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| Figure 1. Isometric Drawing  Start here  Figure 2  End here  Start here  Figure 3 |

**Aim**: **Study and Practice of Isometric Drawings in Auto Cad**

**Theory**: In this assignment, we are going to look at creating isometric drawings with AutoCAD. These drawing appear to be three dimensional but they are not. An AutoCAD isometric drawing is a 2 dimensional drawing just like a paper drawing.

We are going to draw the figure shown on the right. We will use the dimensions shown on the figure and make a drawing that is dimensionally correct

We will start by drawing an isometric box that makes up the main body of the object. From there, we will add the semicircular hole at the bottom and the half cylinder at the top.

The first thing we need to do is to put AutoCAD in the isometric mode. This mode is entered through the **SNAP** command.

Now we can draw the left face of the box. Use the LINE command and click on the lower right corner of the right face of the box. We will use polar coordinates to make the lines at 30 degree angles.

**LINE**

From Point: ***{Click on the screen where you want the object to start}***

To Point: **@5<150** To Point: **@2.5<90** To Point: **@5<330** To Point: **C**

Next draw the right face of the box. In one of the earlier lessons, we turned on the snapping to the endpoint of a line with the **OSNAP** command. You can achieve the same thing by typing **end** when the program is expecting a point. Press return after typing **end** then click on the end point of a line, arc, or circle.

**LINE**

From Point: **end *{type this to tell the program that you want to use the end point of a line to start the new line that you are drawing}***of***{click on the starting point above}***

Start here

Stop here

To Point: **@2.5<30** To Point: **@2.5<90** To Point: **@2.5<210**

The top of the box will be drawn next. We will start with the top right corner of the box we have just finished drawing.

**LINE**

From Point: **end** of***{click on upper right point of box}***

To Point: **@5<150**

To Point: **end** of ***{complete point by clicking on end of the correct point}***

When you have finished, you should have a box like the one shown on the right. Next we need to draw the arcs making up the object. These are actually ellipses because of the isometric view. We use the **ELLIPSE** command to draw them. AutoCAD does not draw elliptical arcs but it does draw complete ellipses and we can trim these to create elliptical arcs. We will start with the arc at the bottom of the box shown in the

Picture at the right. Use the **CTRL E** key combination to change the mouse pointer so that the lines are parallel with the edges of the right face (**<Isoplane right>**).

Isocircle

Midpoint of Line

ELLIPSE

<axis end point 1>/Center/Isocircle: **I**

Center of circle: **MID *{We want the center of the Isocircle to be at the midpoint of theline {select the line at the bottom of the right face}***

of<Circle radius>/Diameter:**.75**

Now we can erase the part of the ellipse we do not need with the **TRIM** command.

**TRIM**

Select cutting edge(s)... Select objects: ***{select the line}***

Select objects to trim: ***{select bottom of circle}***

**TRIM**

Select cutting edges...

Select objects: ***{select upper half of isocircle}*** Select object to trim ***{Select the line through the isocircle}*** Select object to trim

Part to trim

Cutting edge

Part to trim

Cutting edge

We need to add a line at the bottom edge of the arc. We can do this by drawing a line that is too long then trimming it with the **TRIM** command. This will complete the bottom part of the object.



Add this line

**LINE**

From point: **END**

of ***{select end of arc}***

To point: **@3<150**

**TRIM *{Select the arc as the cutting surface and trim the line that we have just drawn. The arc and line are shown in the figure below***

We must start on the half cylinder that intersects the top of the block. We will do this by drawing four ellipses along the side of the block. Use the **CTRL E** command to place the mouse pointer lines parallel to the edges of the left face of the box.

**ELLIPSE**

<Axis endpoint 1>/Center/Isocircle: **I**

Center of circle:**ID** of ***elect top left edge of box}***<Circle radius>/Diameter:**1**

Repeat the **ELLIPSE** command to create the larger, 3 inch diameter ellipse then repeat it two more times to create the ellipses on the other side of the box. After you have draw the ellipses, trim their tops with the **TRIM** command. Use the edges of the box as the cutting planes. The figure on the right shows the **isocircles** after trimming.

The next step is to form the ends of the half cylinder shape. We can do this by moving the inside diameter arcs to the ends of the cylinder and copying the outside diameter arcs to the ends of the cylinder.

**MOVE**

Select objects: ***{Select the inner circles on the left side}***

Base point or displacement: **END** of ***{Select the end of the inside arc}***

Second point of displacement: **@.75<210**

Repeat this command for the other side and move the inside arc .75 inches at an angle of 30 degrees. Next copy the outside diameter arcs to their end positions on the cylinder. You can do this with the **COPY** command.

**COPY**



Copy these

Move these

Select objects: ***{Select the outer arc on the left side of the object}***

<Base point of displacement>:**END*{Select the end of the arc}***

Second point of displacement:**@.75<210**

Copy the arc on the other side of the object using a similar command sequence. When you finish you should have the picture shown on the right.

Use the **TRIM** and the **ERASE** commands to remove the edges of the box that cannot be seen.



Tangent here

Near here

Next, we will draw the line tangent to the arcs. This line forms the outside edge of the cylinder. Press **CTRL E** until the mouse pointer lines are parallel to the right face of the box and then type:

**LINE**

Point from: **NEAR** of ***{Click on one of the arcs as close as you can to the tangent point.. You may have to zoom in on the arc to select it.}***

Point to: **TAN** of ***{Select the other arc. You should move the mouse pointer as close to the tangent point as possible.}***

Finally we do a little more trimming and erasing of the arcs on the cylinder and we have the finished drawing shown below. We can now place the view on the drawing sheet by selecting the “Layout1” tab at the bottom of the screen and following the procedure.