Isometric, dimetric, trimetric, and oblique drawings are two-dimensional representations of three dimensional objects, whether created with AutoCAD or otherwise. Pictorial drawing was invented before the existence of CAD and therefore was intended to simulate a 3D object on a 2D plane (plane of the paper). In this exercise isometric drawings are drawn using AutoCAD.

AutoCAD provides the capability to construct isometric drawings. An isometric SNAP and an isometric GRID are available, as well as a utility for creation of isometrically correct ellipses. Isometric lines are created with the *Line* command. The isometric *SNAP* and *GRID* can be used to force lines to an isometric orientation.

Using Ctrl+E toggles the cursor to one of three possible *Isoplanes* (the three faces of the isometric pictorial). If *ORTHO* is *ON*, only isometric lines can be drawn; that is, you can only draw lines aligned with the coordinate axes. Inclined and oblique lines can only be drawn when *ORTHO* is *OFF*. Isometric ellipses can be drawn using the *Isocircle* option of the *Ellipse* command from the draw menu.

**Exercise:**

Given the top and front views, create an isometric drawing.
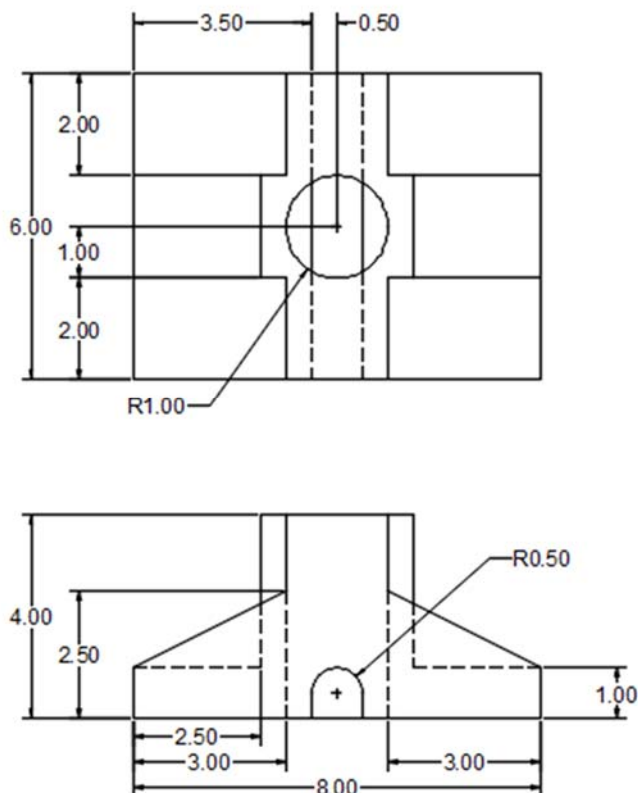
1. Start by opening a new file.

2. In the *Select Template* manager, **left-mouse-click** on the *triangular* button to the right of the *Open* button, and select *Open with no Template – Imperial*.

3. **Right-mouse-click** on the *SNAP* button in the Status Bar, and **left-mouse-click** on *Object Snap Settings* to open the *Drafting Settings* dialog box.

