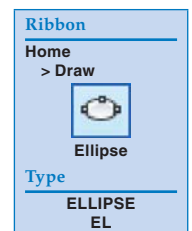# Isometric Circles and Arcs

On an isometric drawing, circles appear as ellipses and arcs as elliptical arcs. You must properly align isometric circles and arcs with the appropriate isometric plane. See **Figure 4A-1**. The minor axis of an ellipse always aligns with the centerline axis of the circular feature. It is also important to locate the correct center point.

The **Isocircle** option of the **ELLIPSE** command allows you to easily construct isometric circles and arcs. The **Isocircle** option is available only when isometric snap mode is active. You must also establish the appropriate isometric plane on which to orient the isometric circle or arc. Set the isometric plane using the **ISOPLANE** command. See **Figure 4A-2**. Refer to the supplemental material for Chapter 3 for information on isometric snap mode and the **ISOPLANE** command.

Ribbon
Home
> Draw
Ellipse
Type
ELLIPSE
EL

ELLIPSE

Drawing Isometric Circles

After you activate isometric snap mode and select the appropriate isoplane, access the **ELLIPSE** command to draw an isometric circle. Select the **Isocircle** option and then specify the location of the circle axis, or center point. Then specify the radius of the circle, or select the **Diameter** option to specify the diameter. Enter a numerical value, or pick a location along an isometric angle. See **Figure 4A-3**.

PROFESSIONAL TIP

To change the isoplane while using the **ELLIPSE** command, issue the **ISOPLANE** command transparently by pressing the [F5] key.

Figure 4A-1.
Construct isometric circles as ellipses, using the correct orientation on the isometric planes. Notice that the minor axis always aligns with the axis centerline.
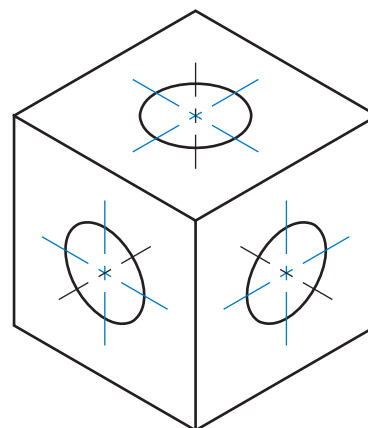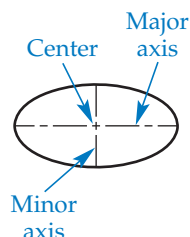
Figure 4A-2.
To use the **Isocircle** option of the **ELLIPSE** command, first activate isometric snap mode and set the appropriate isometric plane as shown.
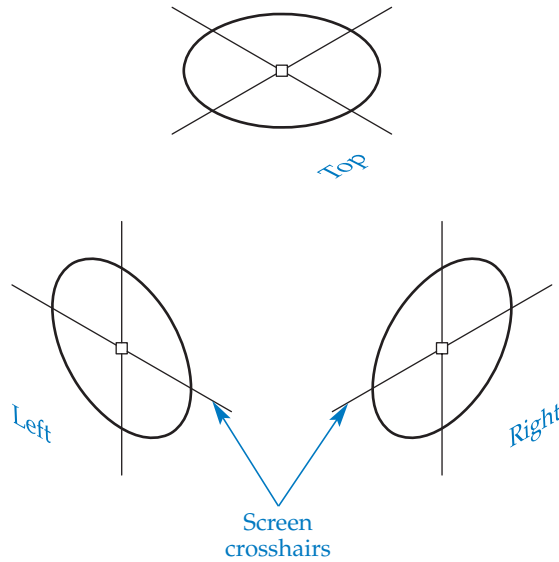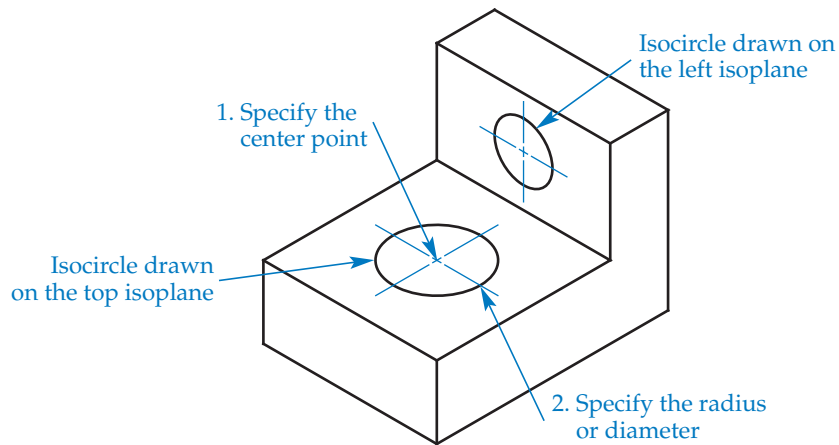
Top

Left

Right

Screen
crosshairs

Figure 4A-3.
The steps required to construct an isocircle on the top isoplane, and an example of an isocircle drawn on the left isoplane.

