Compare Tree Silhouettes and Branch Structures Across Species

Original tasks 1, 2 / complete keys

Task 1

A silhouette has crown width 4 cm, crown height 16 cm, and branch angles of 10, 20, and 30 degrees from vertical. Branch tips rise above attachment points. Classify the silhouette and justify with two evidence items.

Answer: Columnar. Mean angle is (10 + 20 + 30) divided by 3, which equals 20 degrees. Width-to-height ratio is 4 divided by 16, which equals 0.25. A narrow ratio of 0.25 and a small mean angle of 20 degrees support columnar.

Reason: The narrow crown and near-vertical branches match the columnar range. Upward tips rule out weeping. Two evidence items are the ratio and the mean angle.

Check: Recompute 60 divided by 3 equals 20 degrees, and 4 divided by 16 equals 0.25. Confirm both values fall in the columnar ranges stated in the lesson.

Task 2

A silhouette has crown width 12 cm, crown height 10 cm, and branch angles of 50, 60, and 70 degrees from vertical. Most branch tips fall below attachment points. Classify the silhouette and justify with two evidence items.

Answer: Weeping. Mean angle is (50 + 60 + 70) divided by 3, which equals 60 degrees. Width-to-height ratio is 12 divided by 10, which equals 1.2. Downward tips and a broad ratio of 1.2 support weeping.

Reason: The tip direction is the decisive evidence because upward angles alone could suggest spreading. The broad ratio and downward tips together match weeping.

Check: Recompute 180 divided by 3 equals 60 degrees, and 12 divided by 10 equals 1.2. Confirm that most tips are below attachment points.

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Original tasks 3, 4 / complete keys

Task 3

A silhouette has crown width 6 cm, crown height 12 cm, and branch angles of 30, 40, and 50 degrees from vertical. The crown tapers to a point and tips rise above attachment points. Classify the silhouette and justify with two evidence items.

Answer: Conical. Mean angle is (30 + 40 + 50) divided by 3, which equals 40 degrees. Width-to-height ratio is 6 divided by 12, which equals 0.5. A tapering crown and a mean angle of 40 degrees support conical.

Reason: The tapering outline distinguishes conical from columnar, which stays narrow without a pointed taper. The ratio and mean angle are secondary evidence.

Check: Recompute 120 divided by 3 equals 40 degrees, and 6 divided by 12 equals 0.5. Confirm the crown outline tapers to a point.

Task 4

Two silhouettes are compared. Silhouette A has mean angle 45 degrees and ratio 0.6. Silhouette B has mean angle 50 degrees and ratio 0.65. Both have upward tips. Are they different types under the 5-degree and 0.05 allowance? Justify.

Answer: They are not reliably different types under the stated allowance. The angle difference is 5 degrees and the ratio difference is 0.05, both at the allowance boundary. Without additional evidence such as crown outline, classify them as the same type or as uncertain.

Reason: The lesson allows a 5-degree angle difference and a 0.05 ratio difference before changing a label. Both differences sit exactly at the boundary, so the comparison is inconclusive.

Check: Subtract 45 from 50 to get 5 degrees, and subtract 0.6 from 0.65 to get 0.05. Compare each difference with the allowance.

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Source rubric / reflection

- [ ] Silhouette type is labeled for each drawing.
- [ ] Mean branch angle is computed from at least three measured angles.
- [ ] Crown width divided by crown height is computed with consistent units.
- [ ] Branch tip direction is recorded as above or below attachment points.
- [ ] The drawing convention is stated beside each silhouette.
- [ ] At least two evidence items support each type label.
- [ ] Valid alternatives such as curved branches with chords or half-and-mirror drawings are accepted when the convention is stated.

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