Contour Drawing of Scissors: Slow vs Quick Line Passes

Original tasks 1, 2, 3 / complete keys

Task 1

A scissors reference measures 15 cm. The slow box drawing measures 14.5 cm and the quick box drawing measures 13 cm. Using a hypothetical 1 cm tolerance, state which drawing is within tolerance and by how much each differs.

Answer: The slow drawing is within tolerance: 15 - 14.5 = 0.5 cm difference. The quick drawing is outside tolerance: 15 - 13 = 2 cm difference.

Reason: Subtract each drawing measurement from the reference measurement in the same unit. Compare each difference to the stated 1 cm tolerance.

Check: Re-measure the longest dimension in each box with the same ruler and confirm the subtraction: 15 - 14.5 = 0.5 and 15 - 13 = 2.

Task 2

In a slow pass, a handle loop has a baseline at 4 cm from the bottom of the box and a midline at 7 cm from the bottom. In the quick pass, the same loop has a baseline at 4 cm and a midline at 6 cm. Calculate each x-height and the difference.

Answer: Slow x-height = 7 - 4 = 3 cm. Quick x-height = 6 - 4 = 2 cm. Difference = 3 - 2 = 1 cm.

Reason: X-height is midline minus baseline. Apply the convention to each pass and subtract the smaller x-height from the larger.

Check: Confirm the baseline is the same in both passes, then re-subtract: 7 - 4 = 3 and 6 - 4 = 2; 3 - 2 = 1.

Task 3

A quick pass drawing has a blade angle line that starts at the pivot and ends 8 cm to the right and 6 cm up from the pivot. A slow pass drawing has the same start but ends 7 cm to the right and 5 cm up. Which pass has the longer blade line, and by how much? Use whole-centimeter arithmetic and state the unit.

Answer: The quick pass blade line is longer. Quick length is the hypotenuse of 8 cm and 6 cm, which is 10 cm; slow length is the hypotenuse of 7 cm and 5 cm, which is about 8.6 cm. The difference is about 1.4 cm.

Reason: Treat each blade line as the hypotenuse of a right triangle with the horizontal and vertical offsets as legs. Compute each length and subtract.

Check: Recompute 8 squared plus 6 squared equals 100, so the quick length is 10 cm. Recompute 7 squared plus 5 squared equals 74, so the slow length is about 8.6 cm. Subtract: 10 - 8.6 = 1.4 cm.

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Original tasks 4 / complete keys

Task 4

A student writes two comparison notes: 'Slow pass: blade edge has 4 direction changes; quick pass: blade edge has 2 direction changes.' The reference scissors blade is straight. Is the note a valid line-quality comparison, and what should the student check next?

Answer: Yes, the note is valid because it names a specific feature (blade edge) and a countable difference (4 versus 2 direction changes) without guessing about function. The student should next check whether the quick pass still shows a readable blade angle and pivot position, and whether the longest dimension is within the chosen tolerance.

Reason: A valid comparison note describes observable line quality with consistent counting. Direction changes are countable on the drawing. The next check confirms the quick pass remains readable and proportional.

Check: Count the direction changes on each drawn blade edge again and confirm the numbers 4 and 2. Then measure the longest dimension in each box and compare to the reference.

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Source rubric / reflection

- [ ] Both boxes are labeled Slow and Quick, and each contains one contour drawing of the scissors with no shading.
- [ ] The slow pass shows continuous edge tracking with few pencil lifts and records at least one inner and one outer handle edge.
- [ ] The quick pass shows a readable pivot, blade angle, and gap between handle loops in a faster, simplified line.
- [ ] Each box has one comparison note naming a specific line-quality difference with consistent units.
- [ ] Measurements of the longest dimension in each box are recorded and compared to the reference measurement.
- [ ] Handle loop x-height is measured from baseline to midline using the stated convention; loop shape may vary.

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