Introduction to Isometric Drawings

A pictorial drawing shows the height, width, and depth of an object in a single view. The most common type of pictorial drawing used in the drafting industry is the isometric drawing. An isometric drawing is a view in which all three axes appear at equal 120° angles with the plane of projection. 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 toward 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 principal planes and edges of an object are equal. See Figure 3A-2A. Lines that are parallel to the isometric axes form measurable lines and are called isometric lines.

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

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Figure 3A-3.
Use the Snap and Grid tab of the Drafting Settings dialog box to specify isometric grid and snap settings. To quickly toggle isometric snap on and off, pick the Isometric Drafting button on the status bar.

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

Isometric snap and grid modes orient the snap and grid to isometric angles. You can align the crosshairs with the left, right, or top isometric plane, depending on the plane on which you plan to draw. Each of the three isometric planes is referred to as an isoplane. 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. To specify the appropriate isoplane, right-click on the Isometric Drafting button or pick the Isometric Drafting flyout on the status bar and select from the list, or access the ISOPLANE command and select an option. You can also press [F5] repeatedly to cycle through isoplanes.

NOTE
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.

NOTE
Some of the following activities require the use of a decimal-unit isometric template with active isometric snap and grid 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.

<table>
<thead>
<tr>
<th>Type</th>
<th>ISOPLANE</th>
</tr>
</thead>
<tbody>
<tr>
<td>[F5]</td>
<td>[F5]</td>
</tr>
</tbody>
</table>

Left Isoplane
150° “X axis”
90° “Y axis”

Right Isoplane
30° “X axis”
90° “Y axis”

Top Isoplane
150° “X axis”
30° “Y axis”
Activity 3A-1

1. Start a new drawing from scratch using the imperial format. Save the drawing as ACT3A-1.
2. Pick the Isometric Drafting button on the status bar to activate isometric snap.
3. Access the Snap and Grid tab of the Drafting Settings dialog box. The Isometric snap radio button should be selected. Enter .25 for the Y snap and grid spacing values, and pick the 2D model space check box.
4. Toggle grid mode on from the status bar if it is not active.
5. Access the LINE command and use isometric snap and the grid 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. Resave and close the file.
Activity 3A-2

For each of the following isometric drawings, start a new drawing using a decimal-unit isometric template that includes active isometric snap and grid 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