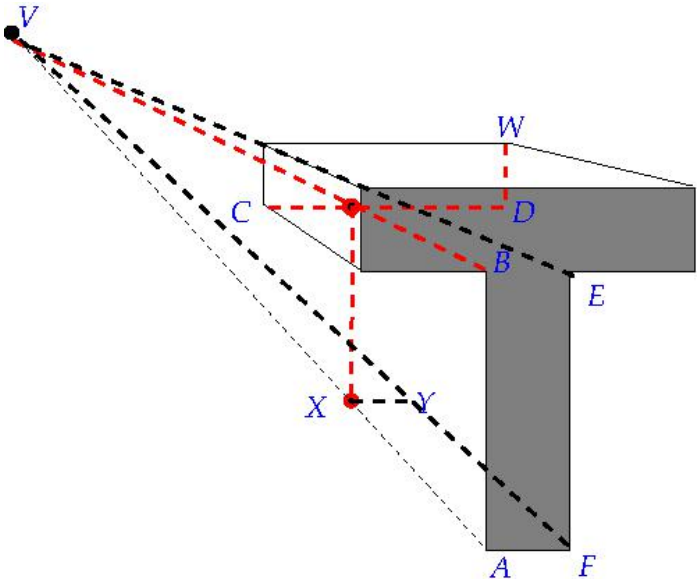
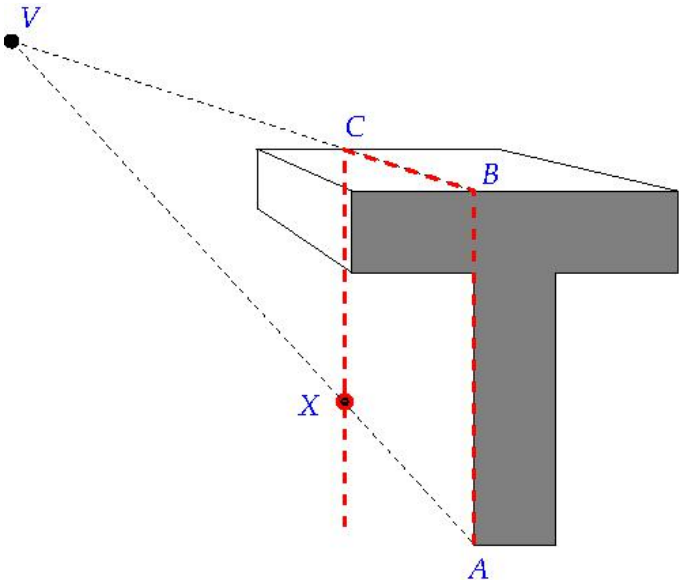
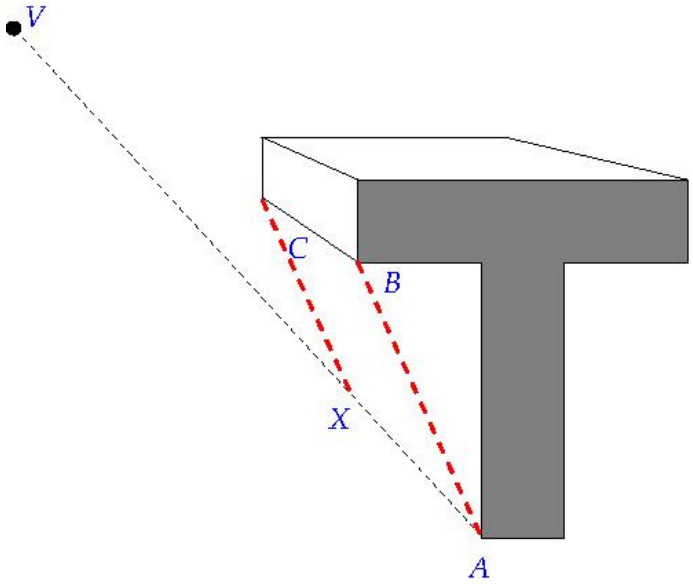


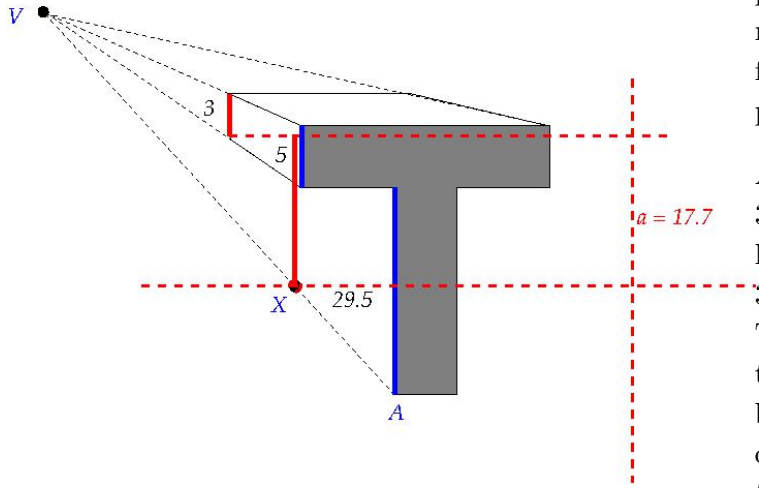
$\overline{CD}$ is drawn horizontally from C so that the vertical line from D passes through W. Thus, $\overline{CD}$ is the bottom edge of the back face of the crossbar. The depth line that extends to the ray $\overline{BV}$ in real life exits the bottom of the crossbar at the unnamed marked point in the back face of the T that is the corner corresponding to the corner B of the front face. The point X we are looking for must be directly below it, on $\overline{YA}$, because vertical lines project to vertical lines in one-point perspective.



