Isometric Chair Drawing on Three Axes

Original tasks 1, 2, 3 / complete keys

Task 1

A seat is 24 units wide, 18 units deep, and 2 units thick. Describe how to draw its top face and thickness on the three-axis grid.

Answer: Draw a parallelogram with one pair of edges 24 units along width and the other pair 18 units along depth. From each corner, drop a vertical line 2 units and connect the lower corners to show thickness.

Reason: The top face uses the two slanted axes; thickness uses the vertical axis. Opposite edges stay parallel.

Check: Confirm the top face has two 24-unit width edges and two 18-unit depth edges, and every thickness line is vertical and 2 units long. Also check that opposite edges remain parallel.

Task 2

A chair has legs 20 units tall and 2 units square. The seat is at height 20. Describe where to place the four legs and how to draw one leg.

Answer: Place legs under the four seat corners. For one leg, draw a small 2-unit square parallelogram at the top, then extend vertical lines 20 units down and connect the bottom corners.

Reason: Legs are vertical prisms; their cross-sections follow width and depth, while height follows the vertical axis.

Check: Check that each leg top sits at the seat underside and each leg bottom is 20 units below, with all four bottoms at the same level. Confirm each leg's vertical edges are parallel to the height axis.

Task 3

A backrest has two posts 28 units tall above the seat and a top rail 30 units wide. Describe the construction and one alignment check.

Answer: From the rear seat corners, draw two vertical posts 28 units upward. Connect their tops with a line 30 units along the width axis. Check that both posts are vertical and the rail is parallel to the seat's width edges.

Reason: Posts use the height axis; the rail uses the width axis. Parallelism confirms correct axis use.

Check: Measure or count 28 units on each post and 30 units on the rail; confirm the rail is parallel to a known width edge and both posts are parallel to the height axis.

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Original tasks 4 / complete keys

Task 4

A student draws a seat as a rectangle with horizontal top and bottom edges. Identify the error and describe the correction using the three-axis convention.

Answer: The error is using horizontal edges instead of the 30-degree width and depth axes. Redraw the seat as a parallelogram with edges along width and depth, then add vertical thickness.

Reason: In isometric drawing, no seat edge should be horizontal; only the vertical axis is upright.

Check: Trace each seat edge and confirm it is parallel to width, depth, or height, not horizontal. Check that opposite edges are parallel and that thickness lines are vertical.

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Source rubric / reflection

- [ ] All chair edges are parallel to one of the three isometric axes.
- [ ] Seat is drawn as a parallelogram with visible thickness.
- [ ] Four legs are vertical and reach a consistent ground level.
- [ ] Backrest has two vertical posts and a width-axis top rail.
- [ ] Proportions are consistent with the chosen unit counts.
- [ ] Drawing is clear, with unnecessary construction lines removed.
- [ ] Valid alternative styles are accepted if axis alignment and structure remain correct.

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