Isometric Product Drawing: Axis, Box Form, and Face Shading

Original tasks 1, 2, 3 / complete keys

Task 1

A hypothetical box product has width 5 cm, depth 3 cm, and height 2 cm. Describe how to construct the top face and the two vertical side faces using isometric axes.

Answer: Draw a vertical axis and two 30-degree axes. Mark 5 cm along width and 3 cm along depth to form the top parallelogram. From each top corner, draw 2 cm vertical edges. Connect the lower endpoints to complete the left and right faces.

Reason: The top face uses the width and depth axes; vertical edges use the height axis. Equal opposite edges keep the form isometric.

Check: Measure opposite top edges: both width edges should be 5 cm and both depth edges 3 cm. Each vertical edge should measure 2 cm.

Task 2

Using the convention top lightest, left medium, right darkest, describe the shading for a box with width 4 cm, depth 4 cm, and height 4 cm. State one valid alternative convention.

Answer: Shade the top face lightest, the left face medium, and the right face darkest. A valid alternative is top lightest, left darkest, right medium, provided the convention is stated first.

Reason: The convention creates clear separation between adjacent faces. Alternatives are valid if consistent and legible.

Check: Confirm three distinct tones and that the stated convention matches the applied tones.

Task 3

A student draws a top face with width edges of 6 cm and 5 cm. Identify the error and describe the correction using isometric construction.

Answer: The opposite width edges must be equal in isometric projection. Correct by redrawing the top parallelogram so both width edges measure 6 cm along the width axis and both depth edges match the planned depth.

Reason: Parallel edges in isometric projection remain equal; unequal opposite edges indicate a construction error.

Check: Measure both width edges and both depth edges; each pair should match.

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Original tasks 4 / complete keys

Task 4

Describe how to check that a drawn box product is isometric rather than perspective, using only a ruler and the stated axes.

Answer: Check that the two non-vertical axes are at 30 degrees from horizontal and that parallel edges remain parallel and equal in length. If lines converge or equal planned lengths differ, the drawing is not isometric.

Reason: Isometric projection preserves parallel equality; perspective converges lines.

Check: Measure the angle of each axis with your own tool and compare opposite edge lengths against the plan.

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Source rubric / reflection

- [ ] Three axes are present: one vertical and two at 30 degrees from horizontal.
- [ ] Top face is a parallelogram with opposite edges equal and parallel to the width and depth axes.
- [ ] All vertical edges use the same planned height.
- [ ] A shading convention is stated before shading.
- [ ] Top, left, and right faces are visually distinct and edges remain sharp.
- [ ] Measurements use consistent units and match the stated plan.
- [ ] Valid alternative conventions are accepted if stated and consistently applied.

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