Neptune Drawing Easy: Globe Bands and Moon Placement

Original tasks 1, 2 / complete keys

Task 1

Draw a Neptune globe with R = 5 cm. Place band boundaries at 0.3R and 0.6R above and below the equator. Place the moon at 90 degrees clockwise from the top and 1.4R from the center, with moon radius 0.2R. State all measured values.

Answer: Globe radius 5 cm. Band boundaries at 1.5 cm and 3.0 cm above and below the equator, drawn as gentle arcs. Moon center on a line 90 degrees clockwise from the top (to the right of the globe), at 1.4 × 5 = 7.0 cm from the center. Moon radius 0.2 × 5 = 1.0 cm. The moon is outside the globe on the right.

Reason: The angle 90 degrees clockwise from the top points to the right. The distance 1.4R is greater than R, so the moon center is outside the globe. The moon radius is a simple fraction of R.

Check: Measure the globe radius and confirm it is 5 cm. Check that band marks are at 1.5 cm and 3.0 cm from the equator. Measure the moon center distance from the globe center; it should be 7.0 cm along the rightward line. Confirm the moon radius is 1.0 cm.

Task 2

Draw a Neptune globe with R = 3 cm. Use four bands with boundaries at 0.25R and 0.75R above and below the equator. Place the moon at 180 degrees clockwise from the top and 1.8R from the center, with moon radius 0.15R. Describe the moon's position relative to the globe.

Answer: Globe radius 3 cm. Band boundaries at 0.75 cm and 2.25 cm above and below the equator. The moon is at 180 degrees clockwise from the top, which is directly below the globe, at 1.8 × 3 = 5.4 cm from the center. Moon radius 0.15 × 3 = 0.45 cm. The moon sits below the globe, outside its outline.

Reason: 180 degrees clockwise from the top points downward. The distance 1.8R is outside the globe. The moon radius is the smallest allowed in the convention.

Check: Confirm the globe radius is 3 cm and band marks are at 0.75 cm and 2.25 cm from the equator. Measure downward from the center to the moon center; it should be 5.4 cm. Check the moon radius is 0.45 cm.

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Original tasks 3, 4 / complete keys

Task 3

Draw a Neptune globe with R = 4 cm. Place band boundaries at 0.4R and 0.7R above and below the equator. Place the moon at 270 degrees clockwise from the top and 1.2R from the center, with moon radius 0.25R. Is the moon outside the globe? Explain using the numbers.

Answer: Globe radius 4 cm. Band boundaries at 1.6 cm and 2.8 cm above and below the equator. The moon is at 270 degrees clockwise from the top, which is directly to the left of the globe, at $1.2 \times 4 = 4.8$ cm from the center. Moon radius $0.25 \times 4 = 1.0$ cm. The moon center is 4.8 cm from the globe center, and the globe radius is 4 cm, so the moon center is outside the globe. The moon's nearest edge is $4.8 - 1.0 = 3.8$ cm from the center, which is inside the globe outline, so the moon overlaps the globe edge. To keep it fully outside, increase the distance to at least 1.25R.

Reason: The moon center distance is greater than R, but the moon radius extends inward. The nearest edge distance is center distance minus moon radius. Comparing that to R shows overlap.

Check: Measure the moon center distance (4.8 cm) and moon radius (1.0 cm). Subtract to find the nearest edge distance (3.8 cm). Compare with the globe radius (4 cm). If the nearest edge distance is less than R, the moon overlaps the globe.

Task 4

Draw a Neptune globe with R = 6 cm. Use three bands with boundaries at 0.5R above and below the equator only. Place the moon at 135 degrees clockwise from the top and 1.5R from the center, with moon radius 0.2R. State the moon's approximate direction and check the placement with simple arithmetic.

Answer: Globe radius 6 cm. One band boundary at 3.0 cm above and below the equator, giving three bands. The moon is at 135 degrees clockwise from the top, which is toward the lower right, at $1.5 \times 6 = 9.0$ cm from the center. Moon radius $0.2 \times 6 = 1.2$ cm. The moon center is 9.0 cm from the globe center, and the nearest edge is $9.0 - 1.2 = 7.8$ cm, which is greater than 6 cm, so the moon is fully outside the globe.

Reason: 135 degrees clockwise from the top lies between the right (90 degrees) and bottom (180 degrees), so the moon is lower right. The distance and radius arithmetic confirm separation.

Check: Measure the globe radius (6 cm) and the band mark (3.0 cm from the equator). Measure the moon center distance along the lower-right radial line (9.0 cm) and the moon radius (1.2 cm). Subtract to get 7.8 cm and confirm it is greater than 6 cm.

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Source rubric / reflection

- [ ] Globe is a clear circle with a horizontal equator and a marked center.
- [ ] Three to five band boundaries are drawn as gentle arcs with consistent spacing.
- [ ] Band arcs curve toward the poles at the circle edges.
- [ ] Moon placement states an angle from the top and a distance in R.
- [ ] Moon center is marked at the stated angle and distance, and the moon radius is between 0.15R and 0.25R.
- [ ] Moon outline is distinct from the globe and bands.
- [ ] Construction lines are light or erased, and the final drawing is readable.
- [ ] Any numerical values are labeled as chosen examples and units are consistent.

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