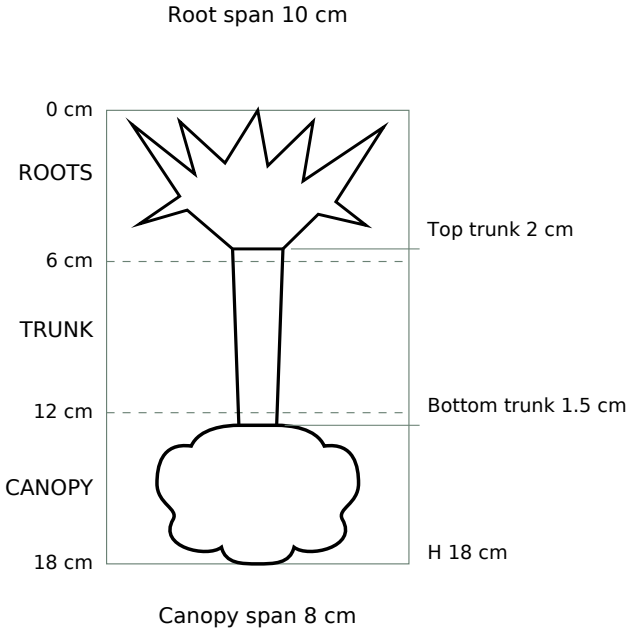
Draw an Upside-Down Tree: Inverted Roots and Canopy

WORKED EXAMPLE / SEPARATE ANSWER

A drawing has height H = 18 cm. The root spread is 10 cm wide at the top, the canopy is 8 cm wide at the bottom, and the trunk tapers from 2 cm to 1.5 cm. Check the inversion and proportions.



The root spread is above the 6 cm line and the canopy below the 12 cm line, so the inversion is correct. The root spread is 2 cm wider than the canopy (10 - 8 = 2). The trunk taper is 0.5 cm (2 - 1.5 = 0.5). All units are centimeters. The drawing passes the proportion check; labels must still be legible.

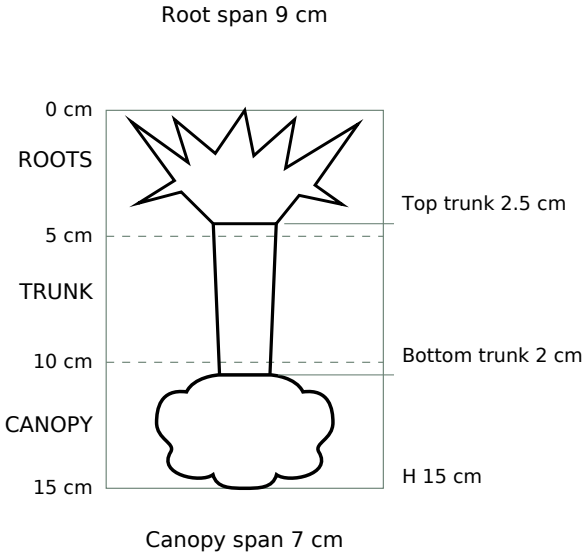
Check: 18 / 3 = 6; 2 x 18 / 3 = 12; 10 - 8 = 2; 2 - 1.5 = 0.5. Check the positions and all three labels on the actual drawing.

Diagram prints at 1:3: the H frame is 6 cm high on paper. For this model only, the lowest root junction is at y = 5.5 cm and canopy starts at y = 12.5 cm; the original task does not fix those two illustration positions.

Draw an Upside-Down Tree: Inverted Roots and Canopy

EXERCISE 1 / SEPARATE ANSWER

A drawing has H = 15 cm. The root spread is 9 cm wide, the canopy is 7 cm wide, and the trunk tapers from 2.5 cm to 2 cm. Check the inversion zones and compute the width difference and taper.



Upper-third line is at 5 cm and lower-third line at 10 cm. Roots must be above 5 cm and canopy below 10 cm. Width difference = 9 - 7 = 2 cm. Taper = 2.5 - 2 = 0.5 cm. Units are centimeters.

Why: Divide H by 3 to get the guide lines. Subtract canopy width from root width for the difference. Subtract bottom trunk width from top trunk width for the taper. Confirm the zones before accepting the drawing.

