C h a p t e r

3

Dimensioning the Rectangular Problem

This chapter will cover:

1. Working with Levels
2. Changing entities from one level to another
3. Creating Centerlines
4. Modifying Dimension Styles
5. The Linear Dimension Command
6. Aligned Dimensions
7. The Dimension Radius Tool
8. The Dimension Diameter Tool
9. Handles
10. The Angular Dimension Tool
11. The Place Text Tool

Working with Levels

_____

When you drew the rectangular problem, you only used the default level. Now that you are going to dimension the problem, you will need to add new levels. Levels are like separate sheets of paper, each containing its own settings and objects. You can view more than one level at a time and you can lock levels.

This is a visual representation of how levels work. In Figure 3.1, you can see three different screens, each with its own information. When you stack them together, you see Figure 3.2. This is how levels work in PowerDraft.
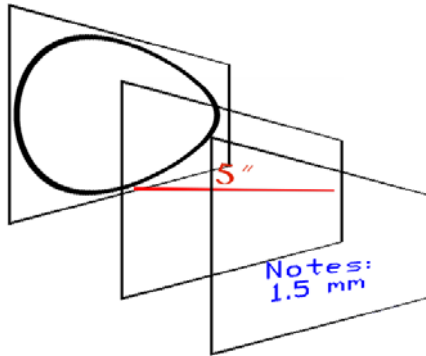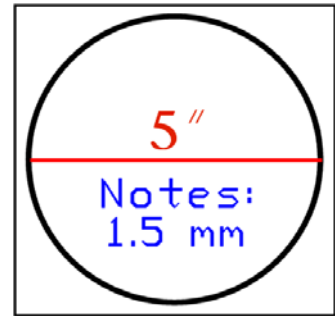
Figure 3.1 – Three Separate Layers

Figure 3.2 – What You See

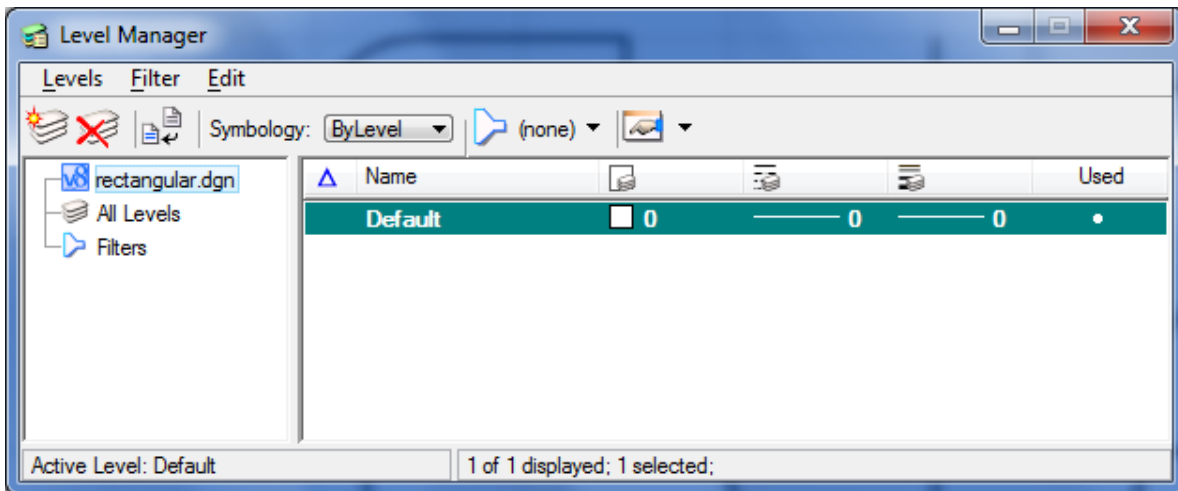**Figure 3.3 - The Active Level Indicator**

Figure 3.4 - The Level Manager Window

You need to create some new layers to dimension this part. On the Primary Tools toolbar, click the Active Level indicator. The Level manager will appear (Figure 3.4). Click the New Level icon at the top left corner of the window three times to create three new levels. Rename the levels Center, Dimension, and Text. Change the colors of the dimensions by clicking the color box and selecting a new color. Set Dimension to red, Center to green, and Text to blue, as shown in Figure 3.5.
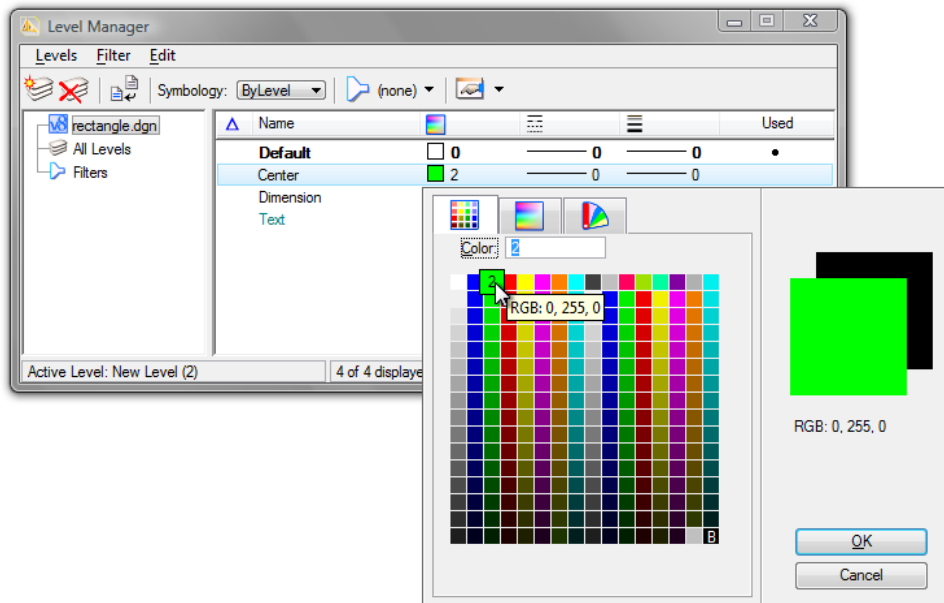
Figure 3.5 - The Symbology Color Window

