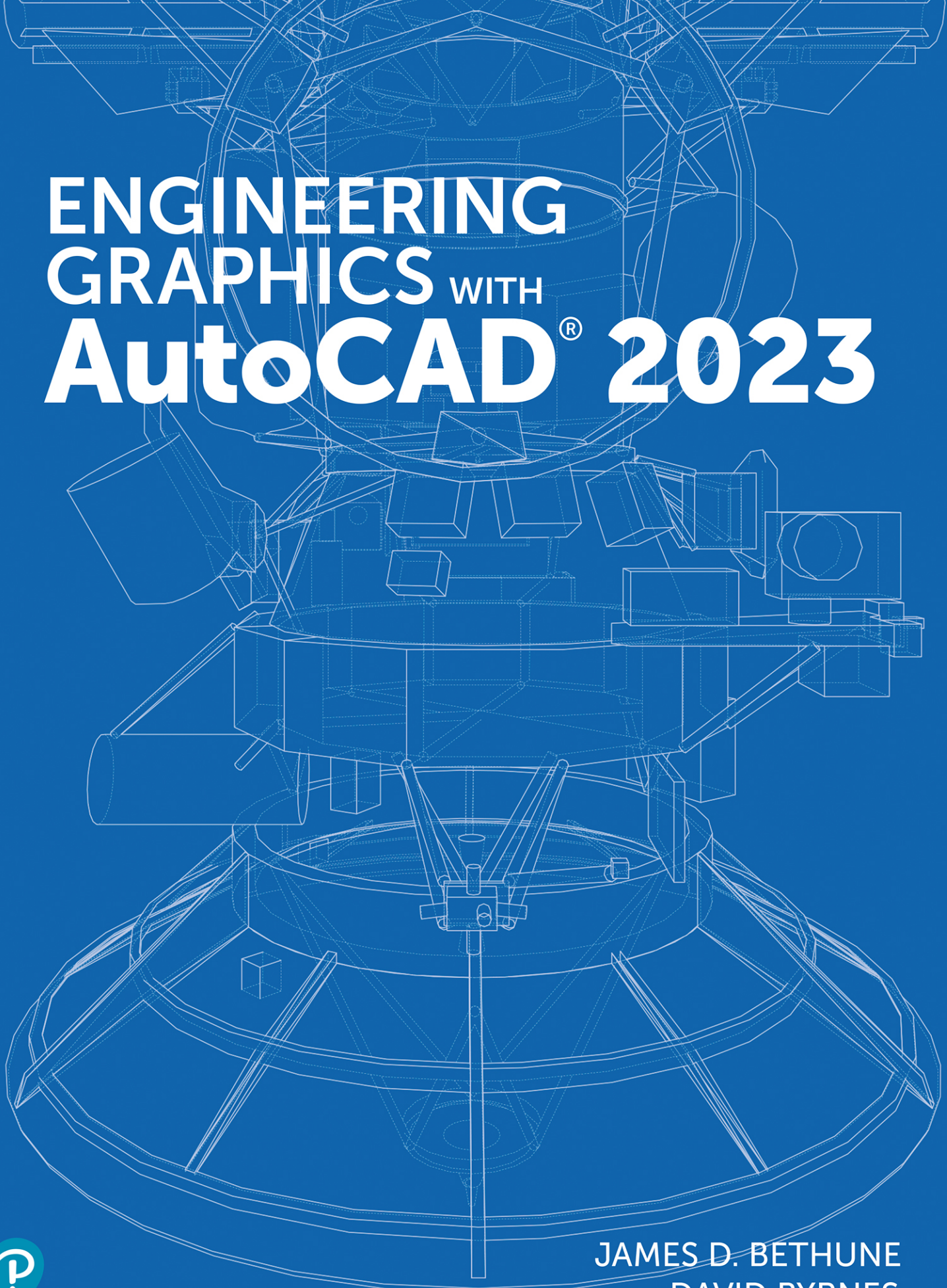
ENGINEERING GRAPHICS WITH AutoCAD® 2023



JAMES D. BETHUNE
DAVID BYRNES

Engineering Graphics with AutoCAD® 2023

James D. Bethune

David Byrnes

Pearson

Revised views

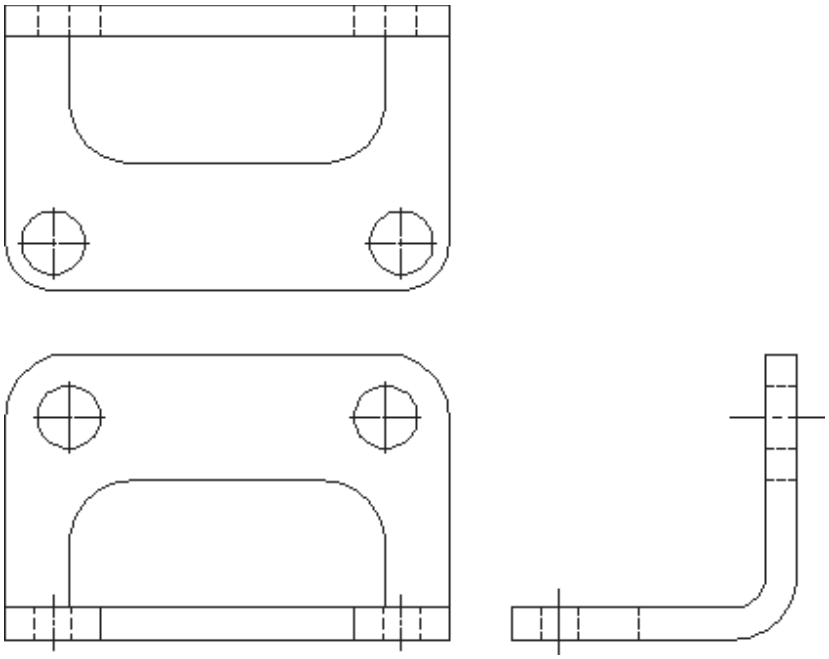


Figure 5-91

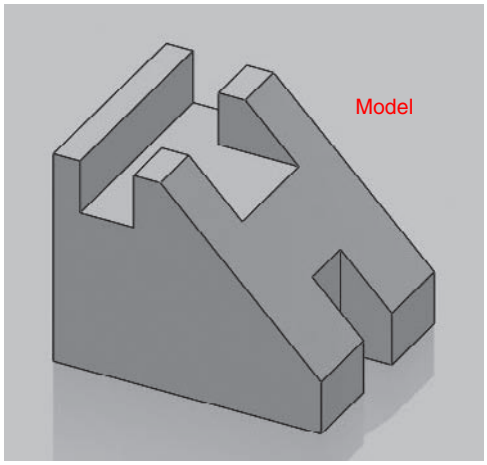
5-36 Drawing Standards

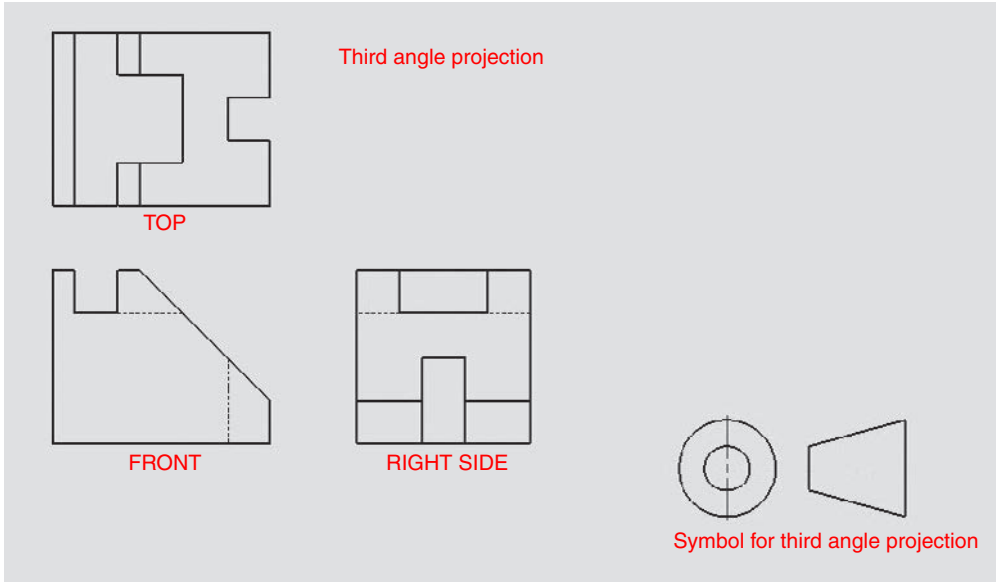
Two standards organizations define the projection and placement of orthographic views: the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO). ANSI calls for orthographic views to be created using third-angle projection; this is the accepted method for use in the United States. See the American Society of Mechanical Engineers publication ASME Y14.3-2018. Some countries other than the United States use first-angle projection. See ISO publication 128-30, available at www.iso.org.

