Draw Shell Forms: Spiral, Ribbed, and Smooth Comparison Plate

Original tasks 1, 2, 3 / complete keys

Task 1

A box is 10 cm wide and 5 cm high. Find the width-to-height ratio and plan four rib gaps that average 0.6 cm.

Answer: Ratio is 10 divided by 5, or 2. Four gaps averaging 0.6 cm total 2.4 cm; for example 0.5, 0.6, 0.7, and 0.6 cm.

Reason: Divide width by height for the ratio. Multiply the average gap by the number of gaps to get total span, then choose gaps that sum to that total.

Check: Add the four gaps and confirm the sum is 2.4 cm; measure two gaps on the drawing and compare with 0.6 cm.

Task 2

Plan a spiral with three turns in a 7 cm by 7 cm box using hypothetical gaps of 0.3, 0.6, and 0.9 cm. State the total radial span and whether the gaps increase.

Answer: Total radial span is 0.3 plus 0.6 plus 0.9, or 1.8 cm. The gaps increase by 0.3 cm each, so the spacing check passes.

Reason: Add the gaps to find the span. Compare consecutive gaps to confirm each is larger than the previous.

Check: Re-add the gaps and measure the distance from center to outer turn; it should be about 1.8 cm.

Task 3

A ribbed form has five ribs spanning 4 cm. Find the average gap and describe how to check two measured gaps.

Answer: Five rib centerlines create four adjacent inter-rib gaps. For a 4 cm first-to-last span, the average gap is 4 / (5 - 1) = 1 cm. Measure two actual adjacent gaps and compare each with 1 cm; individual gaps need not equal the average unless the spacing is also chosen to be uniform.

Reason: Count intervals rather than rib lines: between rib1 and rib5 are the four gaps 1-2, 2-3, 3-4 and 4-5. Dividing the total first-to-last distance by four gives the average.

Check: Count five rib lines and four intervening gaps. Sum the four measured gaps to recover 4 cm and divide that sum by four. For an evenly spaced example, two sample gaps should each be about 1 cm; do not divide by five ribs.

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Original tasks 4 / complete keys

Task 4

Describe a smooth shell form in a 6 cm by 4 cm box using only an outer contour and one midline. State the ratio and one check.

Answer: Ratio is 6 divided by 4, or 1.5. Draw the outer contour and one gentle midline; check that no ridge lines appear.

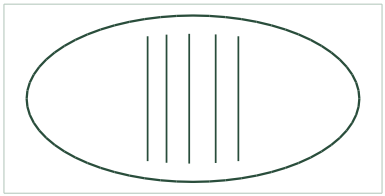
Reason: The smooth form is defined by absence of ridges, so the midline suggests volume without adding rib structure.

Check: Count ridge lines in the smooth row; the count should be zero, and the ratio should read 1.5.

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Task 1 / answers

Shell forms / all labelled hypothetical cm dimensions print 1:2 / not paper-edge margins

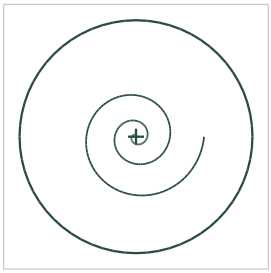


Ratio 10 / 5 = 2. Four chosen gaps 0.5 + 0.6 + 0.7 + 0.6 = 2.4 cm, average 0.6 cm. This numerical task does not assume all four gaps equal.

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Task 2 / answers

Shell forms / all labelled hypothetical cm dimensions print 1:2 / not paper-edge margins

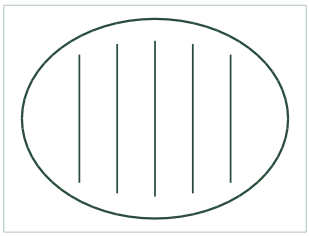


Three turns: radial gaps 0.3, 0.6, 0.9 cm; total radial span 1.8 cm. The measured ray at the end of each full turn gives radii 0.3, 0.9, 1.8 cm.

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Task 3 / answers

Shell forms / all labelled hypothetical cm dimensions print 1:2 / not paper-edge margins



Five ribs / four adjacent gaps. First-to-last span = 4 cm, average = 4 / 4 = 1 cm. This illustrated evenly spaced example has each gap 1 cm.

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Task 4 / answers

Shell forms / all labelled hypothetical cm dimensions print 1:2 / not paper-edge margins



6 / 4 = 1.5. Only the outer contour and one gentle midline appear; there are zero ridges.

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Source rubric / reflection

- [ ] Convention key is stated and used consistently in all three rows.
- [ ] Spiral center is marked and three turns increase in spacing.
- [ ] Ribbed form has evenly spaced ribs that stop short of the outline.
- [ ] Smooth form has no ridges and one gentle midline.
- [ ] Labels are legible, consistent, and use x-height from baseline to midline.
- [ ] Measurements and arithmetic are recorded and checkable.
- [ ] Valid alternatives such as spiral direction or rib curvature are accepted.

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