Holiday Drawings: Ornament, Tree, and Snowman Construction

Original tasks 1, 2, 3 / complete keys

Task 1

Using U = 3 cm, construct an ornament with an oval body 1.2U tall, a cap 0.3U tall, and a loop 0.2U tall. State the total height and the cap width if cap width is one-third of body width when body width is 1U.

Answer: Body height = 1.2 × 3 = 3.6 cm. Cap height = 0.3 × 3 = 0.9 cm. Loop height = 0.2 × 3 = 0.6 cm. Total height = 3.6 + 0.9 + 0.6 = 5.1 cm. Body width = 1 × 3 = 3 cm. Cap width = one-third of 3 = 1 cm.

Reason: Multiply each U multiple by U = 3 cm. Add the three heights for total height. Body width is 1U = 3 cm; cap width is one-third of that.

Check: Re-add 3.6 + 0.9 + 0.6 = 5.1 cm. Confirm cap width 1 cm is less than body width 3 cm and that all parts share the center line.

Task 2

Using U = 2 cm, construct a three-tier tree with tier heights 1U, 1.2U, and 1.4U from top to bottom and trunk height 0.5U. State the total height and check that each lower tier is wider than the one above if widths are 1.5U, 2.5U, and 3.5U.

Answer: Tier heights: 2 cm, 2.4 cm, 2.8 cm. Trunk height = 1 cm. Total height = 2 + 2.4 + 2.8 + 1 = 8.2 cm. Widths: 3 cm, 5 cm, 7 cm. Each lower tier is wider: 3 < 5 < 7.

Reason: Multiply each multiple by U = 2 cm. Add tier heights and trunk height. Compare widths in order from top to bottom.

Check: Re-add 2 + 2.4 + 2.8 + 1 = 8.2 cm. Confirm 3 cm < 5 cm < 7 cm and that tiers overlap slightly at joints.

Task 3

Using U = 4 cm, construct a snowman with bottom diameter 2U, middle diameter 1.5U, and head diameter 1U. State each diameter and the total stacked height if circles overlap by 0.2U at each joint.

Answer: Bottom diameter = 8 cm, middle = 6 cm, head = 4 cm. Overlap = 0.2 × 4 = 0.8 cm at each joint. Total height = 8 + 6 + 4 − 0.8 − 0.8 = 16.4 cm.

Reason: Multiply diameters by U = 4 cm. Sum diameters, then subtract one overlap for each of the two joints.

Check: Re-add 8 + 6 + 4 = 18 cm, subtract 1.6 cm for two overlaps, get 16.4 cm. Confirm diameters decrease from bottom to head.

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Original tasks 4 / complete keys

Task 4

Using U = 2.5 cm, construct an ornament with a teardrop body 1.4U tall and 0.8U wide, a cap 0.2U tall, and a loop 0.15U tall. State the total height and check that the cap width (one-third of body width) is less than body width.

Answer: Body height = 3.5 cm, body width = 2 cm, cap height = 0.5 cm, loop height = 0.375 cm. Total height = 3.5 + 0.5 + 0.375 = 4.375 cm. Cap width = one-third of 2 ≈ 0.67 cm, which is less than 2 cm.

Reason: Multiply each multiple by U = 2.5 cm. Add heights for total. Compute cap width as one-third of body width and compare.

Check: Re-add 3.5 + 0.5 + 0.375 = 4.375 cm. Confirm 0.67 cm < 2 cm and that the teardrop is centered on the vertical line.

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Source rubric / reflection

- [ ] Construction lines are light and final lines are darker and confident.
- [ ] All parts are centered on the vertical center line.
- [ ] Proportions use a consistent unit U and match the stated multiples within a small tolerance.
- [ ] Ornament cap is narrower than the body and the loop sits above the cap center.
- [ ] Tree tiers are stacked with slight overlap and each tier is wider than the one above.
- [ ] Snowman circles decrease in size from bottom to head and overlap slightly.
- [ ] Features and optional additions do not distort the main proportions.
- [ ] Valid alternative shapes (oval or teardrop ornament, rounded tree tiers) are accepted if proportions and centering are correct.

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