This chapter has presented orthographic views using third-angle projections, as defined by ANSI. However, there is so much international commerce happening today that you should be able to work in both conventions, just as you should be able to work in both inches and millimeters.

Figure 5-92 shows a three-dimensional model and three orthographic views created using third-angle projection and three orthographic views created using first-angle projection. Note the differences and similarities. The front view in both projections is the same. The top views are the same but are in different locations. The third-angle projection presents a right-side view, while the first-angle projection presents a left-side view.

Figure 5-92


Model


Third angle projection
TOP
FRONT
RIGHT SIDE
Symbol for third angle projection

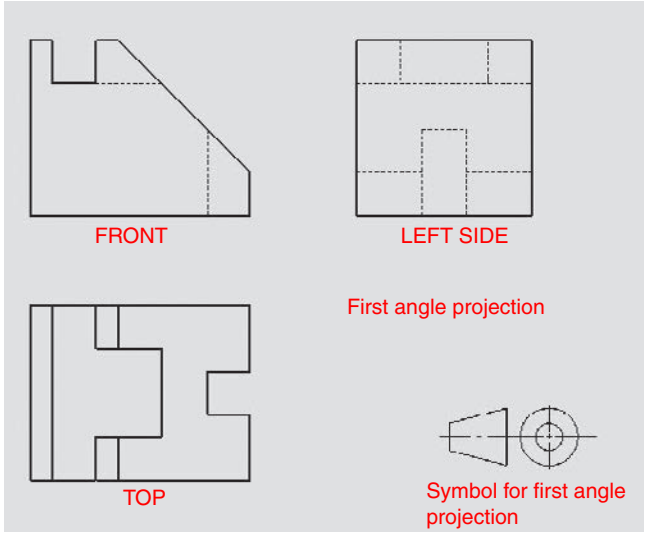

FRONT
LEFT SIDE
First angle projection
TOP
Symbol for first angle projection

Figure 5-92 also shows the drawing symbols for first- and third-angle projections. These symbols can be added to a drawing to help the reader understand which type of projection is being used.

5-37 Third- and First-Angle Projections

Figure 5-93 shows an object with a front orthographic view and two side orthographic views: one created using third-angle projection and the other created using first-angle projection. For third-angle projections, the orthographic view is projected on a plane located between the viewer's position and the object. For first-angle projections, the orthographic view is projected on a plane located beyond the object. The front and top views for third- and first-angle projections appear the same, but they are located in different positions relative to the front view.