You need to change the Line Style of the Center Layer, so click the Style column in the center row. Select Line Style 4 from the list and click OK (Figure 3.6). You now have 4 layers, as shown in Figure 3.7
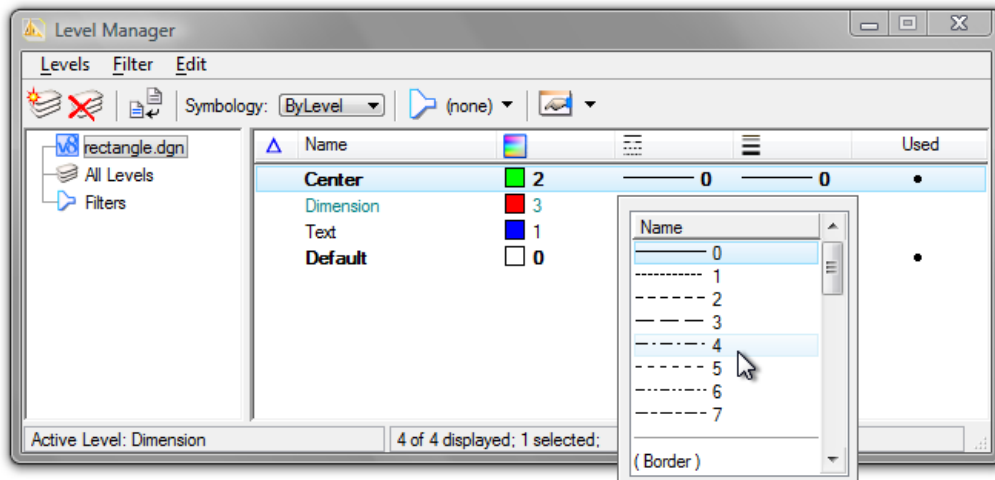

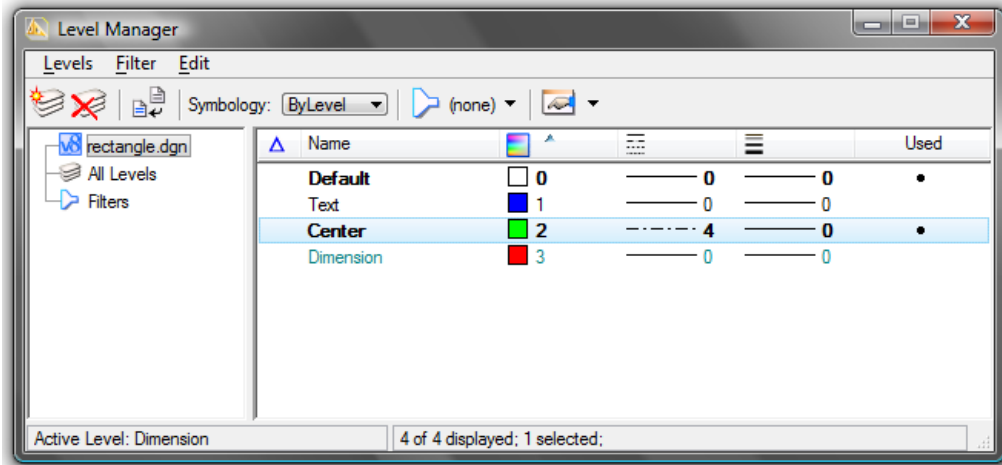**Figure 3.6 - The Select Linetype window**

Figure 3.7 – Four completed layers

Creating Centerlines

_____

Before changing the levels of the centerlines, you need to make sure that the settings will be visible. Press CTRL+B and the View Attributes window will appear (Figure 3.8). The Level Overrides box should not be annotated.

Using the Element Selection tool from the Element Selection toolbar, select the two centerlines in the drawing. Click the first one, then holding CTRL, select the second. Both centerlines should turn magenta.

