Shamrock Outline Drawing: Three-Lobed Symmetry Practice

Original tasks 1, 2, 3 / complete keys

Task 1

A frame is 10 cm tall. Using the 40 percent center and 80 percent tip convention, find the center height and tip height above the baseline.

Answer: Center height = 4 cm; tip height = 8 cm.

Reason: Multiply frame height by 0.40 and 0.80: 10 times 0.40 = 4, and 10 times 0.80 = 8.

Check: Re-measure the frame height and recompute both products; confirm the tip height is twice the center height.

Task 2

Three lobe tips are meant to be evenly spaced. One adjacent angle measures 110 degrees. What should the other two adjacent angles sum to if the total is 360 degrees, and what is the ideal equal angle?

Answer: The other two sum to 250 degrees; the ideal equal angle is 120 degrees.

Reason: 360 minus 110 = 250. For three equal angles, 360 divided by 3 = 120.

Check: Add 110 + 125 + 125 = 360 as one valid split, then compare each to 120 to see the adjustment needed.

Task 3

A lobe's widest point is 3 cm from its center line on the left and 2.5 cm on the right. Is it mirror-symmetric within a hypothetical 0.5 cm tolerance?

Answer: Yes, it passes at the boundary because the difference is 0.5 cm, which is no greater than the 0.5 cm tolerance.

Reason: Subtract the two widths: 3 minus 2.5 = 0.5 cm. The difference equals the tolerance, and the inclusive convention says a difference no greater than the tolerance passes.

Check: Measure both sides again with the same ruler and confirm the difference is no greater than 0.5 cm.

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Original tasks 4 / complete keys

Task 4

In a freehand frame, center-to-tip distances are 5.0 cm, 5.2 cm, and 4.8 cm. Using a hypothetical 0.3 cm tolerance, does the set pass, and what is the range?

Answer: No, it does not pass; the range is 0.4 cm, which exceeds the 0.3 cm tolerance, so one distance should be adjusted.

Reason: Find the largest and smallest distances: 5.2 and 4.8. Their difference is 0.4 cm, greater than 0.3 cm, so the set fails the stated tolerance.

Check: Re-measure all three distances from the same center point and recompute the largest-minus-smallest difference.

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Source rubric / reflection

- [ ] Exactly three lobes are present and no fourth lobe is drawn.
- [ ] Each lobe is mirror-symmetric about its own center line within the chosen hypothetical tolerance.
- [ ] The three tips are evenly spaced around the center, with adjacent angles close to 120 degrees.
- [ ] Center-to-tip distances match within the stated hypothetical tolerance.
- [ ] The outline is continuous and free of decorative styling.
- [ ] The mirror-axis check is recorded for the freehand frame.

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