UG Exercise #6

This will be a short exercise which will utilize the EXTRUDE and REVOLVE commands to create solid geometry.

Start a new file and name it “exercise6”. Set the APPLICATION to MODELING.

Go to PREFERENCES > WORK PLANE and enable and display the snap grid.

Select INSERT > CURVE > BASIC CURVE > CIRCLE. Change the POINT METHOD to POINT CONSTRUCTOR. Use the coordinate inputs (Base Point) to select the location XC = 0, YC = 4, ZC = 0. Select the BACK button of the POINT CONSTRUCTOR dialogue box to return to the previous point method. Drag the diameter of the circle to a value of 2 units.

Select INSERT > CURVE > BASIC CURVE > CIRCLE. Change the POINT METHOD to POINT CONSTRUCTOR. Use the coordinate inputs (Base Point) to select the location XC = -4, YC = 0, ZC = 0. Select the BACK button of the POINT CONSTRUCTOR dialogue box to return to the previous point method. Drag the diameter of the circle to a value of 2 units.

Use the RMB menu to REPLACE VIEW with TFR ISO.

Select INSERT > FORM FEATURE > EXTRUDE. Select one of the circles as the section string. Set the extrusion direction in the direction of positive Z, the extrusion start to zero, the extrusion end to “1” and the taper angle to 5 degrees
Repeat this process using the same section string, but reversing the direction of the extrusion. Use the same values for start, end and taper angle. UNITE the feature upon construction.

Repeat this construction using the other circle as the section string. Note that when completing the first extrusion, you should select option CONSTRUCT and when completing the second extrusion, select UNITE and select the first extrusion as the TOOL SOLID.

Select WCS > ORIGIN and then the point method CIRCLE, ARC CENTER. Move the coordinate system origin to the center of the original circle (the section string) on the left.

Select WCS > ROTATE and rotate the current coordinate system orientation 90 degree about the positive X-axis.

Use the RMB menu to REPLACE VIEW with FRONT.

Go to PREFERENCES > WORK PLANE and change both the X and Y grid spacings to .125.

Use the INSERT > CURVE > BASIC CURVE > LINE command to create the 8 lines shown in the figure.

Use the RMB menu to REPLACE VIEW with TFR ISO.

Use WCS > ORIENT to change the WCS orientation to ABSOLUTE.
Select INSERT > FORM FEATURE > REVOLVE.

When prompted for the section string use the CHAIN CURVES option to pick the lines just created.

Select option AXIS AND ANGLE.

When prompted for the axis, pick the Z-AXIS option and when prompted for the point use the Point Constructor input windows to select the origin (X=0, Y=0, Z=0).

Set the START ANGLE = 0 and END ANGLE = -90.

Select the Option UNITE and select the left cylinder as the TOOL SOLID.

Select INSERT > FEATURES OPERATIONS > UNITE and select the left cylinder and the sweep as the TARGET SOLID. Select the right cylinder as the TOOL SOLID.