Su-27 Orthographic Drawing: Plan and Side Outlines

Original tasks 1, 2 / complete keys

Task 1

In a plan view, the nose is at station 0 and the tail at station 24 grid squares. The horizontal tail leading edge is at station 18 and trailing edge at station 22. The half-span of the tail is 4 squares. Describe the mirrored tail outline and give one arithmetic check.

Answer: Draw the right tail from station 18 to 22, extend 4 squares outward, mirror to the left, and label the tail root chord as 4 squares. Check that both tail tips are 4 squares from the centerline.

Reason: The tail root chord is the trailing station minus the leading station: 22 minus 18 equals 4. Symmetry requires equal half-spans on both sides.

Check: Measure each tail tip distance from the centerline; both should be 4 grid squares. Confirm the chord label equals 22 minus 18.

Task 2

In a side view, the fuselage centerline is at height 0. The canopy top is 3 grid squares above the centerline and the fin top is 7 squares above it. The fin leading edge is at station 16 and trailing edge at station 20. Describe the fin trapezoid and state the fin height label.

Answer: Draw the fin from station 16 to 20, rising from the fuselage top to 7 squares above the centerline, and label the fin height as 7 grid squares. The canopy top is labeled 3 squares above the centerline.

Reason: Heights are measured from the side centerline, and the fin chord is the difference between trailing and leading stations: 20 minus 16 equals 4 squares.

Check: Count grid squares from the centerline to the fin top; it should be 7. Confirm the fin chord label equals 20 minus 16.

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Original tasks 3, 4 / complete keys

Task 3

A student labels a wing sweep as 2 grid squares chordwise for every 5 squares spanwise. The half-span is 10 squares. How many grid squares does the leading edge advance chordwise from root to tip, and what check confirms it?

Answer: The leading edge advances 4 grid squares chordwise, because 10 divided by 5 equals 2, and 2 times 2 equals 4. Check by counting the chordwise shift on the drawing from root to tip.

Reason: The ratio is 2 chordwise per 5 spanwise. For a half-span of 10, there are two 5-square intervals, so the chordwise advance is two times 2 equals 4 squares.

Check: Measure the chordwise distance between the root and tip leading edge stations; it should equal 4 grid squares.

Task 4

The plan view nose is at station 0 and tail at station 20. The side view uses the same stations. A student places the side-view nose at station 2 and tail at station 22. State the alignment error and the correction.

Answer: The side view is shifted two stations to the right. Move the side-view nose to station 0 and tail to station 20 so both panels share the same chordwise stations.

Reason: Orthographic views must align on shared axes. The chordwise stations are the shared reference, so a two-station shift breaks alignment.

Check: Draw a vertical line through the plan nose and confirm it passes through the side nose; repeat for the tail.

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Source rubric / reflection

- [ ] Plan and side panels share one labeled grid scale and aligned nose and tail stations.
- [ ] Plan outline is symmetric within one grid square, or asymmetry is labeled as intentional.
- [ ] Side outline includes fuselage, canopy, and vertical fin with labeled grid counts.
- [ ] Line convention is stated and followed: solid visible edges, optional dashed hidden edges, labeled centerlines.
- [ ] Labels are legible; letter style may vary and x-height is baseline to midline.
- [ ] Any numerical values are labeled as hypothetical examples or as measured from a stated reference.
- [ ] Simplifications are labeled and do not contradict the outer silhouette.

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