Draw a Claw in Perspective with Curved Taper

Original tasks 1, 2, 3 / complete keys

Task 1

Draw a claw with base major axis 5 cm and minor-to-major ratio 1:2. Use a straight axis and two cross-sections with major axes 3 cm and 1.5 cm. State the tip position and check the taper.

Answer: A drawing with a 5 cm by 2.5 cm base ellipse, a straight axis, and cross-section ellipses of 3 cm by 1.5 cm and 1.5 cm by 0.75 cm, with taper lines meeting at a tip on the axis.

Reason: The ratio 1:2 means minor axis is half the major axis. Cross-sections decrease monotonically. A straight axis simplifies centering.

Check: Measure each major axis; confirm 5 > 3 > 1.5 cm. Confirm each center is on the axis within 2 mm. Confirm taper lines meet at one tip.

Task 2

Draw a claw with base major axis 7 cm and ratio 2:3. Curve the axis to the left. Place three cross-sections with major axes 5 cm, 3 cm, and 1 cm. Describe how you keep the centers on the axis.

Answer: A drawing with a 7 cm by 4.67 cm base ellipse (hypothetical example), a left-curving axis, and cross-section ellipses of 5 cm by 3.33 cm, 3 cm by 2 cm, and 1 cm by 0.67 cm, centered on the axis.

Reason: Ratio 2:3 means minor axis is two-thirds of major. Mark the axis first, then place centers at chosen points along it.

Check: Measure minor axes as two-thirds of major axes. Check centers on axis within 2 mm. Confirm taper lines are smooth and meet at one tip.

Task 3

Draw a claw with base major axis 4 cm and ratio 1:1. Use a curved axis bending downward and four cross-sections with major axes 3 cm, 2 cm, 1 cm, and 0.5 cm. Explain why the base looks circular.

Answer: A drawing with a 4 cm diameter base circle, a downward-curving axis, and cross-section circles of 3 cm, 2 cm, 1 cm, and 0.5 cm diameters, centered on the axis.

Reason: Ratio 1:1 means the base ellipse is a circle, representing a view straight along the minor axis. Cross-sections remain circles if the same ratio is kept.

Check: Measure diameters; confirm decrease. Check centers on axis within 2 mm. Confirm taper lines meet at one tip.

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Original tasks 4 / complete keys

Task 4

Draw a claw with base major axis 6 cm and ratio 1:3. Curve the axis upward. Place cross-sections at major axes 4 cm, 2 cm, and 1 cm. State one valid alternative and why it is acceptable.

Answer: A drawing with a 6 cm by 2 cm base ellipse, an upward-curving axis, and cross-section ellipses of 4 cm by 1.33 cm, 2 cm by 0.67 cm, and 1 cm by 0.33 cm. A valid alternative is curving the axis downward or using a different ratio, provided the convention is stated and followed.

Reason: Ratio 1:3 means minor axis is one-third of major. The rubric allows any consistent convention and curve direction.

Check: Measure minor axes as one-third of major axes. Check centers on axis within 2 mm. Confirm taper lines are smooth and meet at one tip. Confirm the stated convention matches the drawing.

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Source rubric / reflection

- [ ] Base ellipse ratio is stated and matches the drawn ellipse.
- [ ] Cross-section ellipses share the stated ratio and decrease in major axis length.
- [ ] Each cross-section center lies on the curved axis within 2 mm.
- [ ] Taper lines are smooth and meet at a single tip without crossing.
- [ ] Perspective spacing is consistent with the stated convention.
- [ ] Labels are readable, units are stated, and letter style is not penalized.

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