Draw Horns with Taper and Curve Construction

Original tasks 1, 2 / complete keys

Task 1

Draw a straight horn with four intervals. Use widths of 2.0 cm, 1.5 cm, 1.0 cm, and 0.5 cm from base to tip. These are hypothetical example values. Describe your construction and final check.

Answer: Draw a straight centerline about 8 cm long. Mark four equal intervals. At each interval, draw a centered cross-section mark with the listed widths. Connect the ends with straight outer lines. The horn tapers from 2.0 cm to 0.5 cm. Check: marks are centered; widths decrease in order; outer lines are straight and do not cross the marks.

Reason: A straight centerline isolates taper control. Four intervals give enough checkpoints without overcomplicating the drawing. The width sequence is simple arithmetic: each step reduces by 0.5 cm.

Check: Measure each cross-section mark with a ruler. Confirm the sequence 2.0, 1.5, 1.0, 0.5 cm. Confirm each mark is centered on the centerline by checking equal distances to the outer lines.

Task 2

Draw a curved horn with five intervals and an oval cross-section. Use widths of 3.0 cm, 2.2 cm, 1.6 cm, 1.0 cm, and 0.4 cm. These are hypothetical example values. Describe how you keep the oval centered and how you check taper.

Answer: Draw a smooth arc about 12 cm long. Mark five intervals. At each interval, draw a short oval centered on the arc, with the listed widths as the oval's long axis. Keep the oval's short axis proportional, for example half the long axis. Connect the oval ends with smooth outer lines. Check: each oval is centered; widths decrease in order; outer lines follow the arc without pinching.

Reason: The oval cross-section tests volume control. Centering the oval prevents one-sided taper. The width sequence decreases by 0.8, 0.6, 0.6, and 0.6 cm, which is easy to check.

Check: Measure the long axis of each oval. Confirm the sequence 3.0, 2.2, 1.6, 1.0, 0.4 cm. Check centering by measuring from the arc to each end of the oval; distances should be equal.

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Original tasks 3, 4 / complete keys

Task 3

Draw two horns side by side: one straight and one curved. Use the same four widths: 2.5 cm, 1.8 cm, 1.1 cm, and 0.4 cm. These are hypothetical example values. Describe how you compare them and what you check.

Answer: Draw a straight centerline and a curved centerline of equal length, about 10 cm each. Mark four intervals on each. At each interval, draw centered cross-section marks with the same widths on both horns. Connect outer lines. Compare: the curved horn's outer lines should follow the bend while the widths match the straight horn at each interval. Check: both horns have the same width sequence; the curved horn does not pinch at the bend; the straight horn's outer lines are parallel to its centerline.

Reason: Side-by-side comparison isolates curve errors from taper errors. Using identical widths makes differences easy to spot.

Check: Measure widths at each interval on both horns. They should match in order: 2.5, 1.8, 1.1, 0.4 cm. Check the curved horn's outer lines for pinching by comparing the distance between outer lines to the cross-section mark at each interval.

Task 4

Draw a curved horn with a gradual twist. Use five intervals and circular cross-sections. Rotate each cross-section mark by 15 degrees from the previous one. Use widths of 2.8 cm, 2.1 cm, 1.5 cm, 0.9 cm, and 0.3 cm. These are hypothetical example values. Describe the construction and check.

Answer: Draw a smooth arc about 12 cm long. Mark five intervals. At the base, draw a centered cross-section mark 2.8 cm wide. At each next interval, draw a centered mark with the listed width and rotate it 15 degrees from the previous mark. Connect the ends of the marks with smooth outer lines that follow the rotation. Check: marks are centered; widths decrease in order; rotation is gradual and consistent; outer lines do not cross the marks.

Reason: The twist tests gradual change in cross-section orientation. A 15-degree step is small enough to keep the form readable and easy to check.

Check: Measure each width: 2.8, 2.1, 1.5, 0.9, 0.3 cm. Check rotation by comparing the angle of each mark to the previous one; each step should be about 15 degrees. Confirm centering by measuring from the arc to each end of the mark.

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Source rubric / reflection

- [ ] Centerline is smooth and continuous from base to tip.
- [ ] Cross-section marks are centered on the centerline at each interval.
- [ ] Widths decrease consistently from base to tip according to the stated plan.
- [ ] Outer lines follow the centerline curve without pinching or bulging.
- [ ] Cross-section form is clearly defined and kept consistent, or changes gradually with a noted transition.
- [ ] Construction marks are light and do not obscure the final outline.
- [ ] Valid alternatives: any cross-section form (circular, oval, flattened) is accepted if centered and consistent; any interval count from four to six is accepted if widths are planned and checked.

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