Sunflower Pencil Drawing: Radial Petal Layers and Shading

Original tasks 1, 2, 3, 4 / complete keys

Task 1

A head radius is 7 cm and the disk radius is 2.8 cm. The middle layer has 14 petals. Compute the disk-to-head ratio and the angular spacing.

Answer: Ratio is 0.4; spacing is about 25.7 degrees.

Reason: 2.8 divided by 7 equals 0.4. 360 divided by 14 equals 25.714..., which rounds to about 25.7 degrees.

Check: Multiply 0.4 by 7 to get 2.8. Multiply 25.7 by 14 to get about 359.8, close to 360.

Task 2

A back layer has 12 petals and a front layer has 8 petals. State the angular spacing of each layer and the offset if the front layer is shifted by half of the back layer's spacing.

Answer: Back spacing is 30 degrees; front spacing is 45 degrees; half-offset is 15 degrees.

Reason: 360 divided by 12 equals 30. 360 divided by 8 equals 45. Half of 30 is 15.

Check: Multiply 30 by 12 to get 360; multiply 45 by 8 to get 360; confirm 15 is half of 30.

Task 3

A drawing uses a head radius of 6 cm and a petal length of 3 cm beyond the head circle. What is the total distance from the center to a petal tip, and what is the ratio of petal length to head radius?

Answer: Total distance is 9 cm; ratio is 0.5.

Reason: Add the head radius and petal length: 6 plus 3 equals 9 cm. Divide petal length by head radius: 3 divided by 6 equals 0.5.

Check: Subtract 6 from 9 to recover 3 cm. Multiply 0.5 by 6 to recover 3 cm.

Task 4

A seed disk has radius 2.4 cm and three concentric rings placed at equal radial intervals inside it. What is the radial interval between rings if the first ring is at the disk boundary and the third is at the center?

Answer: The interval is 1.2 cm.

Reason: From boundary to center is 2.4 cm. Three rings at equal intervals create two gaps, so 2.4 divided by 2 equals 1.2 cm.

Check: Add 1.2 twice to recover 2.4 cm; confirm two equal gaps match the three ring positions.

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Source rubric / reflection

- [ ] Center and axis are marked and used consistently.
- [ ] Outer head circle and seed disk circle are concentric and measured.
- [ ] At least two petal layers are present with offset angular spacing.
- [ ] Petal lengths and widths are consistent within each layer.
- [ ] Seed disk shows concentric rings and radial marks.
- [ ] Shading uses one stated light direction and varies from base to tip.
- [ ] Overlap shadows clarify front-to-back petal order.
- [ ] Valid stylistic alternatives are accepted if radial order and shading logic hold.

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