Select the Center level the Active Level Combo box (Figure 3.9). The centerlines should change color to green, and the line style should be dashed, as shown in Figure 3.10.
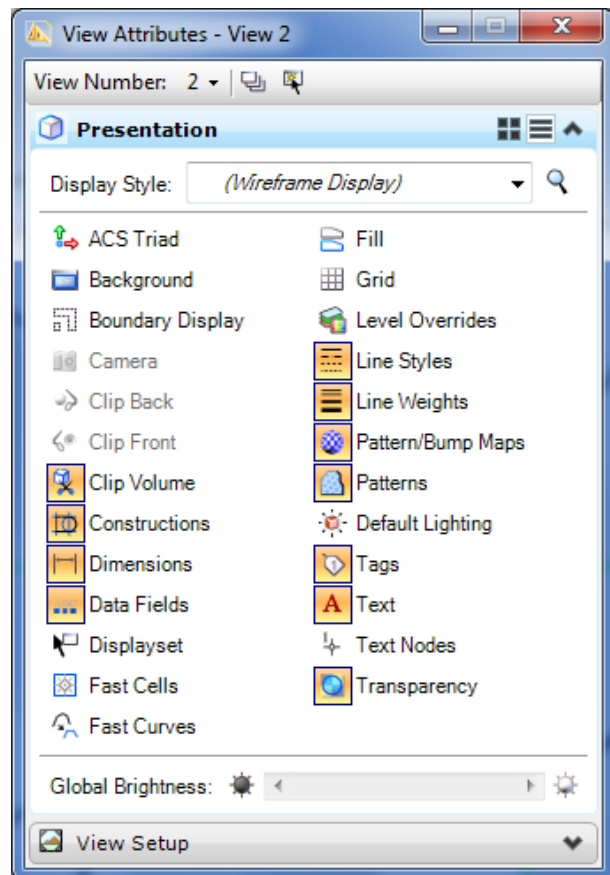

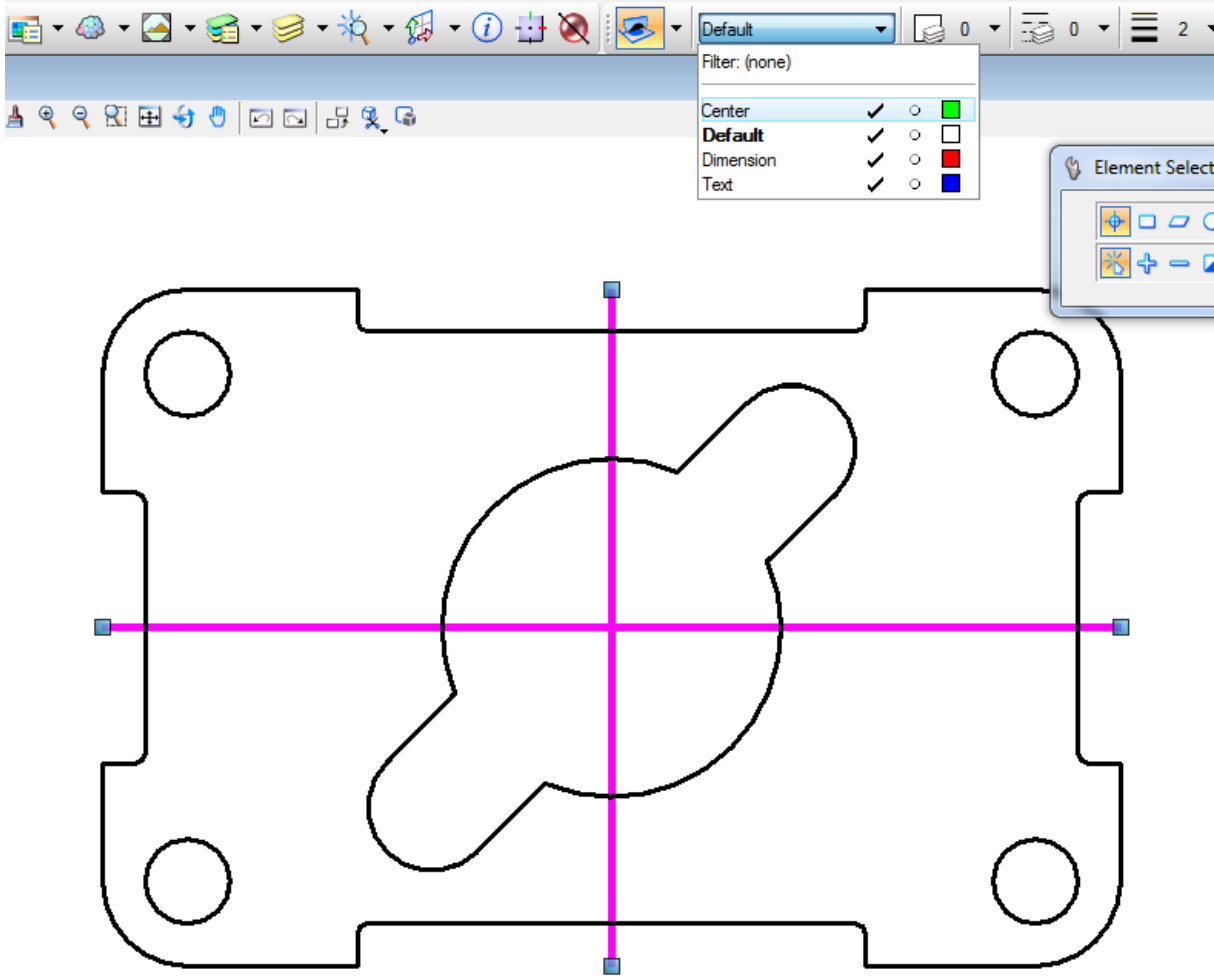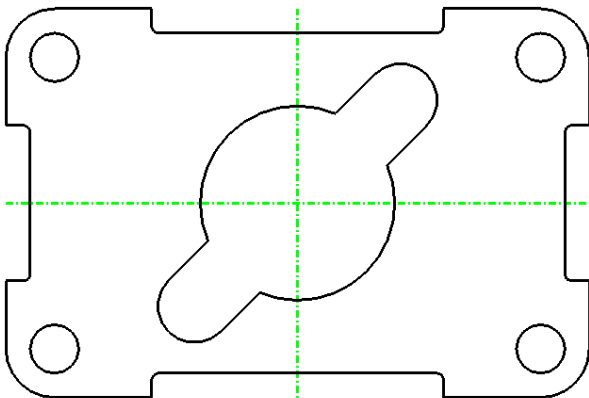**Figure 3.8 – Toggling Level Symbology**

Figure 3.9 – Selecting the Center layer in the Active Layer Combo Box

You have not only changed the two centerlines to the Center level, but also changed the Active Level to Center. This means that all elements you create while Center is still shown in the Active Level Combo box will be in the Center level, and will be green and have dashed lines.

