Wedge Drawing: Compare Taper Angles and Shade Angled Planes

Original tasks 1, 2 / complete keys

Task 1

Draw a wedge with base length 40 mm, base width 20 mm, and ridge height 10 mm. Label all faces and measure the taper angle.

Answer: Base rectangle 40 mm by 20 mm; ridge 10 mm above the base, parallel to the long edge; two triangular side faces and two sloping faces labelled. The taper angle is measured from the base plane using the base width (20 mm) as the run: arctan(10/20) = arctan(0.5) ≈ 26.6 degrees with these hypothetical values.

Reason: The ridge height and base length set the slope; the angle is found by measuring between the sloping face and the base plane.

Check: Verify the base is 40 mm by 20 mm, the ridge is 10 mm high, all four face types are labelled, and the angle is recorded with the unit.

Task 2

Draw two wedges with the same 50 mm base length and 25 mm base width but ridge heights of 15 mm and 25 mm. Compare their silhouettes and state which has the larger taper angle.

Answer: The 25 mm ridge wedge has the larger taper angle and a taller silhouette; the 15 mm ridge wedge is lower. Both have the same 50 mm base length. With these hypothetical values, the taper angles use the base width (25 mm) as the run: arctan(15/25) ≈ 31.0 degrees and arctan(25/25) = 45.0 degrees.

Reason: With base length fixed, increasing ridge height increases the taper angle and changes the silhouette from low to tall.

Check: Confirm both bases are 50 mm by 25 mm, ridge heights are 15 mm and 25 mm, the larger angle is assigned to the 25 mm ridge, and the recorded angles are about 31.0 and 45.0 degrees.

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Original tasks 3, 4 / complete keys

Task 3

Shade a wedge using a light source from the upper right. State the light direction and assign light, medium, and dark to the visible planes.

Answer: Light direction stated as upper right. Right sloping face light, left sloping face medium, triangular side faces dark. Values applied consistently.

Reason: The convention assigns light to the plane facing the source, medium to the angled plane, and dark to the plane facing away.

Check: Check that the light direction is written, each visible plane has one value, and adjacent planes differ unless they face the same direction.

Task 4

On a grid where one square equals 5 mm, plan a wedge with base length 30 mm, base width 15 mm, and ridge height 10 mm. State the square counts and the taper angle.

Answer: Base is six squares by three squares; ridge is two squares high. The taper angle is measured from the base plane using the base width (15 mm) as the run: arctan(10/15) = arctan(0.667) ≈ 33.7 degrees with these hypothetical values.

Reason: Dividing each measurement by 5 mm gives the square counts; the angle is measured from the base plane.

Check: Verify six by three squares for the base, two squares for the ridge, and the angle recorded with the unit.

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Source rubric / reflection

- [ ] Base rectangle drawn with correct proportions and labelled dimensions.
- [ ] Ridge line parallel to the long base edge at the stated height.
- [ ] Two triangular side faces and two sloping rectangular faces clearly labelled.
- [ ] Taper angle measured from the base plane and recorded.
- [ ] Shading convention stated and applied consistently with light, medium, and dark values.
- [ ] Three variants compared on the same baseline with a silhouette strip.
- [ ] Units consistent throughout; hypothetical values identified as examples.

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