The point B lies directly about the top left depth edge of the vertical block of the T. This is because vertical lines project to vertical lines in one-point perspective. The depth line $\overline{BV}$ exits the crossbar at C, directly above the top-left-back corner of the vertical block of the T. The vertical line down from C hits the depth line through A at the point X, again because of one-point perspective. This is the point we seek.

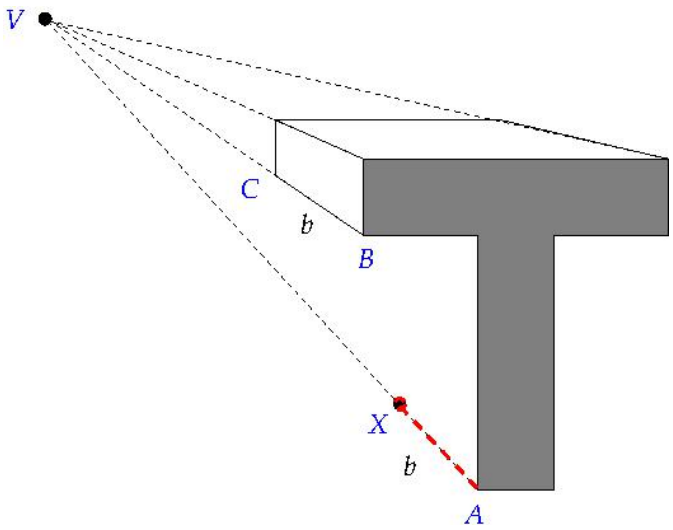


The line segment $\overline{AB}$ connects the corners of the front face of the T in the real world, therefore it is in the plane of the front face in the real world, hence parallel to the viewing plane because we are in one-point perspective. We are looking for the point X representing the left-back corner of the vertical block of the T, so that the line segment CX represents a segment connecting the corresponding two corners of the back face of the T. Because they correspond, in real life $\overline{CX}$ lies directly behind $\overline{AB}$ and parallel to it. They are in planes parallel to the picture plane, hence their images in the picture plane are also parallel. That means we can locate X by drawing the line through C parallel to $\overline{AB}$ and seeing where it intersects $\overline{VA}$, which is what we have done.



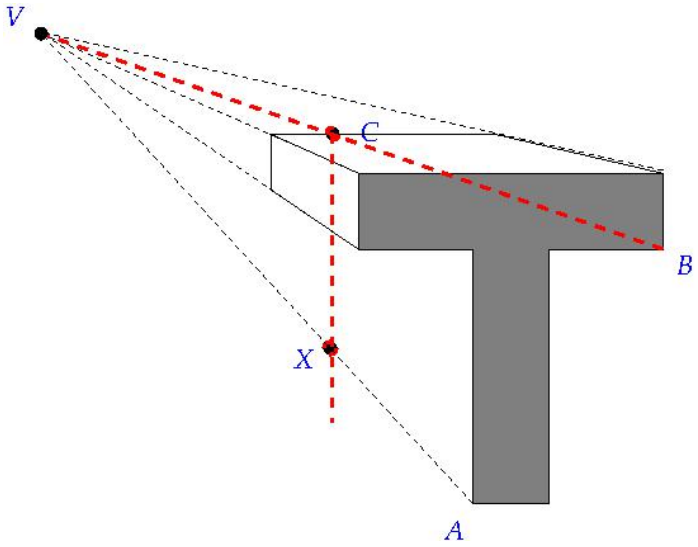
This requires a theorem we have not proved but is true: if a plane ω is parallel to the picture plane, then all lengths of line segments in ω are multiplied by the same amount when projected from the same viewing position to the picture plane.

Assuming this, and assuming the measurements $3, 5$ and 29.5 made at the board, we see that the length multiplier for the back plane of the T is $3/5$ times the length multiplier for the front face. Therefore, the long vertical edge on the left of the vertical rectangle in the back plane should be $(3/5) * 29.5 \approx 17.7$ cm. Its top is at the level of the bottom of the 3 cm red segment. We draw the horizontal line 17.7 cm below that to find the level of the bottom. Where this horizontal line intersects $\overline{VA}$ we find the point X.



The depth edge on the lower left of the crossbar and the depth edge on the vertical block have the same length in real life. Because they are also parallel, their projections to the picture plane, namely edges $\overline{BC}$ and $\overline{AX}$, have same length, call it b. Therefore, we measure the length b up the line AV to find X.

Find the mistake in the reasoning.



Draw the line from the bottom right front corner of the crossbar, labeled B in the picture, to the vanishing point V; this line will lie along the bottom right depth edge of the crossbar. Let C be the point in the picture plane at which this line intersects the top back horizontal edge of the crossbar. Because vertical lines in real life remain vertical when projected to the picture plane, the intersection X of this line with $\overline{AV}$ must be the point we are looking for.

Find the mistake in the reasoning.