Figure 3.10 – The Two Centerlines

Placing Center Marks

_____

Select the Dimension Center tool from the Radial toolbar. The Place Center Mark window will appear (Figure 3.11).

Before placing center marks on the drawing, you need to modify the dimension settings. Click on the magnifying glass beside the style menu access the Dimension Styles window. Click the Create Dimensions Style button, and create a new style called Standard (Figure 3.12).
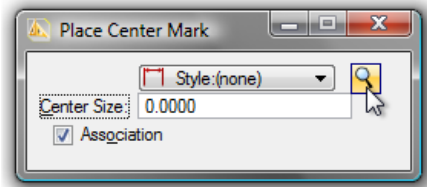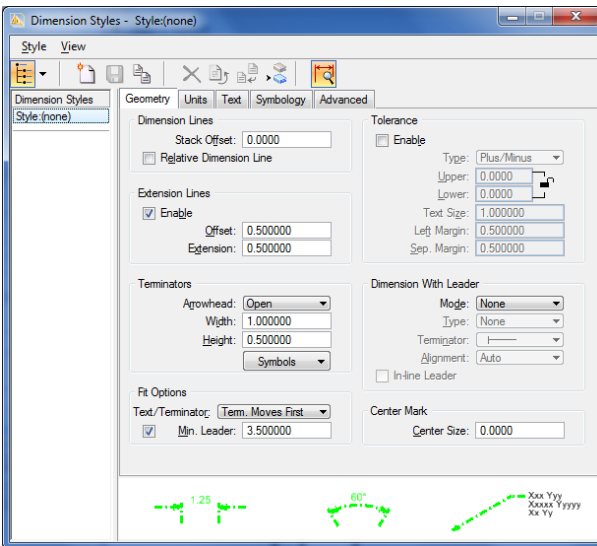

Figure 3.11 – The Place Center Mark Window

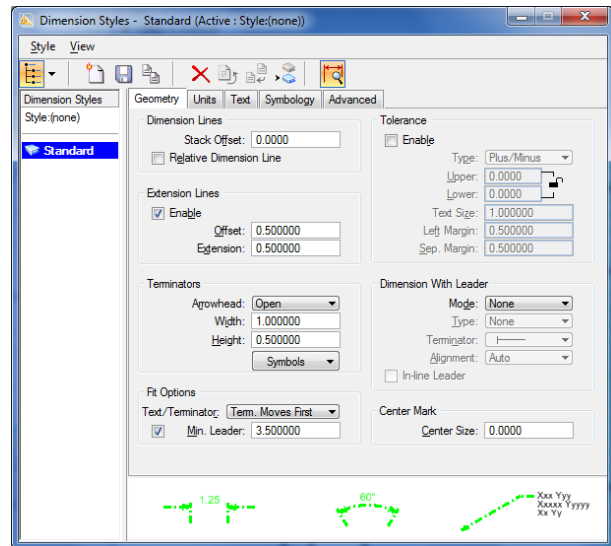**Figure 3.12 – Creating a New Style**

Figure 3.13 – Changing the Accuracy

Under Units, change the Accuracy to 0.12 (Figure 3.13). Also, check the Leading Zeros and Trailing Zeros boxes in the Primary Units area.

Next, you need to create a text style. Click the Place Text tool from the Text toolbox on the Task dialog box and the Text Editor – Word Processor window will appear, as well as the Place Text window. On the Place Text window, click the magnifying glass beside the Text Style drop menu. The Text Style menu will appear. Click the New button and create a new text style named Standard (Figure 3.14).
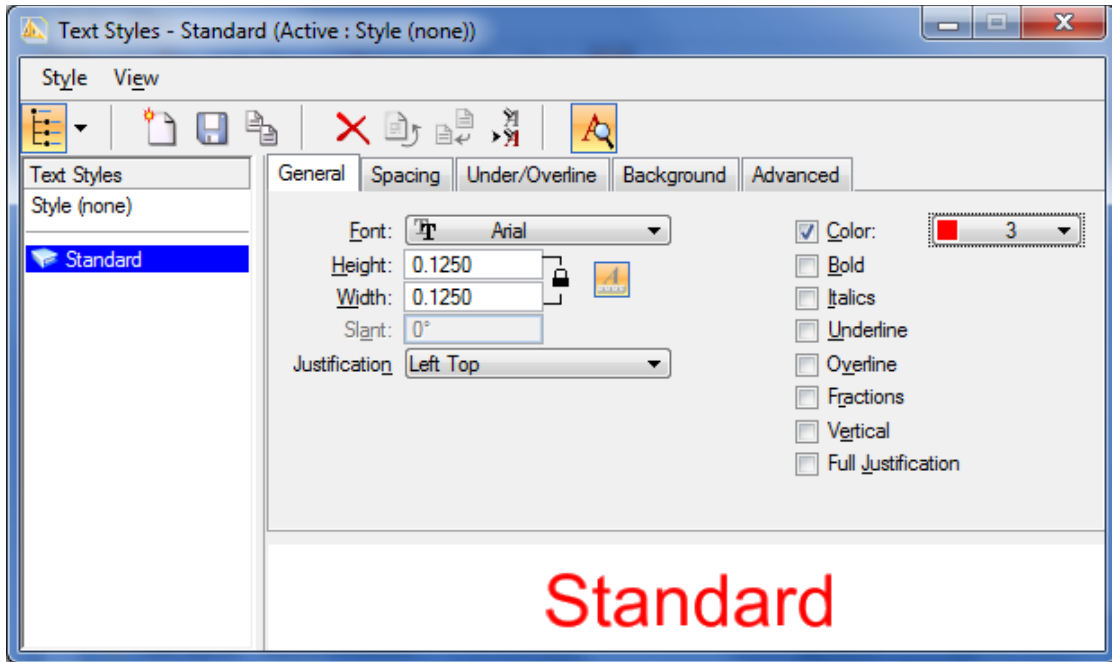
Figure 3.14 – Creating a New Text Style

