Isometric Room Drawing: Grid, Walls, and Furniture Placement

Original tasks 1, 2 / complete keys

Task 1

Using a hypothetical step of 5 mm, draw a room 4 steps wide, 3 steps deep, and 3 steps high. State your convention and record the step counts for the room.

Answer: Near corner marked; up-right axis 4 steps; up-left axis 3 steps; vertical axis 3 steps. Floor grid completed. Left wall height 3 steps on the up-left base; right wall height 3 steps on the up-right base. Convention stated, for example visible solid and hidden dashed. Recorded counts: width 4 steps, depth 3 steps, height 3 steps.

Reason: The room dimensions are converted directly into step counts along the three axes. Wall heights are counted vertically from each floor base, and the convention is declared before drawing.

Check: Count the steps along each axis on the drawing and compare with the recorded counts. Confirm each wall top is parallel to its floor base and that the stated convention appears on the sheet.

Task 2

On a grid with a hypothetical step of 8 mm, place a bed with a 3-step by 2-step footprint and a 1-step height, starting 1 step from the near corner along both floor axes. Describe the footprint corners and the vertical edges.

Answer: Footprint corners at width steps 1 and 4, depth steps 1 and 3. Vertical edges rise 1 step from each corner. Top edges connect parallel to the footprint edges. Recorded counts: footprint 3 by 2 steps at offset 1,1; height 1 step.

Reason: The offset moves the footprint away from the near corner, and the footprint size is added to the offset to find the far corners. Height is counted vertically in the same step value.

Check: Verify that the offset plus footprint size equals the far corner counts: 1+3=4 and 1+2=3. Check that all four vertical edges have the same height count.

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Original tasks 3, 4 / complete keys

Task 3

A room is 5 steps wide, 4 steps deep, and 3 steps high on a hypothetical 10 mm step. A shelf has a 1-step by 1-step footprint and a 2-step height, placed at offset 2 steps along width and 1 step along depth. State whether the shelf fits under the wall height and show the arithmetic.

Answer: The shelf height is 2 steps, and the wall height is 3 steps. Since 2 is less than 3, the shelf fits under the wall height. Footprint corners at width steps 2 and 3, depth steps 1 and 2. Recorded counts: shelf 1 by 1 by 2 steps at offset 2,1.

Reason: Fitting under the wall height is a simple comparison of step counts: shelf height versus wall height. The footprint corners are found by adding the footprint size to the offset.

Check: Compare the recorded shelf height with the recorded wall height. Check that offset plus footprint size gives the far corners: 2+1=3 and 1+1=2.

Task 4

Draw a room 6 steps wide, 4 steps deep, and 3 steps high on a hypothetical 10 mm step. Place two blocks: block A with a 2-step by 1-step footprint and 1-step height at offset 1,1; block B with a 1-step by 2-step footprint and 1-step height at offset 3,1. Check that the footprints do not overlap and record all counts.

Answer: Block A occupies width steps 1 to 3 and depth steps 1 to 2. Block B occupies width steps 3 to 4 and depth steps 1 to 3. The footprints touch at width step 3 but do not overlap in area. Recorded counts: room 6 by 4 by 3 steps; A 2 by 1 by 1 at offset 1,1; B 1 by 2 by 1 at offset 3,1.

Reason: Overlap is checked by comparing the step ranges along each floor axis. Touching at a boundary is not an area overlap. All dimensions and offsets are recorded in the same step unit.

Check: List the width and depth ranges for each block and confirm no step cell belongs to both. Verify that each block height is less than the wall height of 3 steps.

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Source rubric / reflection

- [ ] Three axes are present and correctly oriented: two floor axes and one vertical axis.
- [ ] A single grid step is stated and used consistently.
- [ ] Floor grid intersections are marked and connected along the two floor axes.
- [ ] Both wall planes have tops parallel to their floor bases and heights counted in steps.
- [ ] Furniture footprints align to the floor grid and heights are counted in steps.
- [ ] A line and shading convention is stated and applied consistently.
- [ ] Step counts for room and furniture are recorded and checkable.
- [ ] Valid alternative conventions are accepted if stated and consistent.

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