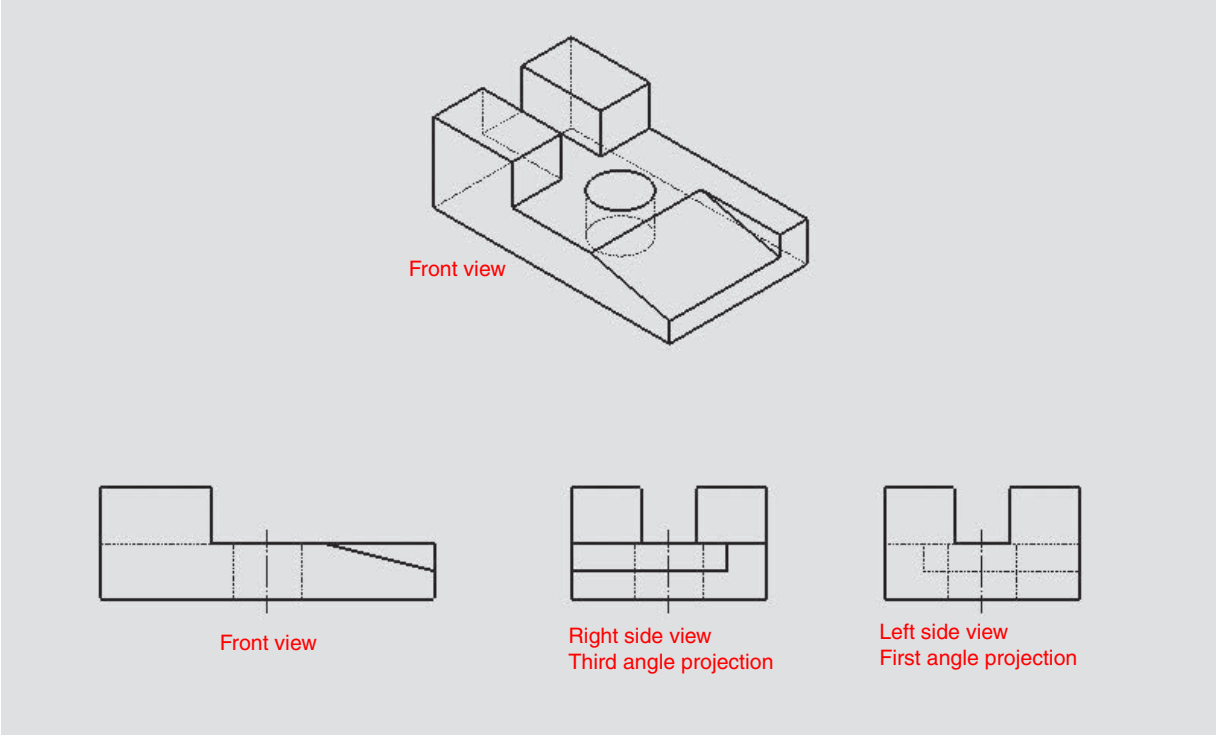


Figure 5-93

The side orthographic views are different for third- and first-angle projections. Third-angle projections use a right-side view located to the right of the object. First-angle projections use a left-side view located to the right of the object. Figures 5-94 and 5-95 show the two different side-view projections for the same object. For third-angle projection, the viewer is located on the right side of the object and creates the side orthographic view on a plane located between the view position and the object. The viewer looks directly at the object. For first-angle projection, the viewer is located on the left side of the object and creates the side orthographic view on a plane located beyond the object. The viewer looks through the object.

