Grid-Guided Rocket Ship Drawing: Body and Fin Placement

Original tasks 1, 2, 3 / complete keys

Task 1

Draw a rocket with body width 5 squares and height 8 squares, nose height 2 squares, and two fins each with base 2 squares and height 3 squares. State the total guide area.

Answer: Body area 5 times 8 equals 40. Nose area half of 5 times 2 equals 5. Each fin area half of 2 times 3 equals 3, two fins total 6. Total guide area is 40 plus 5 plus 6 equals 51 squares.

Reason: Use whole-square counts and the triangle area rule for nose and fins, then sum the parts.

Check: Count whole squares inside each guide shape and confirm the sum equals 51; verify nose base equals 5 squares and fin dots sit at grid intersections.

Task 2

A learner places the nose apex 2 squares to the right of the body centre line. The body width is 6 squares. Describe how to correct the placement using grid counts.

Answer: Move the apex left by 2 squares so it lies on the centre line. The centre line is 3 squares from either body side; the corrected apex should be 3 squares from each side at the chosen nose height.

Reason: Symmetry under this convention requires equal horizontal counts from the centre line to matching features.

Check: Count squares from the apex to the left and right body edges; both counts should be 3.

Task 3

Using body width 4 squares, height 9 squares, nose height 3 squares, and fins with base 3 squares and height 4 squares, compute total guide area and explain one possible source of counting error.

Answer: Body area 4 times 9 equals 36. Nose area half of 4 times 3 equals 6. Two fins each half of 3 times 4 equals 6, total 12. Total guide area is 36 plus 6 plus 12 equals 54 squares. A common error is counting partial squares at the nose or fin edges as full squares.

Reason: Triangular parts contain half-squares; counting them as full squares inflates the total.

Check: Recount using only whole squares plus explicit half-squares, and confirm the arithmetic sum is 54.

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Original tasks 4 / complete keys

Task 4

Design an asymmetric fin placement on a body of width 6 squares and height 10 squares: left fin base 2 squares and height 3 squares; right fin base 4 squares and height 5 squares. Compute total fin area and state how to document the choice.

Answer: Left fin area half of 2 times 3 equals 3 squares. Right fin area half of 4 times 5 equals 10 squares. Total fin area is 13 squares. Document the left and right base and height values separately in the coordinate table and check each side against its own recorded values.

Reason: Asymmetric fins are a valid alternative if each side is recorded and checked independently rather than assumed equal.

Check: Count each fin's whole and half-squares separately and confirm left equals 3 and right equals 10; verify guide dots match the recorded offsets.

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Source rubric / reflection

- [ ] Body is a whole-square rectangle with recorded width and height.
- [ ] Nose base equals body width and apex lies on the body centre line.
- [ ] Fin guide dots are at grid intersections and match recorded base and height values.
- [ ] Coordinate table lists body corners, nose apex, and fin dots.
- [ ] Area check arithmetic is shown and matches counted whole squares.
- [ ] Valid alternatives such as asymmetric fins are documented and checked separately.

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