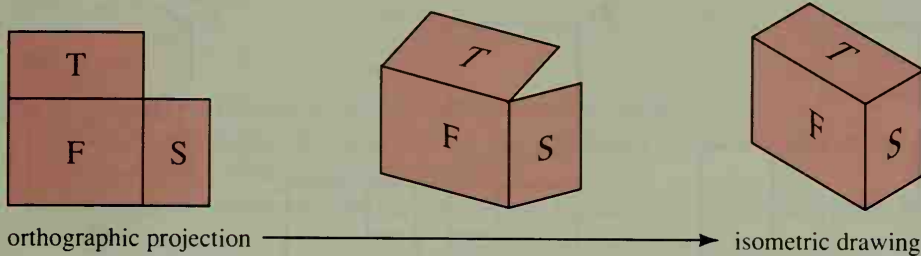To make an orthographic projection into an isometric drawing, we fold the top, front, and side together. The base of the box becomes angled, but vertical lines remain vertical, parallel lines remain parallel, and congruence is preserved.

orthographic projection ⟶ isometric drawing

To illustrate, we shall make an isometric drawing of the solid whose orthographic projection is shown below. Visible edges and intersections are shown as solid lines. Hidden edges are shown as dashed lines.

top
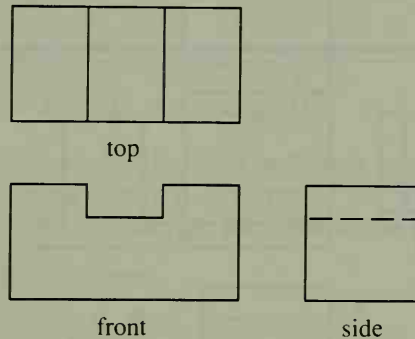
front   side

Begin by drawing three rays with a common endpoint such that one ray is vertical and the other two rays are 30° off of horizontal. Mark off the lengths of the front, side, and height of the solid. By drawing congruent segments and by showing parallel edges as parallel in the figure, you can finish the isometric drawing. The figures that follow suggest the procedure.
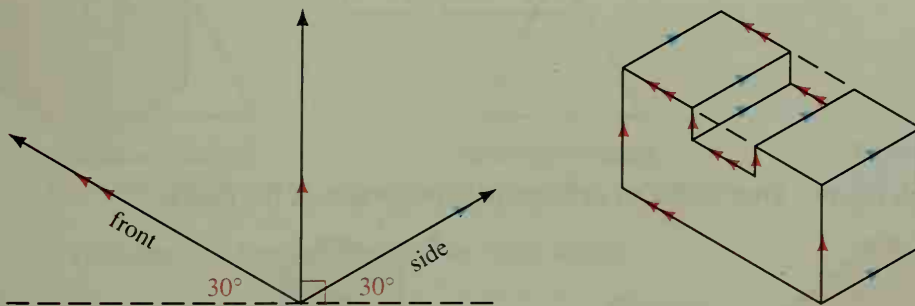
Industry requires millions of drawings similar to these each year. The drafters who make these drawings professionally combine the knowledge of parallel lines with the skills of using a compass, a protractor, and a ruler. More recently, drafters make drawings like these using a computer and a special printer.