4. In the *Drafting Settings* dialog box, turn **on** the *Snap* and *Grid*, set the *Snap Y spacing* and the *Grid Y spacing* to **0.5**, and set the *Snap Style* to **Isometric Style Snap**.
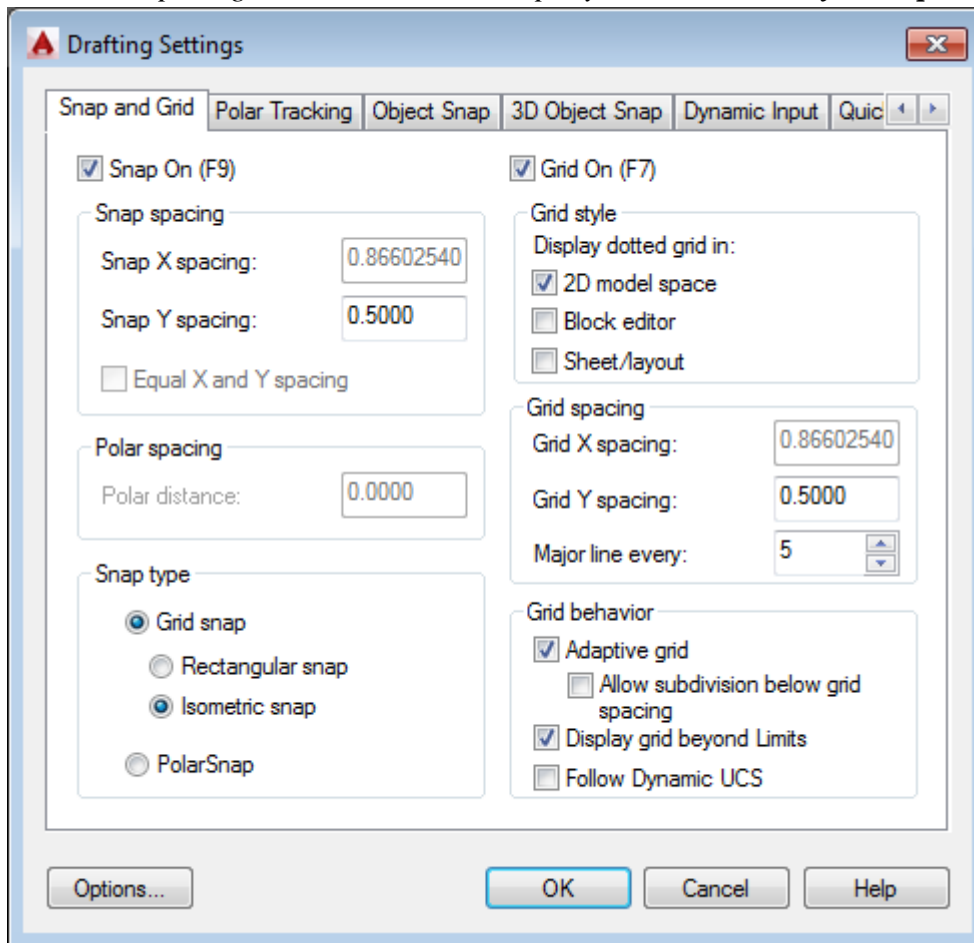


5. Click on the *Polar Tracking* tab. Turn on *Polar Tracking*, and change *Increment Angle* to 30°.

6. Click **OK** to close the dialog box. Notice the orientation of the grid points has changed to isometric. The appearance of the cursor also has changed to make it easy to create entities in the frontal, top, and profile planes.

7. With *ORTHO* tab on, create an isometric box using the *Line* command. Use the given overall dimensions of the object (width = 8, height = 4, depth = 6). Use Crtl+E to set the

appropriate isoplane. Relative polar coordinates can be used to locate corners of the rectangular block.
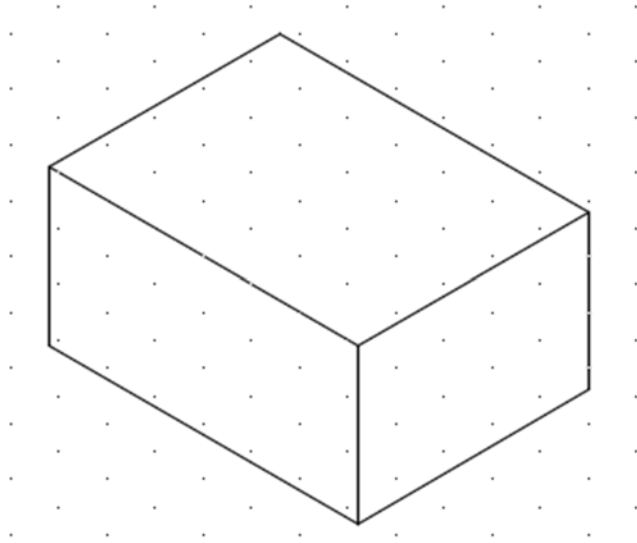