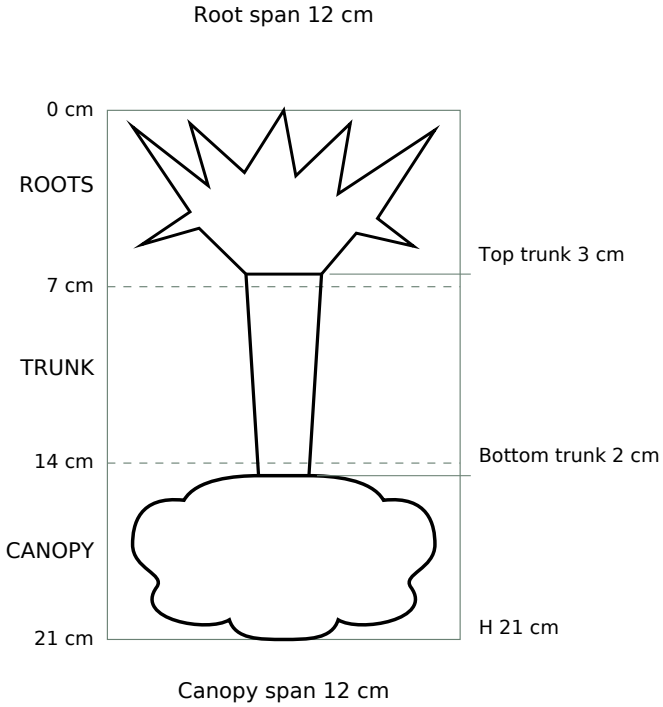
Check: Recompute 15/3 = 5 and 2*15/3 = 10. Verify 9 - 7 = 2 and 2.5 - 2 = 0.5. Confirm roots are above 5 cm and canopy below 10 cm.

Diagram prints at 1:3: the H frame is 5 cm high on paper. For this model only, the lowest root junction is at y = 4.5 cm and canopy starts at y = 10.5 cm; the original task does not fix those two illustration positions.

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EXERCISE 2 / SEPARATE ANSWER

A drawing has H = 21 cm. The root spread is 12 cm wide, the canopy is 12 cm wide, and the trunk tapers from 3 cm to 2 cm. Is the inversion valid? Compute the width difference and taper, and state one label check.



Guide lines are at 7 cm and 14 cm. Roots above 7 cm and canopy below 14 cm make the inversion valid. Width difference = 12 - 12 = 0 cm. Taper = 3 - 2 = 1 cm. Label check: roots, trunk, and canopy labels must be legible.

Why: Equal widths are allowed under the convention; the inversion depends on vertical placement, not width difference. Compute the taper and confirm labels are legible.

Check: Recompute 21/3 = 7 and 2*21/3 = 14. Verify 12 - 12 = 0 and 3 - 2 = 1. Check that all three labels are readable.

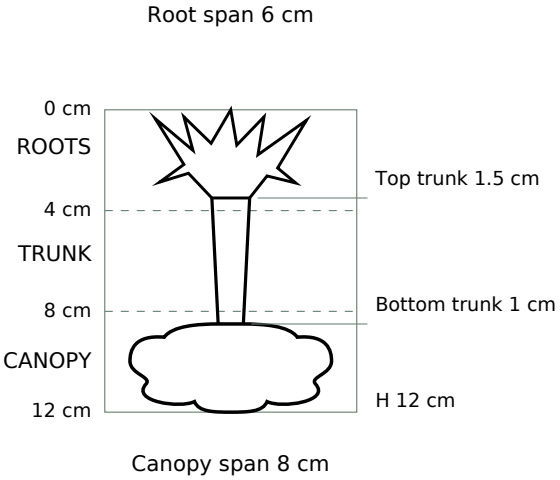
Diagram prints at 1:3: the H frame is 7 cm high on paper. For this model only, the lowest root junction is at y = 6.5 cm and canopy starts at y = 14.5 cm; the original task does not fix those two illustration positions.

Equal widths and a wider canopy are valid when the zones and chosen convention remain clear. A negative root-minus-canopy result describes the direction of the difference.

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EXERCISE 3 / SEPARATE ANSWER

A drawing has H = 12 cm. The root spread is 6 cm wide, the canopy is 8 cm wide, and the trunk tapers from 1.5 cm to 1 cm. The roots are above 4 cm and the canopy is below 8 cm. Is this a valid inverted tree under the convention? Explain and compute the width difference and taper.



Yes, it is valid. The roots are above the upper-third line (4 cm) and the canopy is below the lower-third line (8 cm). Width difference = 6 - 8 = -2 cm, meaning the canopy is 2 cm wider. Taper = 1.5 - 1 = 0.5 cm. A narrower root spread is a valid variation if labeled and consistent.

Why: The convention fixes vertical placement, not relative widths. A negative width difference is acceptable when explained. Compute taper and confirm labels.

Check: Recompute 12/3 = 4 and 2*12/3 = 8. Verify 6 - 8 = -2 and 1.5 - 1 = 0.5. Confirm the variation is noted and labels are legible.

