Draw an Old Balance Scale: Beam, Pan, and Base Construction

Original tasks 1, 2, 3 / complete keys

Task 1

On a 15 cm by 20 cm area, draw a base trapezoid 6 cm wide at the bottom, 4 cm at the top, and 1.5 cm tall. Add a vertical column 8 cm tall and 1 cm wide at the base center. State one measurement you would check.

Answer: A centered trapezoid with the stated dimensions and a vertical column at its center. Check that the column sides are parallel to the center line and that the base left and right widths match.

Reason: The base and column are built from centered measurements, so symmetry and verticality are the key checks.

Check: Measure the base bottom edge left and right from the center line; they should be 3 cm each within your tolerance. Check the column width is 1 cm.

Task 2

Draw a horizontal beam 10 cm long and 0.8 cm thick with its midpoint on a vertical center line. Add a pivot circle at the midpoint. Describe how you check beam symmetry.

Answer: The beam is centered with 5 cm on each side of the midpoint. The pivot circle sits at the midpoint. Check by measuring from the midpoint to each beam end; both should be 5 cm within your tolerance.

Reason: A centered beam has equal halves, and the pivot marks the balance point.

Check: Use a ruler to measure each half from the midpoint; record both lengths and compare.

Task 3

From one end of a beam, draw three suspension cords of equal length down to a shallow pan rim. The cords are 4 cm long in this hypothetical example. Describe how to check the pan is level.

Answer: Draw three cords from the beam end to the pan rim, each 4 cm. The pan rim should be horizontal. Check by measuring each cord and comparing the pan rim height at left and right.

Reason: Equal cord lengths keep the pan level; unequal lengths cause tilting.

Check: Measure each cord length and the vertical distance from the beam end to the pan rim on both sides.

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Original tasks 4 / complete keys

Task 4

Draw a complete old balance scale with one base, one column, one beam, and one pan. Use a center line and state your symmetry tolerance. Then label the base with the word BASE using uppercase letters whose baseline is at the bottom and midline at the top.

Answer: A complete scale with centered base, vertical column, centered beam, and level pan. The label BASE uses uppercase letters meeting the height convention. The stated tolerance might be 2 mm for a hypothetical example.

Reason: The construction follows the same centered order, and the label follows the given lettering convention.

Check: Measure beam halves and base widths for symmetry; check the label letters sit between baseline and midline.

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Source rubric / reflection

- [ ] Base is centered and symmetrical about the vertical center line.
- [ ] Column is vertical and sits at the base center.
- [ ] Beam midpoint is on the center line and beam halves are equal within the stated tolerance.
- [ ] Pan suspension cords are equal in length and the pan hangs level.
- [ ] Construction lines are light and final outlines are clear.
- [ ] Any lettering follows the baseline-to-midline height convention and is legible.

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