8. Add the lines to define the top and right surface. Watch the *Coords* display (in a relative polar format) to give the current lengths as you draw. (See the front ant top views on the first page of this handout for dimensions.)
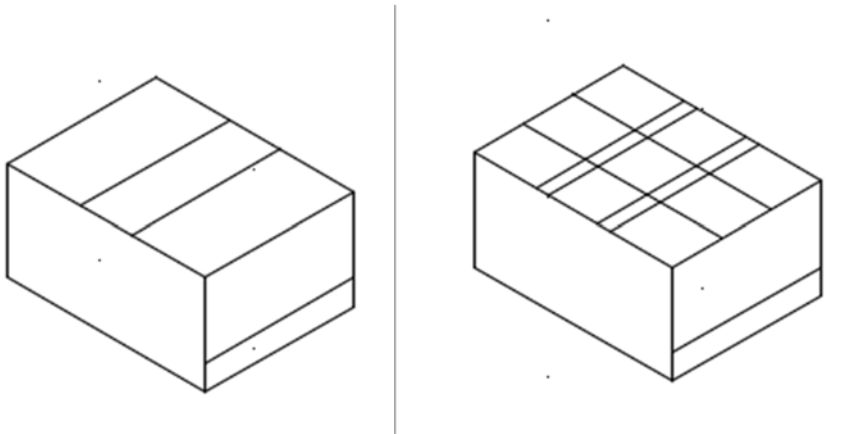


