The most common type of pictorial drawing used in the drafting industry is the isometric drawing. See Figure 3A-1. This supplement focuses on commands and drawing aids that help you create 2D isometric views that look 3D, as if the object tilts towards you. However, a 3D model provides a better way to display isometric views, for most applications. AutoCAD and Its Applications—Advanced describes how to construct 3D models.

The term isometric means equal (iso) measure (metric). An isometric drawing has no perspective. Therefore, edges that are equal in length are drawn equal in length. The angles between the three principle planes and edges of an object are equal. See Figure 3A-2A. The vertical edges of an object are parallel to each other and form measurable isometric lines 90° from horizontal. The horizontal edges of an object are parallel to each other and form measurable isometric lines 30° from horizontal. All other lines are nonisometric lines. See Figure 3A-2B.

**Figure 3A-1.**
An example of a 2D mechanical part drawing with an isometric view used to help visualize the product.

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**Notes:**
2. Remove all burrs and sharp edges.
Circular features appear elliptical in an isometric drawing. The Isocircle option of the ELLIPSE command, described in Chapter 4, allows you to construct isometric circles and arcs easily. Isometric text uses a specific obliquing angle and rotation depending on the plane and drawing application. Chapters 9 and 10 cover AutoCAD text.

Once you understand the geometric layout of an isometric view, you can use any point entry method to construct an isometric drawing. Polar coordinates and dynamic input or dimensional input are common basic point entry options for isometric construction because they allow you to specify angles. Polar tracking set to 30° increment angles is also an effective method. One of the most useful aids for isometric drawing is the Isometric snap option of the Snap and Grid modes.

Use the Snap and Grid tab of the Drafting Settings dialog box to set isometric snap. See Figure 3A-3. A quick way to access the Snap and Grid tab is to right-click on the Grid Display or Snap Mode button on the status bar and select Settings.... Pick the Isometric snap radio button in the Snap type area to activate isometric snap. Then specify the snap increment using the Snap Y spacing: text box in the Snap spacing area, and the grid spacing using the Grid Y spacing: text box in the Grid spacing area. You can only set the Y snap and grid spacing. The X spacing is not applicable because the X axis relates to horizontal measurements. For the same reason, you must also check 2D model space in the Grid style area to display the grid as a pattern of dots.

After you activate the Grid and Snap modes, you are ready to begin drawing. As shown in Figure 3A-3, the grid and crosshairs rotate to an isometric orientation that aids in drawing objects at isometric angles. Figure 3A-4 shows the steps required to construct an isometric cube using the LINE command. Apply the same techniques to drawing other objects. Notice that isometric snap can be very helpful when you are constructing isometric lines.

**Figure 3A-2.**
A—An isometric drawing creates equal angles between the three principal planes and edges of an object. B—An example of an isometric drawing with isometric and nonisometric lines.
Figure 3A-3. Use the *Snap and Grid* tab of the *Drafting Settings* dialog box to specify isometric grid and snap settings.

- Turn snap on and off
- Specify the isometric snap increment
- Turn grid on and off
- Check when using isometric snap to display the grid as a pattern of dots
- Specify the grid spacing

**Isometric crosshairs**

**Pick to set isometric snap**

**Grid rotates 30°**

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Figure 3A-4. Creating a 2 unit × 2 unit cube using isometric grid and snap. Other default drawing aids are also on to help describe the construction process.
Specifying the Isometric Plane

Isometric grid and snap modes orient the grid and snap to isometric angles. You can align the crosshairs with the left, right, or top isoplane, depending on the plane on which you plan to draw. See Figure 3A-5. Changing the isoplane is not required for drawing isometric lines, but doing so can be helpful for visualization and drawing ease. You must change the isoplane orientation to construct isometric circles and arcs using the Isocircle option of the ELLIPSE command, described in Chapter 4. Press [F5] repeatedly to cycle through the isoplanes, or access the ISOPLANE command and specify the Left, Top, or Right option, depending on the isoplane orientation appropriate for the isometric plane on which you plan to draw.

When isometric snap is active, the crosshairs is always oriented with the specified isoplane. The isoplane does not apply to window or crossing selection and similar operations that use a box to make a selection.

Some of the following activities require the use of a decimal-unit isometric template with active isometric grid and snap modes. If you do not have such a template, create it now. Then use it as indicated in these activities.

Figure 3A-5.
Adjusting the isoplane orientation of the crosshairs to match a specific isometric plane.
Activity 3A-1

1. Start a new drawing from scratch using the imperial format.
2. Access the Drafting Settings dialog box. On the Snap and Grid tab, pick the Isometric snap radio button, enter .25 for the Y snap and grid spacing values, and pick the 2D model space check box.
3. Toggle Grid mode on from the status bar if it is not active.
4. Toggle Snap mode on from the status bar if it is not active.
5. Access the LINE command and use the grid and snaps to draw the isometric view shown below. Change the isoplane orientation as appropriate for drawing objects on each isometric plane. Do not dimension the drawing.

6. Save the drawing as ACT3A-1.
Activity 3A-2

For each of the following isometric drawings, start a new drawing using a decimal-unit isometric template that includes active isometric grid and snap modes. Draw an isometric part view similar to each drawing using dimensions of your choice. Save the drawings using the file names shown.

1.

File name: ACT3A-2A

2.

File name: ACT3A-2B

3.

File name: ACT3A-2C

Continued