Draw 3D Solid Figures: Depth Lines and Shading Practice

Original tasks 1, 2 / complete keys

Task 1

Draw a cube with a 30 mm front square and 15 mm depth lines, light from the upper right. Show depth lines and shading.

Answer: Front square 30 mm by 30 mm. Four parallel depth lines of 15 mm going back to the upper left. Connect back ends to form the back top edge, back left edge, and back-right vertical edge; erase the hidden back-bottom edge and the lower-right depth line (hidden for the up-left direction). Shade front light, top mid, left side dark.

Reason: Equal depth lines and a consistent light arrow create a readable solid. The front face faces the light, so it is light; the side away from the light is dark.

Check: Measure the three visible depth lines to confirm 15 mm each and check parallelism (the hidden fourth is erased or faint). Confirm the dark side is opposite the upper-right light arrow and the depth direction is consistently up and to the left.

Task 2

Draw a cylinder with a bottom ellipse 40 mm wide and a top ellipse 40 mm wide, height 50 mm, light from the left. Show shading.

Answer: Two ellipses with equal 40 mm major-axis width, connected by two vertical sides 50 mm long (the cylinder height). Shade the left side light, the middle mid, and the right side dark.

Reason: Equal ellipse widths keep the cylinder from looking tapered. Vertical sides show the height. Shading follows the left light source.

Check: Measure the widest part (major axis) of each ellipse to confirm 40 mm. Measure the vertical sides to confirm they are 50 mm long and parallel. Check that the dark zone is on the right, opposite the left light source.

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Original tasks 3, 4 / complete keys

Task 3

Draw a cone with a base ellipse 50 mm wide and a point 60 mm above the base center, light from the upper left. Show the center depth line and shading.

Answer: Base ellipse 50 mm wide, center marked, point 60 mm above. Two straight sides from the point to the ellipse edges. Faint center depth line from point to base center. Shade upper-left side light, middle mid, lower-right dark.

Reason: The ellipse and center line show depth. The straight sides define the cone. Shading follows the upper-left light.

Check: Measure the base width and the height from base center to point. Confirm the center line is faint and the dark zone is opposite the light arrow.

Task 4

Draw a cube with a 25 mm front square and 12 mm depth lines, light from directly above. Show depth lines and shading.

Answer: Front square 25 mm by 25 mm. Four parallel depth lines of 12 mm going back to the upper right. Connect back ends to form the back top edge, back right edge, and exposed portion of the back-left vertical edge; erase the hidden back-bottom edge and the lower-left depth line (hidden for the up-right direction). With light from directly above, shade the top face light, the front face mid, and the right side dark.

Reason: With light from above, the top face is lightest. Equal depth lines keep the cube consistent.

Check: Measure the three visible depth lines to confirm 12 mm each (the hidden fourth is erased or faint). Check that the top face is the lightest zone, the front is mid, and the right side is darkest, consistent with the light arrow directly above and the up-right depth direction.

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Source rubric / reflection

- [ ] Depth lines are parallel and equal in length where required.
- [ ] Hidden lines are removed or clearly fainter than visible lines.
- [ ] Shading has three distinct zones (light, mid, dark) that match the light arrow.
- [ ] The figure sits on the baseline and reads as a solid, not a flat shape.
- [ ] Valid alternatives (crosshatching, visible construction lines) are accepted if consistent.

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