Change the Text Height to 0.125, and the width will automatically change to match the height (Figure 3.14). Under Spacing, change the Line Spacing to 0.0500. Change the color to ByLevel. Click Save to save your new text style. You will use this style when placing dimensions and notes. Close the Text Styles window to continue configuring the Dimension Style.

Under Text, select the Text Style drop menu and select the Standard text style you just created (Figure 3.15). In the Format area, change the Orientation to Horizontal. Click the save style button at the top of the window when you are finished. Now you are ready to place the center marks, along with the rest of your dimensions.
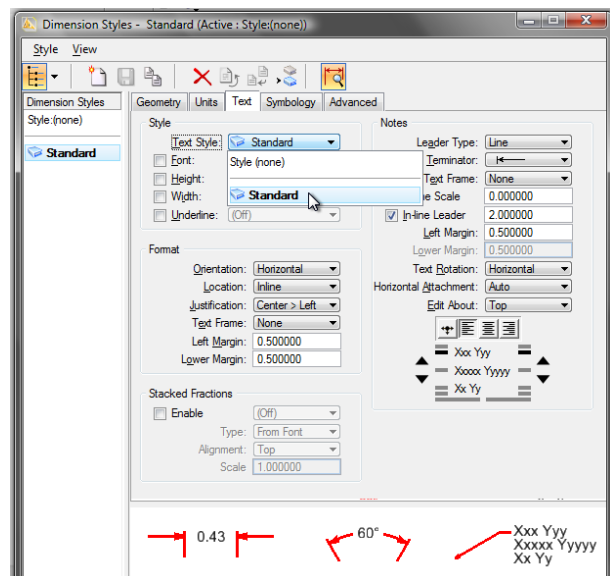

Figure 3.15 – Changing the Accuracy

Place the center marks by selecting the arc you wish to mark (Figure 3.16), and then clicking again to apply the dimension. In Figure 3.17, all the arcs that need center marks are highlighted. There are 6 total.
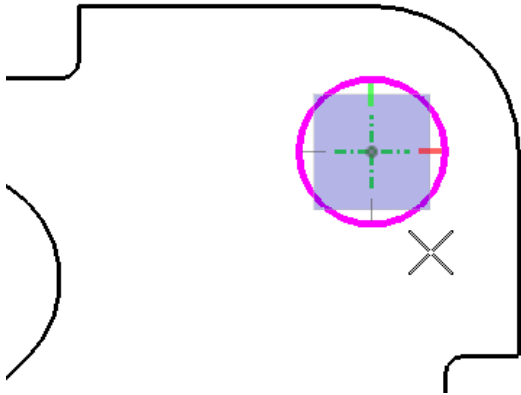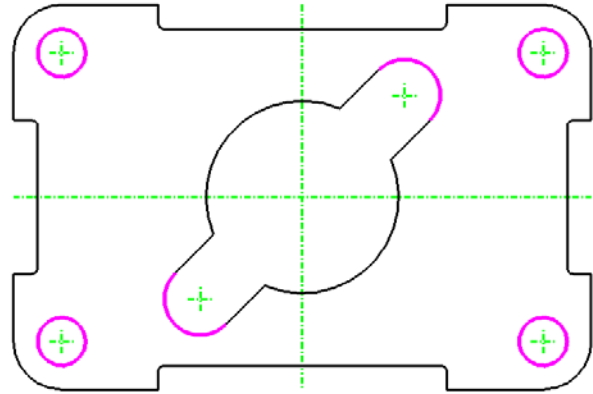
Figure 3.16 – Placing Center Marks

Figure 3.17 – All 6 Center Marks Located

The Linear Dimension Command

From the Active Level Combo box, select Dimension as the active level. Select the Dimension Linear tool from that toolbar on the Task dialog box. You should have AccuDraw set to On. Make sure that the Style is set to Standard and the Alignment is set to Drawing in the Dimensions Size With Arrows window.
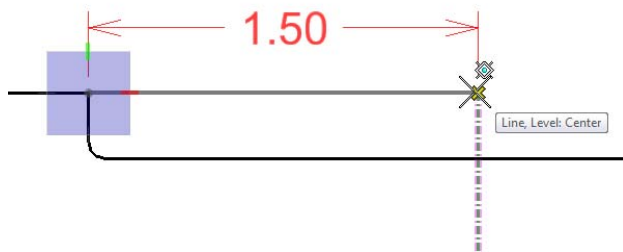

Figure 3.18 – Selecting the Centerline

First, select the top left non-filleted corner in the drawing, as shown in Figure 3.17. The AccuDraw compass will appear. Select the top endpoint of the green centerline (Figure 3.18). Finally, move the dimension upward from the part and left click once more to place the dimension. If done correctly, you should have a 1.50 dimension placed above the drawing.

