Draw a Stylized Black Hole: Event Horizon, Accretion Disk, and Layered Glow

Original tasks 1, 2 / complete keys

Task 1

On a blank frame, draw an event horizon circle with a hypothetical radius of 2.5 cm. Add a tilted ellipse with a long axis of 10 cm and a short axis of 5 cm. Show the front half overlapping the circle and the back half hidden. Add one glow outline.

Answer: A solid black circle centered in the frame, a tilted ellipse centered on the same point, the front half of the ellipse drawn over the circle, the back half erased where the circle covers it, and one smooth glow outline around the circle.

Reason: The circle defines the event horizon. The ellipse defines the accretion disk. The overlap convention makes the front and back halves readable. The glow outline adds the first layered glow band.

Check: Rotate the paper and confirm the circle is round. Confirm the ellipse shares the same center. Confirm the back half does not cross the black circle.

Task 2

Draw a black hole with an event horizon circle of hypothetical radius 3 cm and an accretion disk ellipse tilted 30 degrees above horizontal. Add two inner ellipse guides with even spacing and two glow bands. Describe how you keep the layer order clear.

Answer: The event horizon is solid black. The disk ellipse is tilted 30 degrees, with two inner guides sharing the same center and tilt. The front half of the disk is heavier and overlaps the circle; the back half is interrupted. Two glow bands surround the circle, the inner darker and narrower, the outer lighter and wider.

Reason: Consistent center and tilt keep the disk guides coherent. The overlap convention separates front and back. Glow bands are ordered by width and darkness to suggest layered light.

Check: Measure the spacing between inner ellipse guides along the long axis; they should be equal. Check that the inner glow band is darker or narrower than the outer band.

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Original tasks 3, 4 / complete keys

Task 3

Create a stylized black hole drawing using stippling for the glow bands instead of hatching. Use an event horizon circle and a tilted accretion disk. State your chosen tilt and one hypothetical measurement.

Answer: A solid black event horizon circle, a tilted accretion disk ellipse with the front half overlapping the circle, and two or more glow bands shown by stippling that becomes sparser outward. The chosen tilt and one measurement, such as a hypothetical circle radius of 2 cm, are recorded on the margin.

Reason: Stippling is a valid shading alternative if the band order remains clear. Recording the tilt and measurement keeps the construction consistent.

Check: Confirm the stippling is denser in the inner glow band and sparser outward. Confirm the front disk half still overlaps the event horizon.

Task 4

Draw a black hole with three glow bands and an accretion disk. Then write a short self-check listing two mistakes you avoided and one valid alternative you used.

Answer: A layered drawing with a solid black event horizon, a tilted disk with correct front and back overlap, and three glow bands ordered from narrow and dark to wide and light. The self-check names avoided mistakes such as a flat disk or equal glow bands, and one valid alternative such as a different tilt angle or shading texture.

Reason: The self-check reinforces the convention and shows that alternatives are acceptable when the three layers remain readable.

Check: Verify that all three glow bands are distinguishable and that the disk overlap convention is followed. Read the self-check to confirm it matches the drawing.

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Source rubric / reflection

- [ ] Event horizon is a clean, solid black circle with a crisp edge.
- [ ] Accretion disk is a tilted ellipse centered on the event horizon.
- [ ] Front half of the disk overlaps the event horizon; back half is interrupted by it.
- [ ] At least two glow bands are present and become lighter or wider outward.
- [ ] Layer order is readable: event horizon, disk, glow.
- [ ] Valid alternatives in tilt, line weight, and shading texture are accepted if layers remain clear.

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