Draw a Glass of Water: Rim Ellipse, Refraction Line, and Cast Shadow

Original tasks 1, 2, 3 / complete keys

Task 1

Draw a glass 12 cm tall with a 7 cm rim and water 5 cm above the base. Light from the upper right. Use the rim ellipse convention and place the cast shadow.

Answer: Rim ellipse with 7 cm horizontal axis and about 2.5 cm vertical axis (hypothetical); water line 5 cm above base, curved and parallel to rim; cast shadow to the lower left, about 6 cm long.

Reason: The light from the upper right puts the shadow to the lower left. The water line sits between rim and base and follows the rim curve.

Check: Measure rim 7 cm and base about 6 cm; confirm water line is 5 cm above base and shadow is opposite the light.

Task 2

Draw a glass 9 cm tall with a 5 cm rim and water 3 cm above the base. Light from the left. Add one short offset line inside the glass to suggest refraction.

Answer: Rim ellipse 5 cm by about 1.8 cm (hypothetical); water line 3 cm above base; offset line just below the water line; cast shadow to the right, about 4 cm long.

Reason: The offset line shows the shift of background objects below the water surface. The shadow falls opposite the left light.

Check: Confirm the offset line is below the refraction line and the shadow is on the right.

Task 3

Draw a glass 15 cm tall with an 8 cm rim and water 7 cm above the base. Light from the upper left. Make the cast shadow darkest at the base.

Answer: Rim ellipse 8 cm by about 3 cm (hypothetical); water line 7 cm above base; shadow to the lower right, about 7 cm long, darkest at the base.

Reason: A taller glass needs a slightly larger vertical axis to keep the ellipse readable. The shadow length scales with height.

Check: Measure rim 8 cm and shadow about 7 cm; check the darkest shading is at the base.

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Original tasks 4 / complete keys

Task 4

Draw a glass 10 cm tall with a 6 cm rim and water 4 cm above the base. Light from the right. Use a flatter rim ellipse than the worked example and justify it.

Answer: Rim ellipse 6 cm by about 1.5 cm (hypothetical, flatter); water line 4 cm above base; shadow to the left, about 5 cm long. Justification: a flatter ellipse matches a lower viewing angle.

Reason: The convention allows flatter ellipses when the view is lower. The shadow still falls opposite the right light.

Check: Confirm the ellipse passes the fold check and the shadow is on the left.

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Source rubric / reflection

- [ ] Rim ellipse uses the horizontal and vertical axis convention and passes the fold check.
- [ ] Refraction line is lower than the rim and parallel to the rim ellipse.
- [ ] Cast shadow touches the base and falls opposite the marked light direction.
- [ ] Glass sides taper slightly toward the base and the rim is centered.
- [ ] Construction lines are erased and the drawing is clean.
- [ ] Valid stylistic alternatives are accepted if the three checkable parts are correct.

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