Draw a Turtle Shell: Dome Geometry and Scute Pattern

Original tasks 1, 2, 3, 4 / complete keys

Task 1

A shell is 8 cm wide and 5 cm tall. The rim band is 1.5 cm wide. What is the width of the inner pattern area?

Answer: 5 cm.

Reason: Subtract the rim band from both sides: 8 minus 1.5 minus 1.5 equals 5 cm.

Check: Add the two rim bands back to the inner width: 5 plus 1.5 plus 1.5 equals 8 cm.

Task 2

On a 12 cm wide shell, you plan five central scutes of equal width. What is each scute width if they fill the center line exactly?

Answer: 2.4 cm each.

Reason: Divide total width by number of scutes: 12 divided by 5 equals 2.4 cm.

Check: Multiply 2.4 by 5 to confirm 12 cm.

Task 3

A side-view dome has center height 7 cm and side heights 4 cm and 4 cm. Is the contour symmetric left to right? Explain.

Answer: Yes, it is symmetric because both side heights are equal at 4 cm.

Reason: Symmetry requires matching measurements on both sides of the center.

Check: Compare the two side heights; equal values confirm symmetry.

Task 4

You draw a rim band 3 cm wide on a 10 cm shell. Is this within the suggested narrow-band convention of about one-fifth shell width?

Answer: No. One-fifth of 10 cm is 2 cm, so 3 cm is wider than the convention.

Reason: The convention suggests a narrow band; 3 cm exceeds the 2 cm example.

Check: Divide shell width by 5 and compare with the chosen band width.

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Source rubric / reflection

- [ ] Dome contour is smooth and highest at the center, with measured height checks.
- [ ] Top-down scute layout uses closed polygons with shared edges and no gaps.
- [ ] Side-view scutes wrap over the dome with curved edges and compressed widths near the rim.
- [ ] Rim band is narrow, continuous, and follows the outer outline.
- [ ] Construction lines are erased and outer contour is slightly darker than internal lines.
- [ ] Valid alternatives such as rounded corners or slight asymmetry are accepted if structure remains consistent.

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