Mini Car Drawing: Compact Proportions and Wheel Placement

Original tasks 1, 2 / complete keys

Task 1

Side view: wheel diameter 3 cm, wheelbase 6 cm, total body length 9 cm, body height 4.5 cm. State whether the wheelbase and total length ratios match the compact targets of about two and about three wheel diameters.

Answer: Wheelbase ratio = 6 ÷ 3 = 2, matching the target. Total length ratio = 9 ÷ 3 = 3, matching the target. Body height ratio = 4.5 ÷ 3 = 1.5, matching the suggested height.

Reason: Divide each measurement by the wheel diameter to compare with the target ratios. The values are hypothetical examples and are consistent with the compact convention.

Check: Recompute each division and confirm the units cancel: cm ÷ cm gives a pure ratio.

Task 2

Side view: wheel diameter 2.5 cm, wheelbase 7.5 cm, total body length 10 cm. Identify which ratio is too long for the compact target and suggest one adjustment.

Answer: Wheelbase ratio = 7.5 ÷ 2.5 = 3, which is longer than the target of about 2. Total length ratio = 10 ÷ 2.5 = 4, also longer than about 3. Shorten the wheelbase to about 5 cm and the total length to about 7.5 cm, or record a different compact target.

Reason: A wheelbase of three wheel diameters makes the car look long. Reducing the wheelbase and total length restores the compact look while keeping the same wheel diameter.

Check: After adjustment, divide the new measurements by 2.5 cm and confirm the ratios are close to 2 and 3.

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Original tasks 3, 4 / complete keys

Task 3

Three-quarter view: near wheel diameter 2 cm, far wheel diameter 2 cm, near wheelbase 4 cm, far wheelbase 4 cm, horizontal offset 1 cm, vertical offset 0.5 cm. Check whether the wheel sizes and wheelbase are consistent.

Answer: Near and far wheel diameters are equal at 2 cm. Near and far wheelbases are equal at 4 cm, which is two wheel diameters. The offsets are hypothetical example values and are consistent with a simple three-quarter convention.

Reason: Consistency requires equal diameters and equal wheelbases between near and far pairs. The offsets only suggest depth and do not change the compact proportion.

Check: Compare each near measurement with its far counterpart and confirm the differences are zero for diameter and wheelbase.

Task 4

A drawing has wheel diameter 2 cm, wheelbase 5 cm, total body length 8 cm, and body height 4 cm. Calculate the three ratios and state whether the drawing meets the compact targets of about 2, about 3, and about 1.5.

Answer: Wheelbase ratio = 5 ÷ 2 = 2.5, which is above the target of about 2. Total length ratio = 8 ÷ 2 = 4, above the target of about 3. Body height ratio = 4 ÷ 2 = 2, above the suggested 1.5. The drawing is not compact by these targets; shorten the wheelbase, total length, and body height.

Reason: All three ratios exceed the hypothetical targets, so the car will look larger and less compact. Adjusting the measurements while keeping the wheel diameter fixed brings the ratios closer to the targets.

Check: Recalculate each ratio after adjustment and confirm each is close to its target within your chosen tolerance.

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Source rubric / reflection

- [ ] Wheel diameters are equal within the chosen tolerance.
- [ ] Wheelbase is about two wheel diameters, or another short value you have recorded.
- [ ] Total body length is about three wheel diameters, or another compact value you have recorded.
- [ ] Body height above the baseline is about one and a half wheel diameters.
- [ ] Wheel arches have small, consistent clearance and are not wider than the wheels.
- [ ] In three-quarter view, near and far wheels share the same diameter and the offset is consistent.
- [ ] Construction lines are light and final lines are clear.
- [ ] Valid alternative styles are accepted if the compact proportion and wheel placement rules are met.

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