Forklift Isometric Drawing: Stacked Volumes on a 30-Degree Grid

Original tasks 1, 2, 3 / complete keys

Task 1

Draw a counterweight box 4 units wide, 2 units deep, and 2 units high behind a chassis 6 units wide, 4 units deep, and 1 unit high. Use a unit length of 10 mm. Describe the placement and one hidden edge.

Answer: Counterweight top face is 40 mm by 20 mm; height 20 mm. It sits behind the chassis with rear faces aligned. One hidden edge is the chassis rear bottom edge behind the counterweight.

Reason: Multiply units by 10 mm: 4×10=40, 2×10=20, 2×10=20. Align rear faces to keep the stack stable in isometric view.

Check: Measure the counterweight height (20 mm) and compare to twice the chassis height (2×10=20 mm).

Task 2

Draw two mast posts 1 unit wide and 5 units tall, spaced 3 units apart, with crossbars every 1 unit. Use a unit length of 8 mm. State the total mast height and the gap between posts.

Answer: Each post is 8 mm wide and 40 mm tall; gap between posts is 24 mm. Crossbars at 8, 16, 24, 32, and 40 mm heights.

Reason: 5×8=40 mm height; 3×8=24 mm gap. Crossbars every 1 unit means every 8 mm.

Check: Count five equal vertical steps on each post and verify the gap is three unit steps.

Task 3

Draw two fork prongs 1 unit wide, 4 units long, and 0.5 unit thick projecting forward from the mast base. Use a unit length of 12 mm. State the fork length and thickness in mm.

Answer: Each fork is 12 mm wide, 48 mm long, and 6 mm thick. They project forward along the D axis from the mast base.

Reason: 4×12=48 mm length; 0.5×12=6 mm thickness. Draw as thin boxes on the D axis.

Check: Measure fork length (48 mm) and confirm it equals four unit steps; thickness equals half a unit step.

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Original tasks 4 / complete keys

Task 4

Draw four wheels as ellipses: front wheels 2 units diameter, rear wheels 1.5 units diameter, with major axis 1.5 times minor axis. Use a unit length of 10 mm. State the front wheel major axis length if the minor axis equals the diameter.

Answer: Front wheel diameter is 20 mm; if minor axis is 20 mm, major axis is 30 mm. Rear wheel diameter is 15 mm; major axis 22.5 mm.

Reason: 2×10=20 mm; 1.5×20=30 mm. Rear: 1.5×10=15 mm; 1.5×15=22.5 mm.

Check: Measure the major axis and divide by the minor axis; the ratio should be about 1.5.

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Source rubric / reflection

- [ ] All receding edges are parallel to the 30-degree axes.
- [ ] Chassis, counterweight, mast, forks, and wheels are present as distinct volumes.
- [ ] Mast height is five times chassis height; forks extend four units forward.
- [ ] Wheels are ellipses with consistent orientation and size.
- [ ] Line convention followed: solid visible edges, dashed hidden edges.
- [ ] Lettering is uppercase block with x-height equal to one grid step; valid stylistic alternatives accepted.

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