9. Using the **Trim** and **Erase** commands make the appropriate changes to remove unnecessary lines.
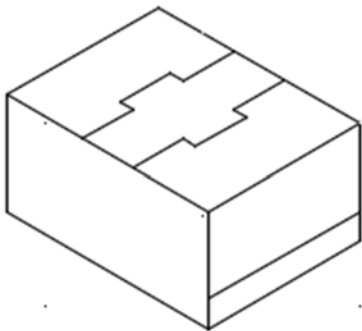
10. Draw the vertical surfaces that connect with the top surface. After turning *ORTHO* off we can now create the inclined surfaces by connecting the two vertical surfaces with lines.
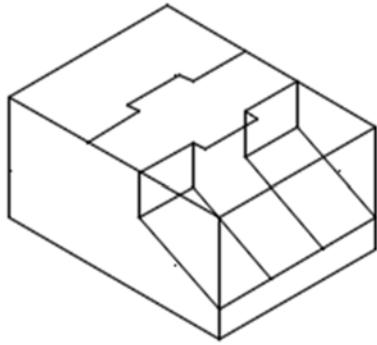
11. **Trim** and **Erase** the excess lines and start adding definition to the slotted portion between the two incline surfaces.
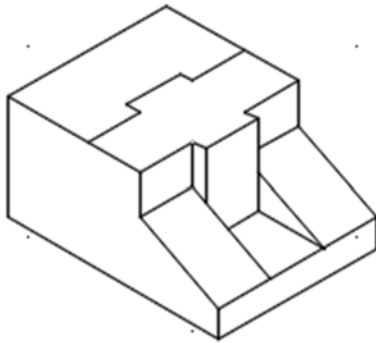
12. Finish the slotted edges on the hidden portion of the drawing and **Trim** and **Erase** the left over lines.
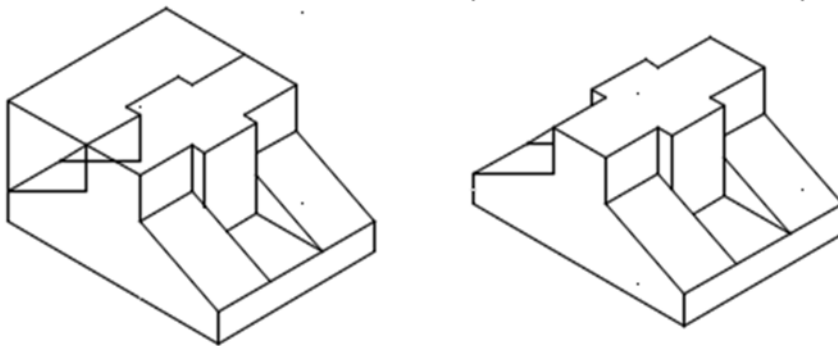
13. To create a circle in an isometric sketch we will utilize the *Ellipse* command. To use the *Ellipse* command either type *Ellipse* or locate the *Elliptical Arc* command in the drawing tab. Next type *Isocircle* or **right-mouse-click** and choose the *Isocircle* option. Use Crtl+E
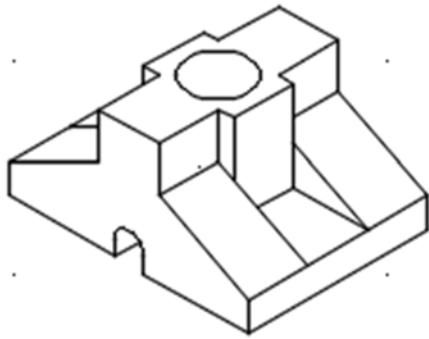
to set the appropriate isoplane
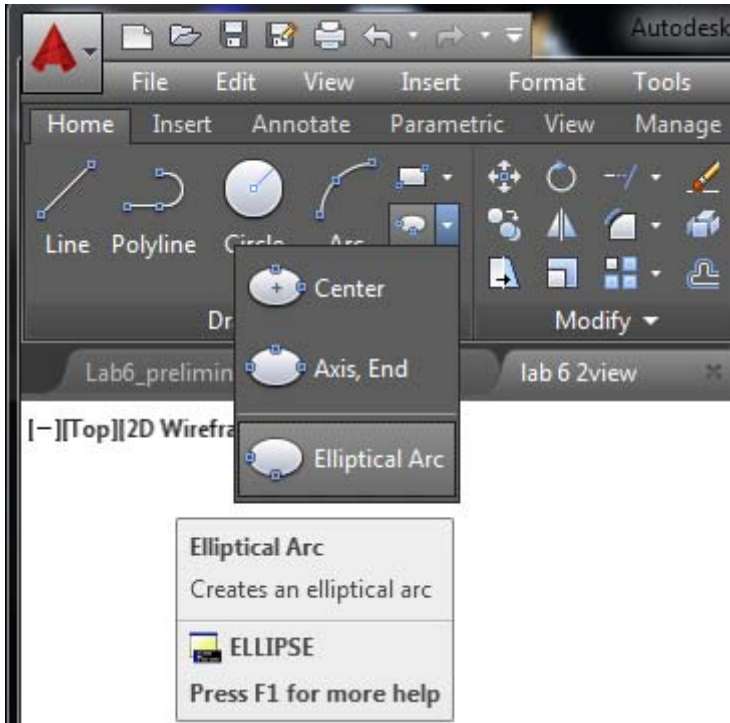


14. Using the *Isocircle* command create the circle on the top surface and the circle on the left surface.
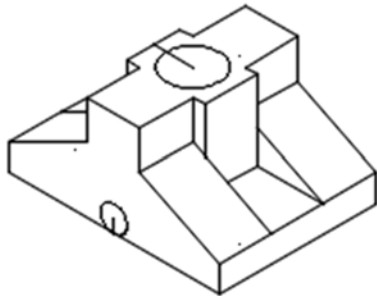


15. On the lower circle add the two vertical lines to connect the top half of the ellipse with the bottom edge of the shape.

16. Finally **Trim and Erase** any excess lines.



17. Save the drawing as **lab7-a.dwg**.

**Assignment:**

1. **(Metric)** Given the front and top views, create an AutoCAD isometric of the object. Save the drawing as **lab7-b.dwg**.

2. **(Imperial)** Given the front and top views, create an AutoCAD isometric of the object. Save the drawing as **lab7-c.dwg.** Grid size is 0.5 inch.

Note that all dimensions are in mm.