Circle, Center Line, and Tilt: Constructing Faces in Perspective

Original tasks 1, 2, 3 / complete keys

Task 1

An upright circle has diameter 10 cm. The eye line is at the center. Where is the nose base if it is halfway between the eye line and the bottom of the circle? Give the distance below the eye line.

Answer: 2.5 cm below the eye line.

Reason: The radius is 5 cm. The bottom of the circle is 5 cm below the eye line. Halfway is 2.5 cm below the eye line. Wait: the distance from eye line to bottom is 5 cm, so halfway is 2.5 cm. The answer is 2.5 cm below the eye line.

Check: Measure the radius (5 cm), confirm the bottom is 5 cm below the eye line, and divide by 2 to get 2.5 cm.

Task 2

A head is tilted 20 degrees to the left. The vertical center line is rotated counterclockwise by 20 degrees. If the eye line was horizontal before tilting, what is its angle relative to the page's horizontal edge after tilting?

Answer: 20 degrees counterclockwise from the page's horizontal edge.

Reason: Rotating the entire grid counterclockwise by 20 degrees rotates the horizontal eye line by the same angle. The eye line remains perpendicular to the vertical center line.

Check: Use a protractor to measure the angle between the eye line and the page's horizontal edge; it should be 20 degrees.

Task 3

On an upright head with circle diameter 12 cm, the mouth line is one-third of the way from the nose base to the bottom of the circle. The nose base is halfway between the eye line and the bottom. How far below the eye line is the mouth line?

Answer: 4 cm below the eye line.

Reason: Radius is 6 cm. Bottom is 6 cm below eye line. Nose base is halfway: 3 cm below eye line. Distance from nose base to bottom is 3 cm. One-third of 3 cm is 1 cm. Mouth line is 3 cm + 1 cm = 4 cm below the eye line.

Check: Measure radius 6 cm, nose base at 3 cm, mouth line at 4 cm; confirm 4 cm is one-third of the way from 3 cm to 6 cm.

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Original tasks 4 / complete keys

Task 4

A tilted head has its vertical center line rotated 15 degrees clockwise. The nose base is marked 2 cm along the rotated vertical line below the eye line. Describe how to check that the nose base lies on the vertical center line.

Answer: Place a straightedge along the rotated vertical center line and confirm the nose base mark lies on that line. Also check that the eye line is perpendicular to the vertical line at the circle's center.

Reason: The nose base must lie on the vertical center line regardless of tilt. A straightedge along the rotated line verifies alignment. The perpendicular check confirms the grid is consistent.

Check: Use a straightedge and a right-angle corner to verify alignment and perpendicularity.

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Source rubric / reflection

- [ ] Circle is drawn lightly and center lines pass through the center.
- [ ] Vertical and horizontal center lines are perpendicular before tilting.
- [ ] Features are placed using the center lines, not the page edges.
- [ ] On tilted heads, the entire grid is rotated and features follow the rotated lines.
- [ ] Eye line passes through both eye centers; nose and mouth lie on the vertical center line.
- [ ] Proportions along the rotated lines match the upright proportions.
- [ ] Valid alternative conventions are accepted if consistently applied and explained.

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