Stained-Glass Window Contour Drawing: Lead-Line Structure

Original tasks 1, 2 / complete keys

Task 1

On a 100 mm by 100 mm square, draw an outer frame with a 3 mm width and internal lines with a 2 mm width (hypothetical examples). Create exactly 4 glass pieces using one vertical line and one horizontal line. Check closure and measure three internal lines.

Answer: A square frame with one vertical line at 50 mm from the left and one horizontal line at 50 mm from the top creates 4 closed pieces. Internal lines measure about 2 mm. All pieces are closed.

Reason: One vertical and one horizontal line crossing inside a closed frame divide the interior into four regions. Each region is bounded by frame or internal lines, so each is closed. The line widths follow the stated convention.

Check: Trace each of the 4 pieces with your finger; no gap should allow escape. Measure three internal line segments with a ruler; each should be within 1 mm of 2 mm. Count labels: 4.

Task 2

Draw a rectangular frame 80 mm wide and 120 mm tall with a 3 mm frame width and 2 mm internal width (hypothetical examples). Add one vertical line and two horizontal lines to create 6 pieces. Then add one short internal line inside the top-left piece that connects two existing lines, creating 7 pieces total. Check closure and count.

Answer: The frame plus one vertical and two horizontal lines gives 6 pieces. The short line inside the top-left piece splits it into 2, giving 7 pieces. All lines connect at both ends. Final count is 7.

Reason: Each new internal line that connects two existing lines and does not cross another line adds one new closed piece. The short line splits one piece into two, increasing the count by one.

Check: Trace all 7 pieces and mark any gap. Measure five internal lines for width. Count labels and compare with 7. Verify the short line touches existing lines at both ends.

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Original tasks 3, 4 / complete keys

Task 3

Create a contour with exactly 8 glass pieces on a 120 mm by 120 mm square. Use a 3 mm frame and 2 mm internal lines (hypothetical examples). Include at least one curved lead line. Check closure, measure four internal lines, and write a design note with piece count, curved line count, and straight line count.

Answer: One valid design: a square frame, one central vertical line, one central horizontal line (4 pieces), then one diagonal line in each of the four pieces, each connecting two existing lines (8 pieces total). One diagonal is curved. Design note: 8 pieces, 1 curved internal line, 5 straight internal lines (the frame is not counted as an internal line).

Reason: The central cross creates 4 pieces. Adding one line inside each piece that connects two existing lines splits each piece into 2, giving 8. The curved line is a single continuous stroke connecting at both ends.

Check: Trace 8 pieces for closure. Measure four internal lines for width. Count curved internal lines (1) and straight internal lines (5) and compare with the note. Count labels: 8.

Task 4

Draw a contour with 10 glass pieces on a 140 mm by 100 mm rectangle. Use a 3 mm frame and 2 mm internal lines (hypothetical examples). Include two curved lines. After drawing, intentionally leave one gap in a lead line, then find and fix it. Check closure and recount.

Answer: A valid design uses a frame, one vertical line, two horizontal lines (6 pieces), and four short lines that each split one piece (10 pieces). Two of the short lines are curved. The intentional gap is marked with a dot, then redrawn as a single stroke. Final count is 10.

Reason: The main divisions create 6 pieces. Four additional lines that each connect two existing lines add 4 pieces, giving 10. Fixing a gap restores closure without changing the count if the gap was within an existing line.

Check: Trace all 10 pieces after fixing the gap. Measure five internal lines for width. Count curved lines (2) and compare with the design note. Count labels: 10.

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Source rubric / reflection

- [ ] Outer frame is a closed shape with a consistent width at least 1 mm wider than internal lines.
- [ ] Every internal lead line is a single continuous stroke that connects to existing lines at both ends.
- [ ] Every glass piece is a closed shape with no gaps, verified by finger tracing.
- [ ] Five measured internal lines are within 1 mm of the chosen internal width.
- [ ] The number of labeled glass pieces matches the final count after fixes.
- [ ] The design note lists piece count, curved line count, and straight line count accurately.

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