Right click twice to reset the command. You should be using the AccuSnap MultiSnap settings to make sure you are selecting the correct points. Select the same starting point for your next dimension, but this time move the cursor past the 1.50 dimension when the AccuDraw compass appears, and click the other top non-filleted corner to create a 3.00 dimension. Right click twice to reset the command. Next, select that same corner and then the indented line just below to create a 0.25 dimension (Figure 3.20).

Figure 3.20 – Placing the 3.00 and 0.25 Dimensions

3-8

Continue to dimension the part with the same command, double-right-clicking to reset the command when needed. If you get lost or make a mistake, press CTRL+Z to Undo and then right click twice to reset the Linear Dimension tool. This may take some trial and error. Place the 1.50, 3.00, 4.00, and 0.50 dimensions as shown in Figure 3.21. Make sure not to use already-placed dimensions as selection points for new dimensions. Every dimension you place should be connected to a part of the drawing.
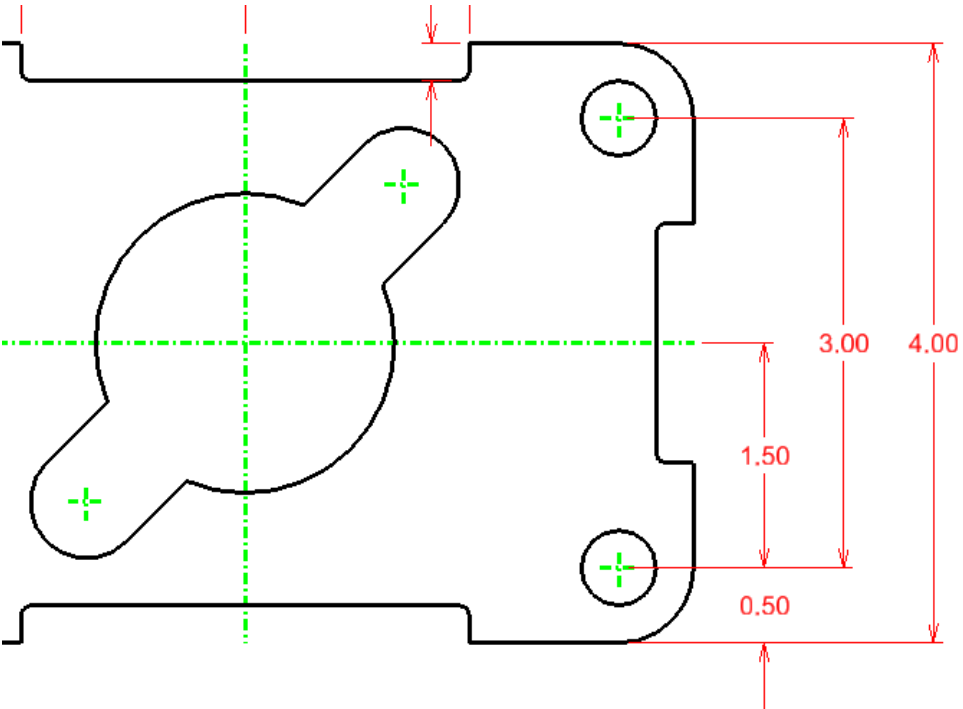

Figure 3.21 – The Right Side Dimensioned

Place four more dimensions on the bottom of the part. Start by placing the 6.00 the farthest away from the part, and then place the 5.00 and 2.50 above it. Place the 0.50 dimension in line with the 2.50, as shown in Figure 3.22.

Figure 3.22 – The Bottom Dimension

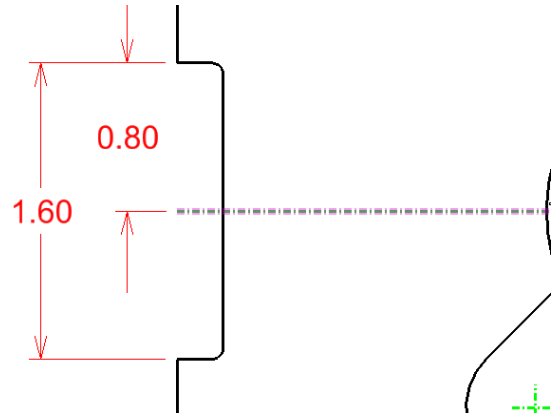Place the final dimensions, 1.60 and 0.80 on the left side of the part, as shown in Figure 3.23.

Figure 3.23 – Dimensioning the Left Side

Aligned Dimensions

_____

To place aligned dimensions, change the Alignment on the Dimension Size with Arrows window to True.

