Negative Space Robot Drawing: Contour Study with Surrounding Shapes

Original tasks 1, 2 / complete keys

Task 1

A robot arm has a joint gap that is 5 mm wide at the shoulder and 3 mm wide at the elbow. The arm is drawn at 1:1 scale. Describe how to draw the joint gap as a negative shape and what to check with a ruler.

Answer: Draw a tapering closed contour with one edge 5 mm from the shoulder side and the other edge 3 mm from the elbow side, closing both ends. Check that the gap measures 5 mm at the shoulder and 3 mm at the elbow with a ruler.

Reason: The joint gap is a narrow negative shape that changes width along its length. Drawing it as a closed contour with measured widths preserves the convention and makes the gap checkable.

Check: Measure the drawn gap at both marked points. If either measurement differs by more than 1 mm from the stated value, adjust the contour.

Task 2

An antenna space is a triangle with a 12 mm base and 18 mm height. The robot head is 30 mm wide. Draw the antenna space first, then describe where the robot head contour should touch the triangle.

Answer: Draw a triangle with a 12 mm base and 18 mm height. The robot head contour should touch the triangle along its base and one side, leaving the triangle as a closed negative shape. The head width of 30 mm is independent and should be checked separately.

Reason: The antenna space is an elongated negative shape. Drawing it first defines the gap between antenna and head. The head contour must touch the triangle without crossing it.

Check: Verify the triangle base is 12 mm and height is 18 mm. Confirm the head contour touches the triangle at the base and one side and does not cross the triangle.

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Original tasks 3, 4 / complete keys

Task 3

A robot torso has a rectangular panel space 20 mm by 10 mm. The surrounding area outside the robot is bounded by a paper edge 50 mm from the robot. Classify the panel space and the surrounding area, then state the order of drawing.

Answer: The panel space is an enclosed negative shape; the surrounding area is a surrounding shape. Draw the surrounding area first, then the panel space, then the robot silhouette.

Reason: Largest negative shapes are drawn first to establish the overall composition. The panel space is smaller and enclosed, so it comes after the surrounding area.

Check: Confirm the panel space is closed and measures 20 mm by 10 mm. Confirm the surrounding area is bounded by the paper edge and does not merge with the panel space.

Task 4

A robot drawing uses shading instead of outlines for negative shapes. The robot is 80 mm tall. A joint gap is shaded and measures 2 mm wide. State whether this is valid under the convention and describe one check.

Answer: Yes, shading is a valid alternative if the convention is stated and applied consistently. Check that the robot remains unshaded and that the shaded joint gap is 2 mm wide and clearly separated from other shaded regions.

Reason: The convention allows outlining or shading as long as negative regions are clearly separated and the robot silhouette remains identifiable. The 2 mm width is a checkable value.

Check: Measure the shaded gap width and confirm the robot area is unshaded. If the shading crosses the robot silhouette, the drawing is invalid under the convention.

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Source rubric / reflection

- [ ] Negative shapes are drawn as closed contours or clearly shaded regions before or alongside the robot silhouette.
- [ ] At least one joint gap, one antenna space, and one surrounding shape are identified and drawn.
- [ ] Joint gap widths are measured or estimated and labeled with consistent units; hypothetical values are labeled as examples.
- [ ] The robot silhouette remains unshaded and identifiable, and no negative contour crosses it.
- [ ] Valid alternatives such as shading instead of outlining are accepted if the convention is stated and applied consistently.

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