Isocircle drawn on
the left isoplane

1. Specify the
center point

Isocircle drawn
on the top isoplane

2. Specify the radius
or diameter

Activity 4A-1

1. Start a new drawing from scratch using the imperial format. Save the drawing as ACT4A-1.
2. Access the **Drafting Settings** dialog box. On the **Snap and Grid** tab, pick the **Isometric snap** radio button, enter .5 for the Y snap and grid spacing values, and pick the **2D model space** check box in the **Grid style** area to set the grid to a dot pattern.
3. Toggle the grid and snap modes on from the status bar if they are not active.
4. Access the **LINE** command and use isometric snap and the grid to draw the isometric view of a 3-unit cube as shown below. Change the isoplane orientation as appropriate to draw on each isometric plane.
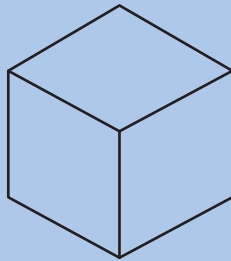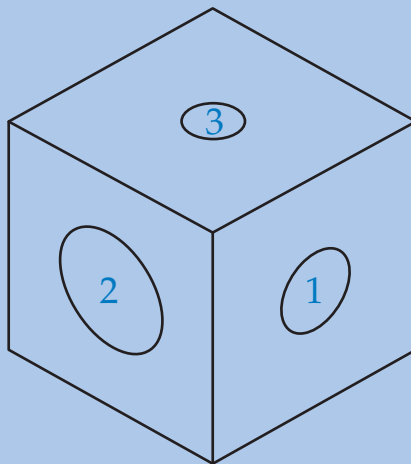
5. Access the **ELLIPSE** command and use the **Isocircle** option to draw an isometric circle on each side of the cube as shown. Center each isometric circle at the center of the corresponding cube face. Change the isoplane orientation as appropriate to draw on each isometric plane. Refer to the following instructions for each ellipse:

   Ellipse 1: Pick a radius of .5 using the crosshairs.

   Ellipse 2: Enter a radius of .75 at the keyboard.

   Ellipse 3: Use the **Diameter** option to enter a diameter of .6 at the keyboard.

6. Resave and close the file.

Drawing Isometric Arcs

Draw isometric arcs to represent common features, such as fillets and rounds. Activate isometric snap mode and select the appropriate isoplane. Then access the **ELLIPSE** command to draw an isometric arc. Select the **Arc** option, followed by the **Isocircle** option. Then specify the location of the arc axis, or center point. Specify the radius of the arc, or select the **Diameter** option to specify the diameter. Enter a numerical value or pick a location along an isometric angle. Finally, select the start and end angles for the elliptical arc. See **Figure 4A-4A**. The start and end angles are the angular relationships between the center of the ellipse and the arc endpoints. The angle of the first axis establishes the angle of the elliptical arc. **Figure 4A-4B** shows additional examples of isometric arcs added to complete a mechanical part drawing. Representing tangent edges using phantom lines as shown on the right is an option, but is not common practice.
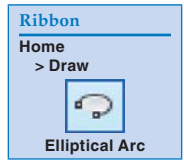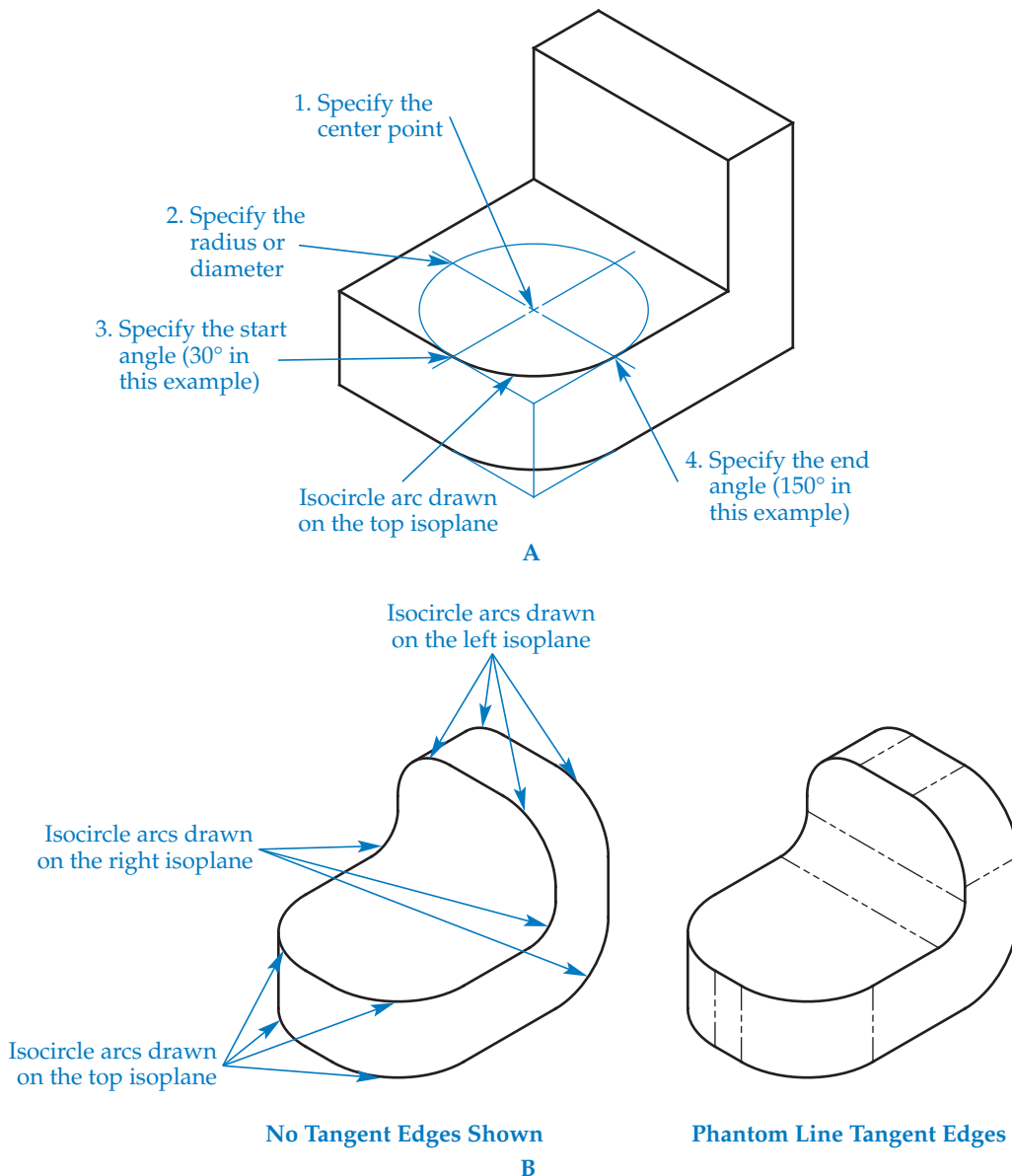
Figure 4A-4.
A—The steps required to construct an isocircle arc on the top isoplane. B—Additional isometric arcs added to the top, left, and right isoplanes.

