Leg Proportion Drawing: Thigh, Knee, Calf, Ankle

Original tasks 1, 2 / complete keys

Task 1

A leg has L = 12 grid squares with ratios thigh 40 percent, knee 10 percent, calf 40 percent, ankle 10 percent. List the four boundary tick positions from the top of the thigh.

Answer: 0, 4.8, 6.0, 10.8, and 12.0 squares.

Reason: Multiply L by each cumulative ratio: thigh top 0; knee top 0.4 times 12 = 4.8; knee bottom 0.5 times 12 = 6.0; ankle top 0.9 times 12 = 10.8; ankle bottom 12.0.

Check: Add the segment lengths: 4.8 + 1.2 + 4.8 + 1.2 = 12.0 squares.

Task 2

In a side-view sketch, the knee center is at 5.0 squares and the ankle center is at 9.0 squares. The calf segment is 3.5 squares and the knee block is 1.0 square. Does the landmark distance pass the arithmetic check?

Answer: No, the complete landmark check does not pass for positive ankle-block height. The given vertical difference is 9.0 - 5.0 = 4.0 squares. Half knee plus calf already equals 0.5 + 3.5 = 4.0; adding the required positive half-ankle height would make the expected difference larger than 4.0. Matching the incomplete two-term sum is not a passing center-to-center check.

Reason: For ankle-block height A > 0, the full midpoint-height relation gives 0.5 + 3.5 + A/2 = 4.0 + A/2, which is strictly larger than the stated difference 4.0. No positive ankle-block height can reconcile these measurements. Do not omit the half-ankle term merely because the two other terms already total 4.0.

Check: Compute the stated height difference: 9.0 - 5.0 = 4.0. Compute half knee plus calf: 1.0/2 + 3.5 = 4.0. The remaining allowance for A/2 is 4.0 - 4.0 = 0, so it would require A = 0, contrary to positive block heights. The measurements fail the full check.

Leg Proportion Drawing: Thigh, Knee, Calf, Ankle

Original tasks 3, 4 / complete keys

Task 3

A practice row uses L = 8 squares with thigh 3.2, knee 0.8, calf 3.2, and ankle 0.8 squares. A second row uses L = 8 squares with thigh 3.0, knee 1.0, calf 3.0, and ankle 1.0 squares. Which row uses the 40-10-40-10 ratio convention, and what is the knee-center to ankle-center distance in that row?

Answer: The first row keeps thigh and calf equal at 3.2 squares. Knee center is at 3.6 squares and ankle center is at 7.6 squares, so the distance is 4.0 squares.

Reason: Check each row against the 40-10-40-10 convention: thigh and calf should each be 40 percent of L (3.2 squares when L = 8), and knee and ankle should each be 10 percent (0.8 squares). Row one matches; row two uses 3.0 and 1.0, so it does not. For row one, knee center is 3.2 + 0.4 = 3.6 squares and ankle center is 3.2 + 0.8 + 3.2 + 0.4 = 7.6 squares; the difference is 4.0 squares.

Check: Verify row one sums to 8: 3.2 + 0.8 + 3.2 + 0.8 = 8.0. Verify the center difference: 7.6 - 3.6 = 4.0, which equals half knee 0.4 plus calf 3.2 plus half ankle 0.4.

Task 4

You are drawing a front view with L = 10 squares. The knee block is drawn 1.5 squares wide, and the thigh at the knee tick is 1.2 squares wide. Is the knee block acceptable under the lesson convention? State the check.

Answer: Yes, it is acceptable. The knee block is wider than the thigh by 0.3 squares, which is less than half the thigh width (0.6 squares).

Reason: The convention allows a knee block slightly wider than the thigh. Compare the difference to half the thigh width. If the difference is less than or equal to half the thigh width, the block is acceptable.

Check: Compute 1.5 - 1.2 = 0.3 and 1.2 divided by 2 = 0.6. Since 0.3 is less than 0.6, the check passes.

Leg Proportion Drawing: Thigh, Knee, Calf, Ankle

Original rubric / reflection

- [ ] Four boundary ticks are present and labeled for thigh, knee, calf, and ankle.
- [ ] Segment lengths match the stated ratios within one rounding unit.
- [ ] Knee block is drawn as a block, not a point, and is slightly wider than the thigh.
- [ ] Joint landmarks are marked with crosses and aligned in front and side views.
- [ ] Arithmetic check is shown and passes for each practice row.
- [ ] Convention for line types and labels is stated and applied consistently.
- [ ] No feet, hands, or torso construction is added.

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