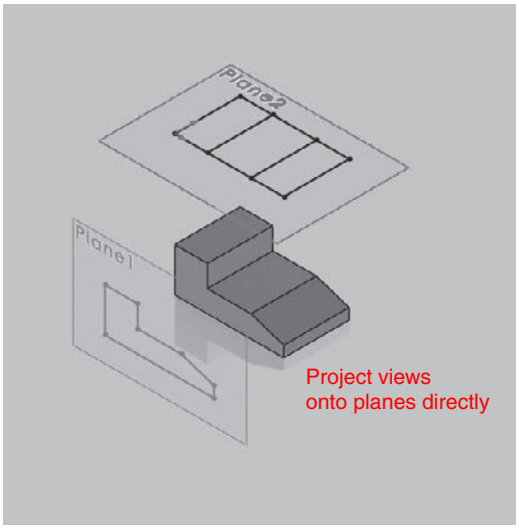


Figure 5-94

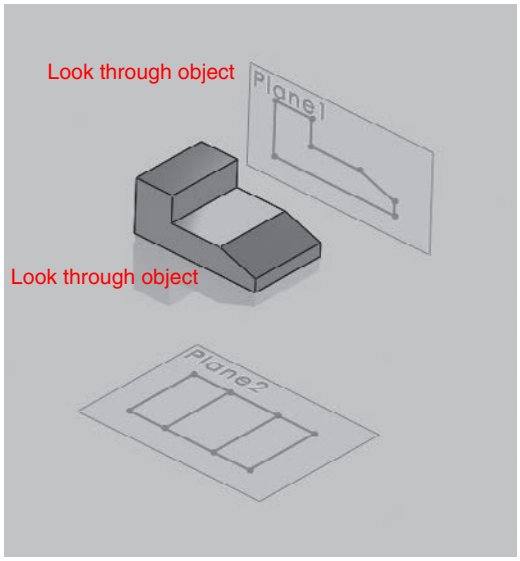


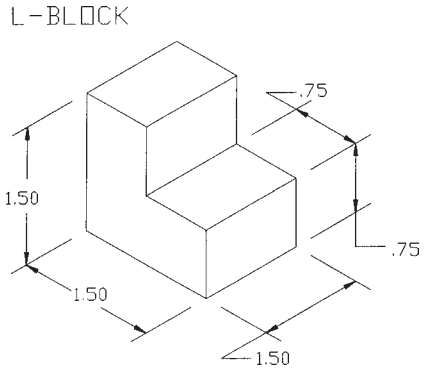
Figure 5-95

To help understand the difference between side-view orientations for third- and first-angle projections, locate your right hand with the heel facing down and the thumb facing up. Rotate your hand so that the palm is facing up; this is the third-angle projection orientation. Return to the thumb-up position. Rotate you hand so that the palm is down; this is the first-angle view orientation.

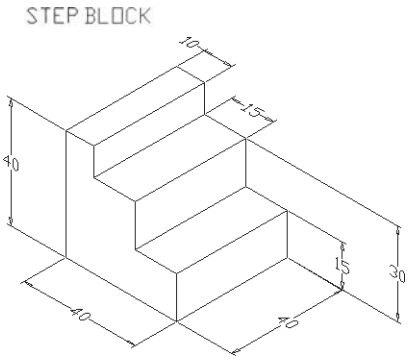
5-38 EXERCISE PROBLEMS

Draw a front, top, and right-side orthographic view for each of the objects in Exercise Problems EX5-1 through EX5-94. Do not include dimensions.

