Draw a Realistic Skeleton: Bone Proportions and Joint Placement

Original tasks 1, 2, 3 / complete keys

Task 1

A figure is 160 mm tall. The hip is at 0.50 of height, the knee at 0.30, and the ankle at 0.05. Calculate each joint height from the ground in millimeters.

Answer: Hip 80 mm, knee 48 mm, ankle 8 mm.

Reason: Multiply total height by each fraction: 160 times 0.50 equals 80; 160 times 0.30 equals 48; 160 times 0.05 equals 8.

Check: Add the differences: hip minus knee is 32 mm; knee minus ankle is 40 mm; hip minus ankle is 72 mm. Confirm 32 plus 40 equals 72.

Task 2

A learner draws a femur of 45 mm and a tibia of 40 mm. The hip station is 95 mm from the ground and the ankle station is 10 mm. Does the drawn leg match the station distance? Show the arithmetic.

Answer: Drawn leg is 85 mm; station distance is 85 mm; they match.

Reason: Femur plus tibia equals 45 plus 40 equals 85 mm. Hip minus ankle equals 95 minus 10 equals 85 mm.

Check: Re-measure both bones with the same ruler and confirm the sum equals the hip-to-ankle distance within your chosen tolerance.

Task 3

On a 200 mm figure, the shoulder is at 0.80 of height and the elbow at 0.60. The wrist is 35 mm below the elbow. Calculate the wrist height from the ground.

Answer: Wrist is 85 mm from the ground.

Reason: Shoulder is 200 times 0.80 equals 160 mm. Elbow is 200 times 0.60 equals 120 mm. Wrist is 120 minus 35 equals 85 mm.

Check: Check that shoulder minus elbow is 40 mm and elbow minus wrist is 35 mm; both are positive and consistent with the stated offsets.

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Original tasks 4 / complete keys

Task 4

A learner uses circles for joints on the left arm and crosses on the right arm. State whether this satisfies the convention and propose a fix.

Answer: It does not satisfy the convention because joint markers differ. Use one marker shape for all joints, for example circles everywhere, and relabel both arms.

Reason: The convention requires a single joint marker so that placement can be checked consistently across the figure.

Check: Inspect every joint marker on the sheet and confirm they are the same shape and size within your stated tolerance.

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Source rubric / reflection

- [ ] Vertical axis and ground line are present and measurable.
- [ ] Joint stations are marked with one consistent convention and labeled.
- [ ] Each joint station has a recorded height and horizontal offset.
- [ ] Bone segments connect joint centers and show gentle taper.
- [ ] Limb segment sums are compared with joint-station distances.
- [ ] Paired joints and bones are symmetric within a stated tolerance.
- [ ] Valid alternative conventions are accepted if applied consistently.

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