The boom is 40 mm long at 30 mm above that same deck. Base and top lie on x=0; their horizontal deviation is 0 mm, within the selected 5 mm limit.

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Task 4 / answers

CUTAWAY SIDE VIEW / named interior deck stations / hypothetical dimensions



Local detail PRINT 1.5:1; coordinate labels remain original centimetres. The two shared stations are x=3.5 and 4 cm, not x=0. Forward/aft heights are 173/56 and 17/8 cm at x=3.5, then 95/28 and 11/4 cm at x=4. Gap difference 9/28 cm is below 0.5 cm. Only the forward segment crosses the mast; its actual hidden part is omitted.

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Source rubric / reflection

- [ ] Hull is closed, the deepest point lies on the vertical midline, and the bow and stern endpoints match the baseline marks.
- [ ] In the labeled cutaway view, interior deck lines stay inside the hull and their spacing varies by under 0.3 cm.
- [ ] Mast is vertical within 0.5 cm of the vertical midline.
- [ ] For the defined boom example, the vertical gap between the two boom-end lines at x=3.5 and x=4 cm differs by under 0.5 cm; rigging lines are thin and straight.
- [ ] Convention is consistent: solid visible edges, dashed hidden or construction lines, thin rigging.
- [ ] Visible edges, hidden guides, and rigging use the stated line conventions; optional labels are legible.

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