Cyborg Drawing: Mechanical Joints and Panel Lines

Original tasks 1, 2 / complete keys

Task 1

Draw a cyborg knee joint in a bent position. Show the axle, housing, and one piston. Add two panel lines on the lower leg that stop short of the housing. Describe or draw the joint so the axle stays central when the leg bends.

Answer: A valid answer shows a bent lower leg with a central axle circle, a housing that rotates around it, and a piston line that angles across the joint. The two panel lines run lengthwise on the shin and stop before the housing edge. The axle remains in the same relative position within the housing.

Reason: The knee hinge must show movement. Keeping the axle central and the housing rotating around it demonstrates a functional joint. Panel lines that stop short of the housing follow the convention and separate the lower leg plate from the joint.

Check: Check that the axle circle is inside the housing, the piston does not cross the axle, and both panel lines leave a small gap before the housing. Confirm the leg is bent, not straight.

Task 2

Draw a cyborg shoulder with a ball-and-socket joint. Use a human torso and a mechanical arm. Add one panel line on the torso that separates a chest plate from a side panel, and one panel line on the upper arm. Keep the panel lines away from the shoulder joint.

Answer: A valid answer shows a sphere inside a cup at the shoulder, with a collar connecting to the torso and a bracket connecting to the upper arm. The torso panel line runs vertically between the chest and side, stopping before the shoulder cup. The upper arm panel line runs lengthwise and stops before the collar.

Reason: The ball-and-socket shape shows a different joint type while keeping the hybrid boundary. Panel lines on the torso and upper arm separate machine sections but avoid the joint, following the convention.

Check: Check that the sphere is visible inside the cup, the collar connects to the torso, and both panel lines stop short of the shoulder joint. Confirm the torso still has a human shape.

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Original tasks 3, 4 / complete keys

Task 3

Compare two cyborg figures: one with a mechanical elbow hinge and one with a mechanical elbow ball joint. Both use the same human upper arm and the same head-unit height. Draw both elbows and label the axle or sphere. Explain which joint shows movement more clearly and why.

Answer: A valid answer shows two elbows at the same height. The hinge has a central axle and a housing; the ball joint has a sphere inside a cup. The hinge usually shows movement more clearly because the axle and housing rotate in one plane, while the ball joint can look static unless the cup and sphere are drawn with a clear gap.

Reason: Comparing joint types builds understanding of mechanics. The hinge is simpler to read, but the ball joint is valid if the sphere and cup are clear. Both must keep the same limb length and head-unit height.

Check: Check that both elbows are at the same height, both joints have a labeled axle or sphere, and the limb lengths match. Confirm the explanation names a specific visual reason.

Task 4

Draw a full cyborg on a blank rectangular frame. Use a human face and torso, mechanical forearms and lower legs, and mechanical joints at elbow, wrist, knee, and ankle. Add panel lines only to the machine areas. Check that the figure is a hybrid, not a pure robot or pure human.

Answer: A valid answer shows a human face and torso with mechanical forearms and lower legs. Each mechanical joint has an axle or pivot and a housing. Panel lines appear on the forearms and lower legs but not on the face or torso. The figure fits inside the frame and uses a consistent head-unit height.

Reason: The full figure tests all skills together: proportion, joint mechanics, panel line convention, and the hybrid boundary. Keeping the face and torso human ensures the figure is not a pure robot, while the mechanical limbs ensure it is not a pure human.

Check: Check that the face and torso are human, the forearms and lower legs are mechanical, every mechanical joint has an axle and housing, and panel lines are only on machine areas. Confirm the figure fits the frame and the head-unit height is consistent.

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Source rubric / reflection

- [ ] The figure reads as a human-machine hybrid, not a pure robot or pure human.
- [ ] Mechanical joints show an axle or pivot, a housing, and a connection to both limb segments.
- [ ] Panel lines follow a consistent convention: thin, continuous, stopped short of joint axles, and placed on machine areas.
- [ ] Human and machine proportions are consistent, using the same head-unit height.
- [ ] At least one joint is drawn in two positions to show movement.
- [ ] The drawing includes a clear boundary between human and machine areas.
- [ ] Valid alternatives are accepted: hinge or ball joints, different panel line counts, and varied human features, as long as the convention and hybrid boundary are maintained.

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