Draw a Concentric-Ring Target with an Arrow Hitting It

Original tasks 1, 2 / complete keys

Task 1

Draw a target with four concentric rings spaced 1 cm apart. Place an arrow hitting the third ring on the left side. Describe each construction step.

Answer: Mark center C. Draw rings at radii 1, 2, 3, and 4 cm. Choose impact point P on ring 3 at the left. Draw a guide line through P angled toward the center. Mark tail T 7 cm from P along the guide line. Draw shaft from T to P. Draw a triangle with tip at P. Add three fletching shapes near T. Check gaps are 1 cm and tip is at P.

Reason: The spacing value is 1 cm, so radii increase by 1 cm. The impact point is on ring 3, which has radius 3 cm. The shaft must pass through P and the head tip must sit at P.

Check: Measure the gap between adjacent ring edges; each should be 1 cm. Confirm the head tip touches P and the shaft is straight.

Task 2

A target has rings spaced 1.5 cm apart. The outermost ring has radius 6 cm. How many rings are there, and what are their radii? Then describe placing an arrow hitting between ring 2 and ring 3.

Answer: There are four rings with radii 1.5, 3, 4.5, and 6 cm. Choose impact point P between ring 2 and ring 3, for example at radius 3.75 cm. Draw a guide line through P, mark tail T, draw the shaft to P, add a triangle with tip at P, and add fletching near T.

Reason: Dividing the outer radius 6 cm by the spacing 1.5 cm gives 4 rings. The radii are multiples of 1.5 cm. An impact point between ring 2 and ring 3 lies between radii 3 cm and 4.5 cm.

Check: Verify that 6 divided by 1.5 equals 4. Check that P lies between the circles of radius 3 cm and 4.5 cm.

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Original tasks 3, 4 / complete keys

Task 3

Draw a target with three rings spaced 2 cm apart. Place an arrow hitting the innermost ring near the center. Explain how to keep the arrowhead readable.

Answer: Draw rings at radii 2, 4, and 6 cm. Choose P on ring 1 near the center. Use a small triangle for the head so it does not cover the center mark. Draw the shaft from a tail point T outside the rings to P. Add fletching near T. Check that the head tip is at P and the triangle is small relative to the 2 cm spacing.

Reason: A small head preserves the visibility of the center and ring 1. The shaft still passes through P, and the fletching remains near the tail.

Check: Confirm the head triangle fits within the 2 cm spacing and its tip is at P. Check that the center mark remains visible.

Task 4

A target has rings spaced 1.2 cm apart and an outer radius of 4.8 cm. An arrow hits the second ring at the bottom. Describe the full construction and state the radius of the second ring.

Answer: There are four rings with radii 1.2, 2.4, 3.6, and 4.8 cm. The second ring has radius 2.4 cm. Choose P on ring 2 at the bottom. Draw a guide line through P, mark tail T, draw the shaft to P, add a triangle with tip at P, and add fletching near T. Check gaps are 1.2 cm.

Reason: Dividing 4.8 by 1.2 gives 4 rings. The second ring radius is 2 times 1.2 cm, which is 2.4 cm. The impact point lies on that circle at the bottom.

Check: Verify that 4.8 divided by 1.2 equals 4 and that the second ring radius is 2.4 cm. Confirm the head tip is at P and gaps are 1.2 cm.

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Source rubric / reflection

- [ ] Center is marked and all rings share the same center point.
- [ ] Ring spacing is consistent and recorded; gaps between adjacent ring edges are equal.
- [ ] Arrow shaft is straight and passes through the chosen impact point.
- [ ] Arrowhead tip coincides with the impact point and points in the travel direction.
- [ ] Fletching is attached near the tail, touches the shaft, and does not cross it.
- [ ] Line work is legible and consistent; valid alternative styles are accepted if geometry is preserved.

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