Draw a Pie: Crust, Filling, and Slice Construction

Original tasks 1, 2, 3 / complete keys

Task 1

A dish ellipse has a major axis of 10 cm and a minor axis of 3 cm. The rim width is 0.4 cm. Calculate the outer rim major and minor axis lengths.

Answer: Outer major axis = 10 + 2(0.4) = 10.8 cm; outer minor axis = 3 + 2(0.4) = 3.8 cm.

Reason: The rim adds its width on both ends of each axis, so add twice the rim width to each axis length.

Check: Verify that the difference between outer and inner major axes equals 0.8 cm, and the same for the minor axes.

Task 2

A pie is cut into a wedge of 90 degrees. If the dish major axis is 12 cm and the minor axis is 4 cm, describe how to mark the two radii and check the wedge angle using the center point.

Answer: Mark the center where the axes cross. Draw one radius to the rim, then a second radius 90 degrees from the first using a right-angle check at the center. Confirm both radii end on the rim ellipse and that the angle between them is 90 degrees.

Reason: A 90-degree wedge is a quarter of the pie; the radii must meet at the center and terminate on the rim.

Check: Measure the angle at the center with a protractor or compare the wedge arc to a quarter of the rim; both radii should be equal in length if the dish were circular, but on an ellipse check that each ends on the drawn rim.

Task 3

On a cut face, the bottom crust is 0.3 cm thick, the filling band is 2.0 cm thick, and the top crust is 0.4 cm thick. What is the total cut-face height, and what is the ratio of filling to total height?

Answer: Total height = 0.3 + 2.0 + 0.4 = 2.7 cm. Filling ratio = 2.0 / 2.7 ≈ 0.74, or about 74%.

Reason: Add the three layer thicknesses for total height, then divide the filling thickness by the total.

Check: Re-add the layers and confirm the sum; multiply the ratio by the total to recover the filling thickness.

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Original tasks 4 / complete keys

Task 4

A crimped rim has 12 equal segments. If the outer rim perimeter is estimated as 30 cm, what is the approximate arc length per segment? State one adjustment if the scallops look too wide.

Answer: Arc length per segment = 30 / 12 = 2.5 cm. If scallops look too wide, increase the number of segments to 15, giving 30 / 15 = 2.0 cm per segment.

Reason: Divide the perimeter by the number of equal segments; increasing segments reduces arc length per scallop.

Check: Multiply the segment count by the arc length to recover the perimeter estimate, and check that spacing remains even around the rim.

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Source rubric / reflection

- [ ] Dish ellipse is symmetric and the rim width is even around the contour.
- [ ] Crimped edge has consistent scallop height and readable spacing.
- [ ] Filling texture follows surface curvature and stops before the crimped edge.
- [ ] Wedge radii meet at the center and the cut face aligns with dish depth.
- [ ] Cutaway shows bottom crust, filling band, and top crust with consistent thickness.
- [ ] Construction lines are light and final lines are firm; lettering, if any, follows the stated x-height convention and may use varied styles.

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