Isometric Flintlock Drawing: Lock, Stock, and Barrel as Box Volumes

Original tasks 1, 2, 3 / complete keys

Task 1

A stock box is 120 units along X, 20 units along Y, and 40 units along Z. Draw it isometrically and list the lengths of one front edge, one depth edge, and one vertical edge.

Answer: Front edge along X: 120 units. Depth edge along Y: 20 units. Vertical edge along Z: 40 units.

Reason: In isometric projection, each box edge is drawn parallel to its corresponding axis, so the measured length along that axis equals the box dimension.

Check: Verify that the front edge is parallel to X at 30 degrees, the depth edge is parallel to Y at 30 degrees, and the vertical edge is vertical.

Task 2

A barrel box is 150 units along X and a stock box is 130 units along X. Both start at the same X origin. How many units does the barrel extend beyond the stock along X?

Answer: 20 units.

Reason: Subtract the stock length from the barrel length: 150 minus 130 equals 20.

Check: Count grid squares along the X axis from the stock end to the barrel end; the difference should be 20 units.

Task 3

You draw a lock plate box with dimensions 40 along X, 12 along Y, and 25 along Z. You then draw a second box with dimensions 40 along X, 12 along Y, and 25 along Z but rotated so its long edge runs along Y. Is the second drawing isometric? Explain.

Answer: Yes. The box dimensions are unchanged, and rotating it so the long edge runs along Y keeps every edge parallel to X, Y, or Z, so the drawing remains isometric. It would only cease to be isometric if an edge were not parallel to one of the three axes.

Reason: Isometric projection requires all edges to be parallel to one of three axes separated by 120 degrees. A rotation that keeps edges on axes is acceptable; one that does not is not.

Check: Check each visible edge against the X, Y, and Z axes. Any edge not parallel to an axis indicates a non-isometric drawing.

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Original tasks 4 / complete keys

Task 4

A drawing shows a box with a front edge at 45 degrees to the baseline. Is this isometric? What simple change would make it isometric?

Answer: No. Change the 45-degree edge to 30 degrees above the baseline so it aligns with the X or Y axis.

Reason: Isometric axes are at 30 degrees to the baseline, not 45 degrees. Aligning the edge to 30 degrees satisfies the convention.

Check: Measure the angle between the edge and the baseline; it should be 30 degrees for a non-vertical isometric edge.

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Source rubric / reflection

- [ ] All non-vertical edges are parallel to the 30-degree isometric axes.
- [ ] Vertical edges remain vertical.
- [ ] Three box volumes are clearly labeled and distinguishable.
- [ ] Dimensions are consistent in one unit and arithmetic checks are shown.
- [ ] Labels are legible with label height from baseline to midline; style may vary.
- [ ] Assembled form shows plausible relative positions of lock, stock, and barrel.

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