To place the first aligned dimensions, select the left arc center mark of the hole, and the AccuDraw compass will appear. Now select the intersection of the two centerlines of the part. A 1.50 dimension will appear aligned with the rotated hole. Click once more to place the dimension, making sure that the 1.50 is unobstructed by any other elements on the drawing (Figure 3.25).
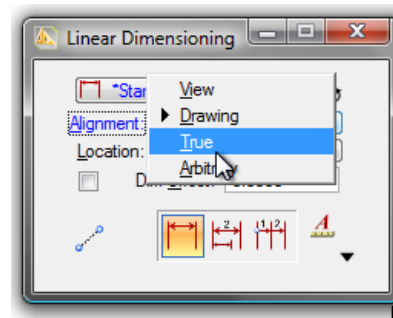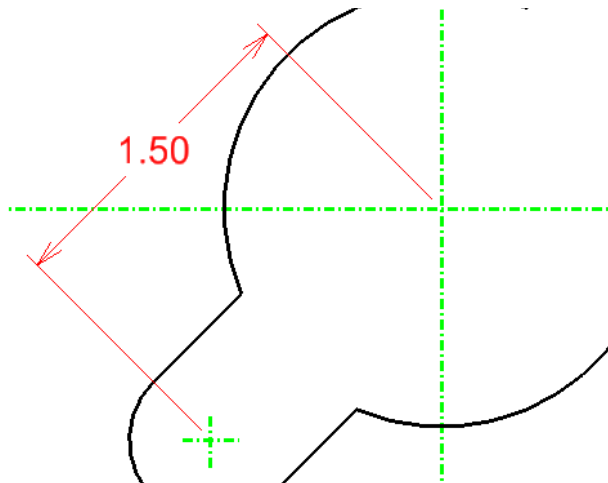
Figure 3.24 – True Alignment

To place the second aligned dimension, select the same original center mark as before. Select the top arc center point, and then the centerpoint of the hole. Pull the dimension to the opposite side of the part than the 1.50 dimension, as shown in Figure 3.26.
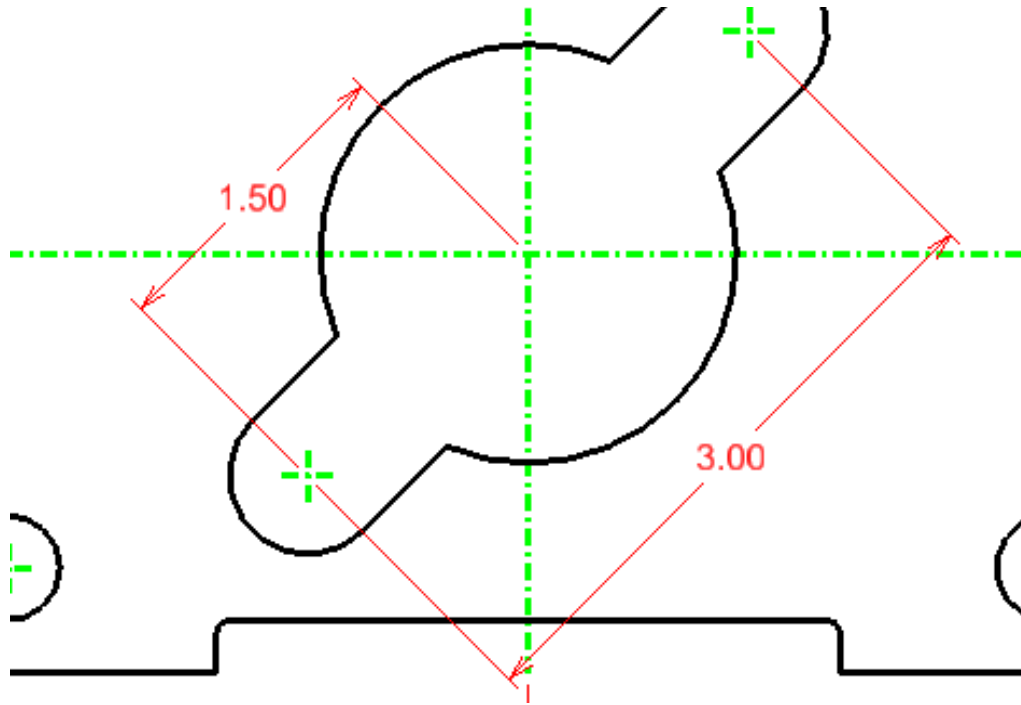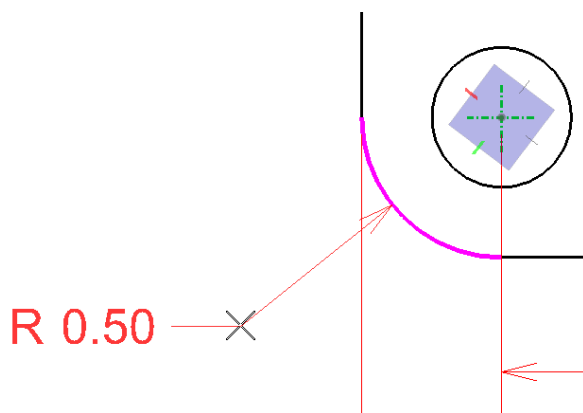
Figure 3.25 – A 1.50 Aligned Dimension

Figure 3.26 – The 1.50 and 3.00 Aligned Dimensions

Using the Dimension Radius Tool

_____

Select the Dimension Radial tool from the Radial Dimension toolbar, and the Dimension Radial window will appear. Make sure the Dimension Style is still set to Standard and the Mode to Radius.