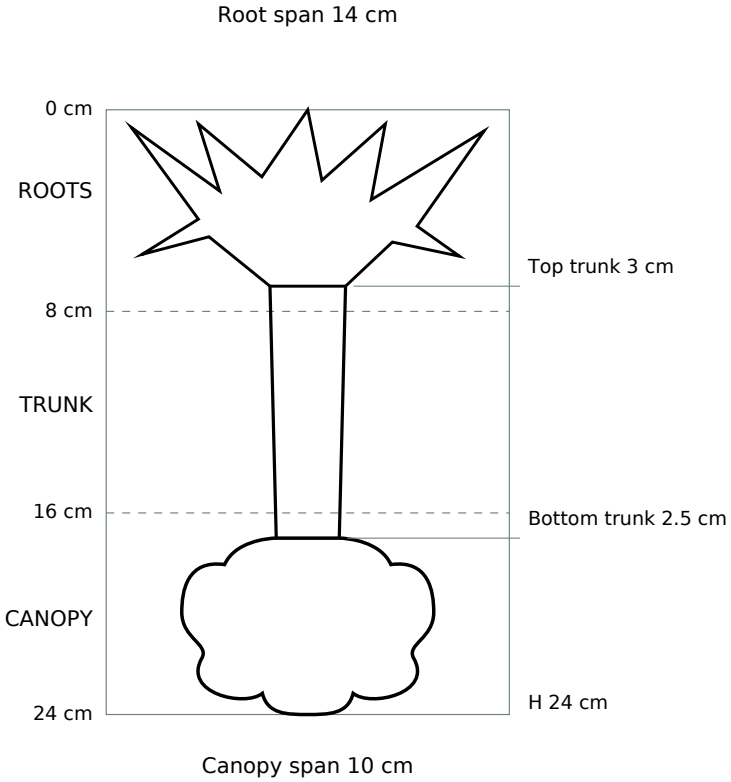
Diagram prints at 1:3: the H frame is 4 cm high on paper. For this model only, the lowest root junction is at y = 3.5 cm and canopy starts at y = 8.5 cm; the original task does not fix those two illustration positions.

Equal widths and a wider canopy are valid when the zones and chosen convention remain clear. A negative root-minus-canopy result describes the direction of the difference.

Draw an Upside-Down Tree: Inverted Roots and Canopy

EXERCISE 4 / SEPARATE ANSWER

A drawing has H = 24 cm. The root spread is 14 cm wide, the canopy is 10 cm wide, and the trunk tapers from 3 cm to 2.5 cm. The roots are at 7 cm from the top and the canopy starts at 17 cm from the top. Check the zones, compute width difference and taper, and state whether the drawing passes the proportion check.



Upper-third line is at 8 cm and lower-third line at 16 cm. Roots at 7 cm are above 8 cm, so the root zone is correct. Canopy starting at 17 cm is below 16 cm, so the canopy zone is correct. Width difference = 14 - 10 = 4 cm. Taper = 3 - 2.5 = 0.5 cm. The drawing passes the proportion check; labels must still be legible.

Why: Compare measured positions to the guide lines. Compute width difference and taper. A pass requires correct zones and checkable arithmetic; labels are checked separately.

Check: Recompute 24/3 = 8 and 2*24/3 = 16. Verify 7 < 8 and 17 > 16. Verify 14 - 10 = 4 and 3 - 2.5 = 0.5. Check labels for legibility.

Diagram prints at 1:3: the H frame is 8 cm high on paper. The shown root junction y = 7 cm and canopy start y = 17 cm are the given positions.

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RUBRIC AND REFLECTION

Use this same checklist for the labelled plate, your tracing and the four proportion tasks. Consistent alternative root/canopy line styles are valid. Numerical answers alone do not prove an actual drawing is in the correct zones.

1. Root spread is placed above the upper-third guide line.
2. Canopy is placed below the lower-third guide line.
3. Trunk connects root spread and canopy through the middle band with a consistent taper.
4. Line convention is consistent and the three parts are distinguishable.
5. Labels for roots, trunk, and canopy are legible; letter style may vary.
6. Measurements are recorded with consistent units and simple arithmetic is correct.
7. Any deliberate variation from the example proportions is noted and explained.

- ☐ Roots above the first guide; canopy below the second.
- ☐ I used one unit and checked each subtraction.
- ☐ My labels are readable and I explained any width variation.

My chosen line convention / one change after tracing:

Root width minus canopy width may be positive, zero, or negative. A result of -2 cm means the canopy is 2 cm wider. Top trunk width minus bottom width describes the selected downward narrowing. Keep all measurement units consistent.

All dimensions are hypothetical classroom examples. Root spread stays in the upper zone and canopy in the lower zone; relative widths may vary. Trunk taper is a chosen drawing rule, not a botanical standard.