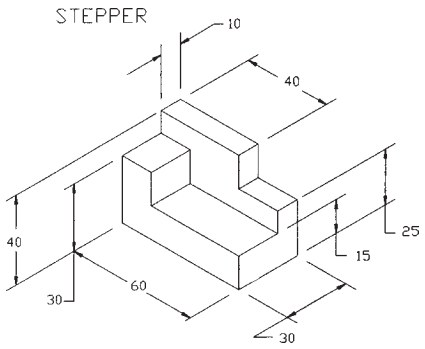
EX5-1 Inches



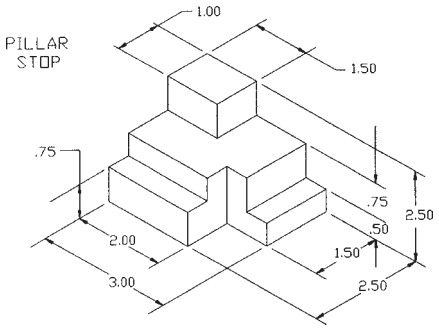
EX5-2 Millimeters



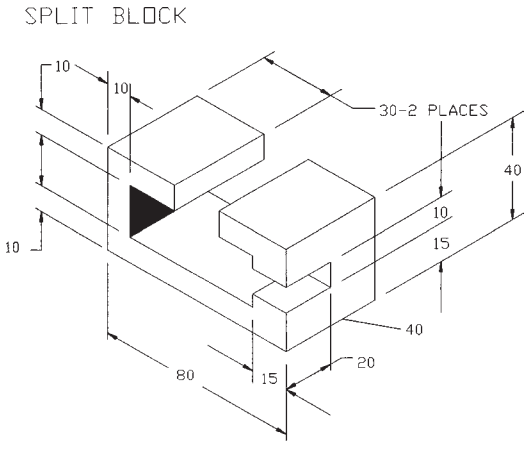
EX5-3 Millimeters



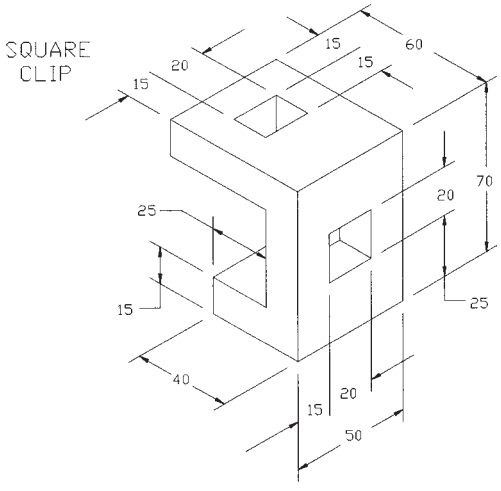
EX5-4 Inches



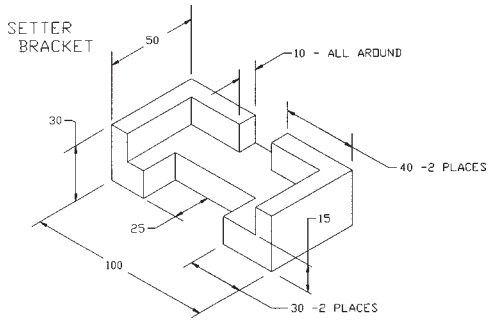
EX5-5 Millimeters



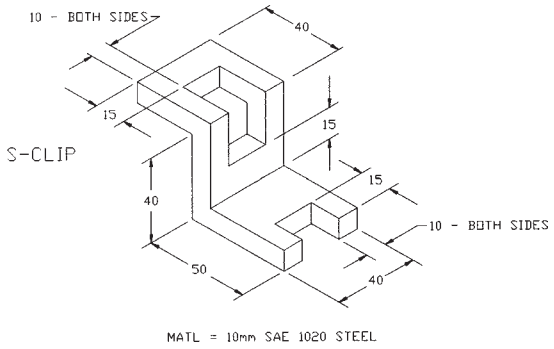
EX5-6 Millimeters



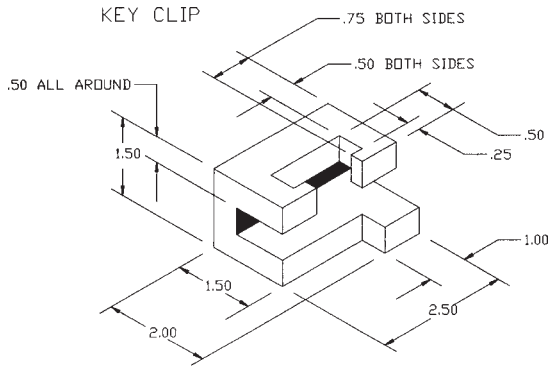
EX5-7 Millimeters



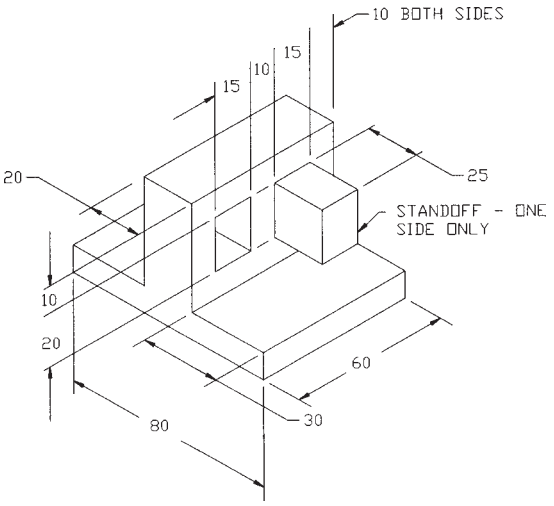
EX5-8 Millimeters



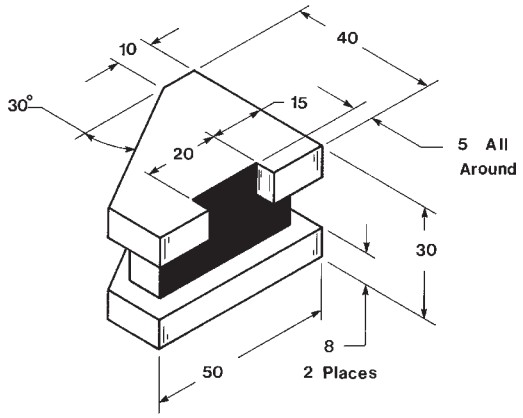
EX5-9 Inches



EX5-10 Millimeters



EX5-11 Millimeters



EX5-12 Inches