1. Specify the center point

2. Specify the radius or diameter

3. Specify the start angle (30° in this example)

4. Specify the end angle (150° in this example)

Isocircle arc drawn on the top isoplane

A

Isocircle arcs drawn on the left isoplane

Isocircle arcs drawn on the right isoplane

Isocircle arcs drawn on the top isoplane

No Tangent Edges Shown

Phantom Line Tangent Edges

B

Use ortho mode to aid in selecting accurate start and end angles for an isometric arc.

You can edit an ellipse or elliptical arc created using the **Isocircle** option of the **ELLIPSE** command, just as you would any other ellipse object. However, remember that the radius and diameter of an isometric circle or arc form along isometric angles, not the axis endpoints of the ellipse. Therefore, do not use axis endpoint grips to edit an isometric circle or arc. Use a 120° rotation angle to rotate an isometric circle or arc onto a different isometric plane.

Activity 4A-2

Start a new drawing for each of the following objects using a decimal isometric template that includes active isometric grid and snap modes. If you do not have a template with these characteristics, create a template now. Set the grid to display as a pattern of dots on the screen. Change the isoplane orientation appropriately as you work to draw on each isometric plane.

1. Draw an isometric part view similar to the drawing shown below using dimensions of your choice. Save the drawing as ACT4A-2.
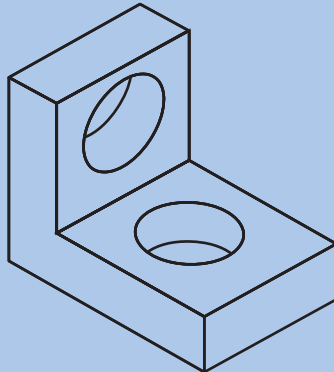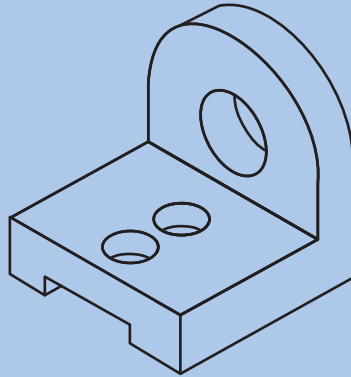
2. Draw an isometric part view similar to the drawing shown below using dimensions of your choice. Save the drawing as ACT4A-3.
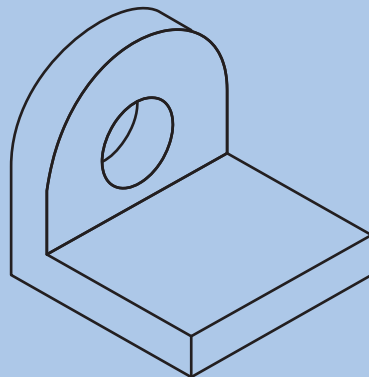
Continued

3. Draw an isometric part view similar to the drawing shown below using dimensions of your choice. Save the drawing as ACT4A-4.

4. Draw an isometric part view similar to the drawing shown below using dimensions of your choice. Save the drawing as ACT4A-5.