Draw a Plant Stem: Leaf-Node Joints and Taper Construction

Original tasks 1, 2 / complete keys

Task 1

Axis length 100 mm, base width 8 mm, top width 4 mm, nodes at 20, 50, and 75 percent. Calculate node positions and interpolated widths, then describe the drawing.

Answer: Node positions: 20 mm, 50 mm, and 75 mm. Widths: at 20 percent, 8 minus 0.20 times 4 equals 7.2 mm; at 50 percent, 8 minus 0.50 times 4 equals 6.0 mm; at 75 percent, 8 minus 0.75 times 4 equals 5.0 mm. Draw axis, mark positions, mark widths, connect side lines smoothly, add short upward joint lines.

Reason: Interpolation uses base width minus fraction times difference between base and top widths. Node positions are percentages of axis length.

Check: Measure node positions from baseline and compare to 20, 50, and 75 mm within 2 mm. Measure widths at nodes and compare to 7.2, 6.0, and 5.0 mm within 1 mm.

Task 2

Axis length 80 mm, base width 5 mm, top width 2 mm, nodes at 30, 60, and 90 percent. Calculate and describe the drawing.

Answer: Node positions: 24 mm, 48 mm, and 72 mm. Widths: at 30 percent, 5 minus 0.30 times 3 equals 4.1 mm; at 60 percent, 5 minus 0.60 times 3 equals 3.2 mm; at 90 percent, 5 minus 0.90 times 3 equals 2.3 mm. Draw axis, mark positions, mark widths, connect side lines, add joint lines.

Reason: The difference between base and top widths is 3 mm. Multiply by each fraction and subtract from base width.

Check: Verify node positions within 2 mm of 24, 48, and 72 mm. Verify widths within 1 mm of 4.1, 3.2, and 2.3 mm.

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Original tasks 3, 4 / complete keys

Task 3

Axis length 150 mm, base width 9 mm, top width 3 mm, nodes at 10, 40, and 70 percent. Calculate and describe the drawing.

Answer: Node positions: 15 mm, 60 mm, and 105 mm. Widths: at 10 percent, 9 minus 0.10 times 6 equals 8.4 mm; at 40 percent, 9 minus 0.40 times 6 equals 6.6 mm; at 70 percent, 9 minus 0.70 times 6 equals 4.8 mm. Draw axis, mark positions, mark widths, connect side lines, add joint lines.

Reason: Difference between base and top widths is 6 mm. Interpolate at each node fraction.

Check: Measure node positions within 2 mm of 15, 60, and 105 mm. Measure widths within 1 mm of 8.4, 6.6, and 4.8 mm.

Task 4

Axis length 60 mm, base width 4 mm, top width 1 mm, nodes at 35, 65, and 85 percent. Calculate and describe the drawing.

Answer: Node positions: 21 mm, 39 mm, and 51 mm. Widths: at 35 percent, 4 minus 0.35 times 3 equals 2.95 mm; at 65 percent, 4 minus 0.65 times 3 equals 2.05 mm; at 85 percent, 4 minus 0.85 times 3 equals 1.45 mm. Draw axis, mark positions, mark widths, connect side lines, add joint lines.

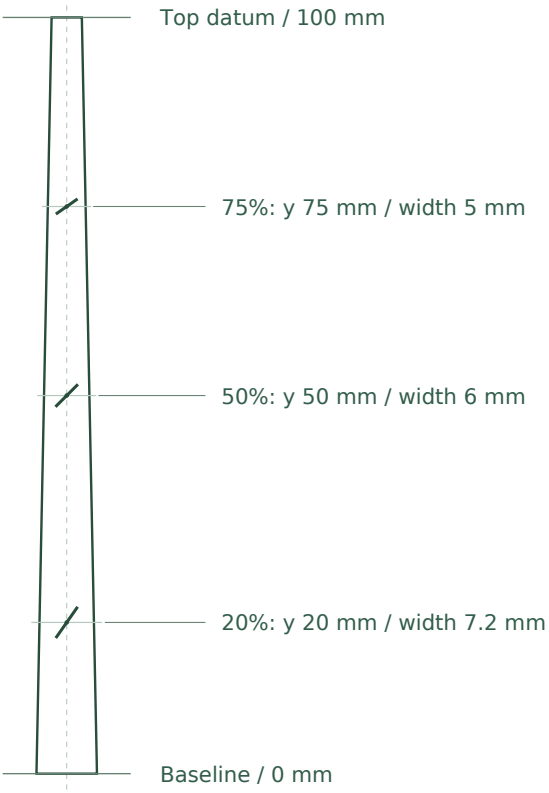
Reason: Difference between base and top widths is 3 mm. Multiply by each fraction and subtract from base width.

Check: Verify node positions within 2 mm of 21, 39, and 51 mm. Verify widths within 1 mm of 2.95, 2.05, and 1.45 mm.

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Task 1 / answers

Stem construction / all labelled mm dimensions print 1:1 / selected classroom study

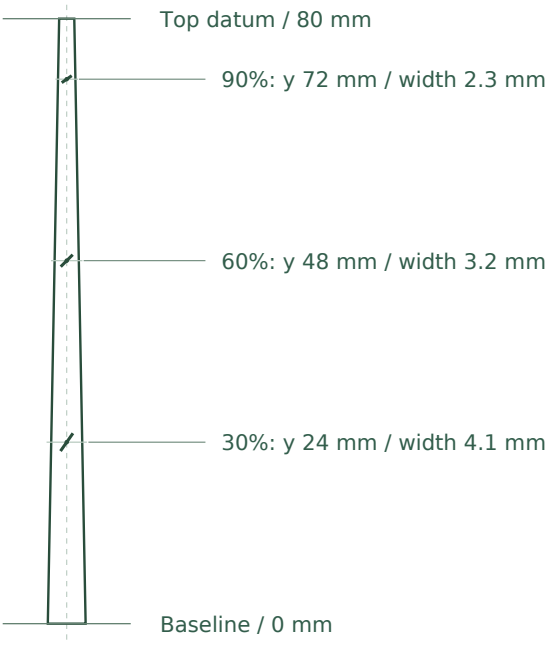


Linear taper: width(y) = 8 + (4 - 8) x y / 100. The three selected node positions are not equal segments. Thin locating ticks are perpendicular; each dark final joint is shorter than the local width and separately angled. The 2 mm and 1 mm checks in the source are selected class criteria, not printing standards.

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Task 2 / answers

Stem construction / all labelled mm dimensions print 1:1 / selected classroom study

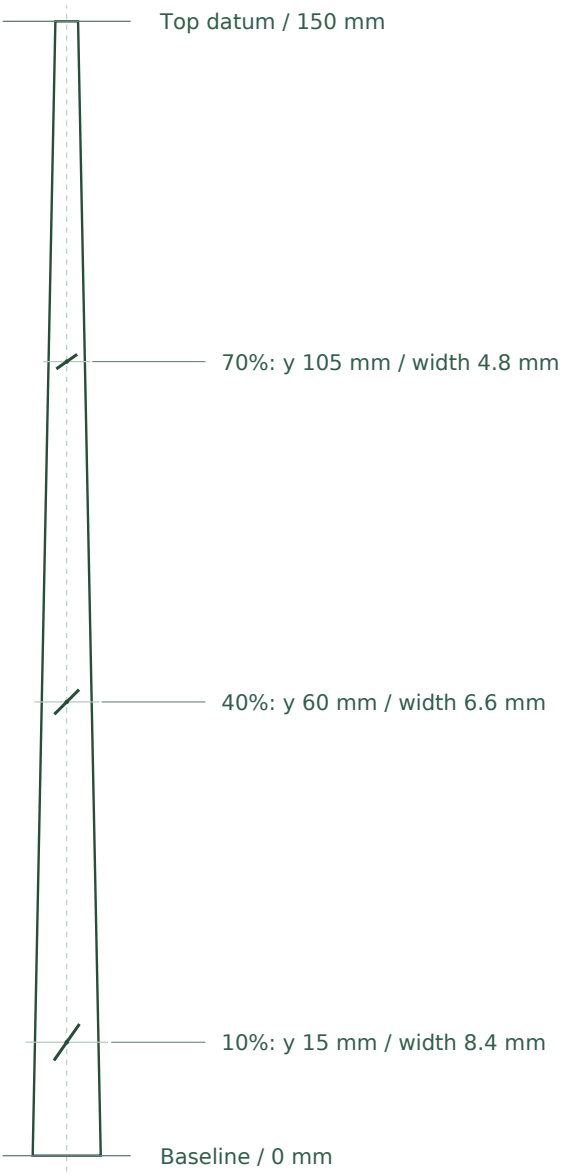


Linear taper: width(y) = 5 + (2 - 5) x y / 80. The three selected node positions are not equal segments. Thin locating ticks are perpendicular; each dark final joint is shorter than the local width and separately angled. The 2 mm and 1 mm checks in the source are selected class criteria, not printing standards.

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Task 3 / answers

Stem construction / all labelled mm dimensions print 1:1 / selected classroom study

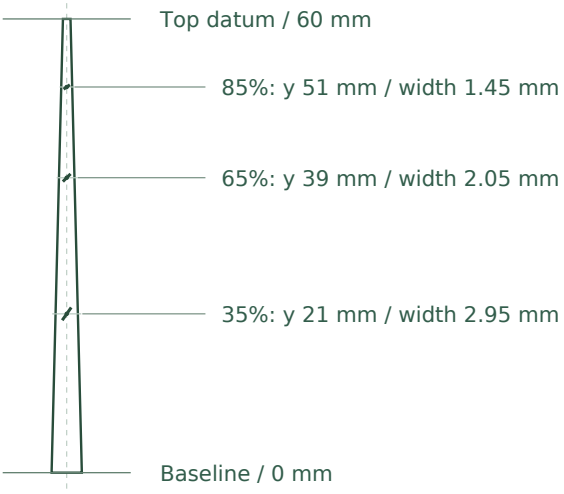


Linear taper: width(y) = 9 + (3 - 9) x y / 150. The three selected node positions are not equal segments. Thin locating ticks are perpendicular; each dark final joint is shorter than the local width and separately angled. The 2 mm and 1 mm checks in the source are selected class criteria, not printing standards.

Draw a Plant Stem: Leaf-Node Joints and Taper Construction

Task 4 / answers

Stem construction / all labelled mm dimensions print 1:1 / selected classroom study



Linear taper: width(y) = 4 + (1 - 4) x y / 60. The three selected node positions are not equal segments. Thin locating ticks are perpendicular; each dark final joint is shorter than the local width and separately angled. The 2 mm and 1 mm checks in the source are selected class criteria, not printing standards.

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Source rubric / reflection

- [ ] Axis is straight or smoothly curved and has marked baseline and midline.
- [ ] Node positions match calculated percentages within 2 mm.
- [ ] Stem width at base and top matches chosen values within 1 mm.
- [ ] Taper is gradual with no bulges at nodes.
- [ ] Joint lines are shorter than local stem width and angled upward between 30 and 60 degrees.
- [ ] All measurements use one stated unit.
- [ ] Any alternative convention is stated on the page and applied consistently.

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