First, place a dimension on the arc of the bottom left corner of the drawing. Select the corner, and then place the 0.50 dimension as shown in Figure 3.27. Also place a 0.38 radius on the upper arc contained in the hole of the part, as shown in Figure 3.28. Finally, and you will have to zoom in for this, place a 0.06 radius on the right upper filleted edge (Figure 3.29).
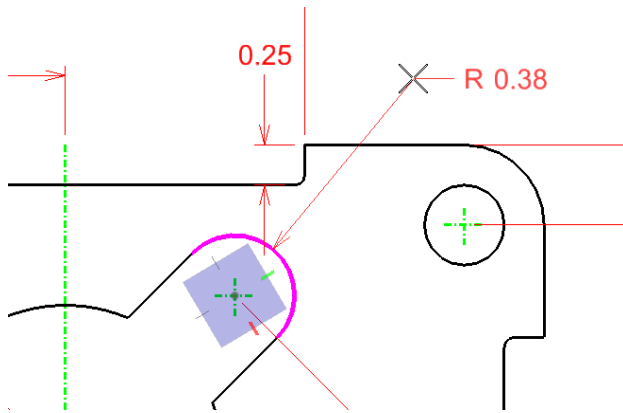
Figure 3.27 – The 0.50 Radius Dimension
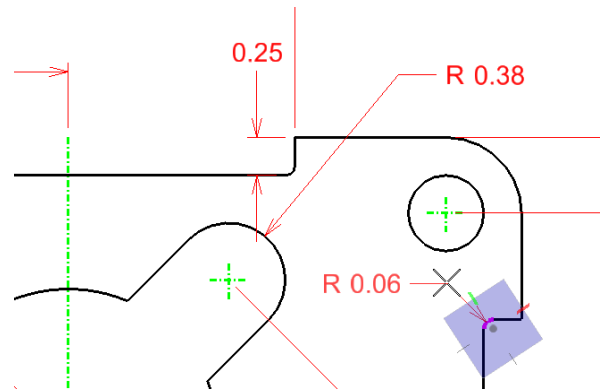
Figure 3.28 – The 0.38 Radius Dimension

Figure 3.29 – The 0.06 Radius Dimension

Using the Dimension Diameter Tool

Select the Dimension Diameter tool from the Radial Dimension toolbar. This tool works much in the same way as the Dimension Radials tool.
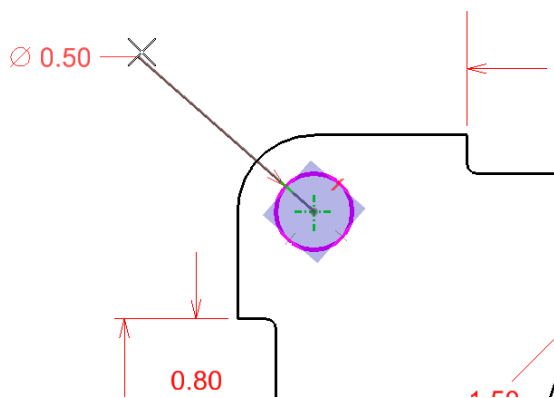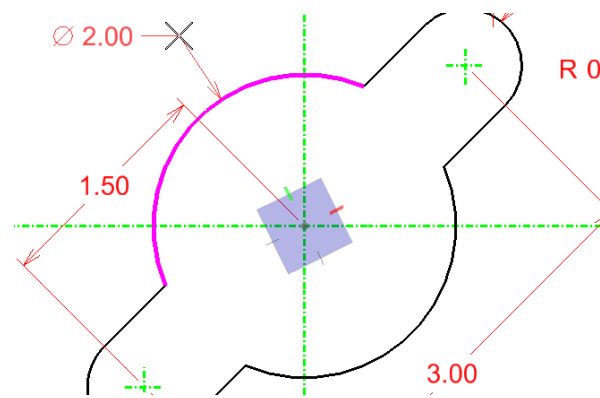

Figure 3.30 – The 0.50 diameter

Figure 3.31 – The 2.00 diameter

First place a diameter on the top left circle (Figure 3.30). Next, place a 2.00 diameter on the large arc of the center hole, as shown in Figure 3.31.

Using Handles

Before placing the next dimension, you need to create an extension line manually. Start by selecting the SmartLine tool from the Linear Elements toolbar. While remaining in the Dimension level, draw a line connecting the centerline intersection to the center mark of the upper arc of the center hole (Figure 3.32). AccuSnap should make this very simple. Before resizing the line, toggle AccuSnap off by clicking the Toggle AccuDraw button on the Snap Mode toolbar. Select the Element Selection tool from the Element Selection toolbar and click the line.
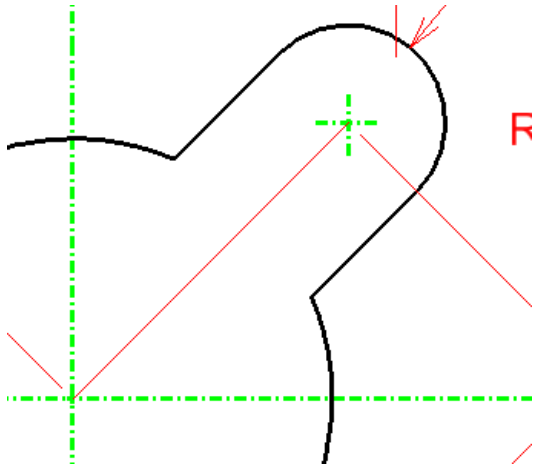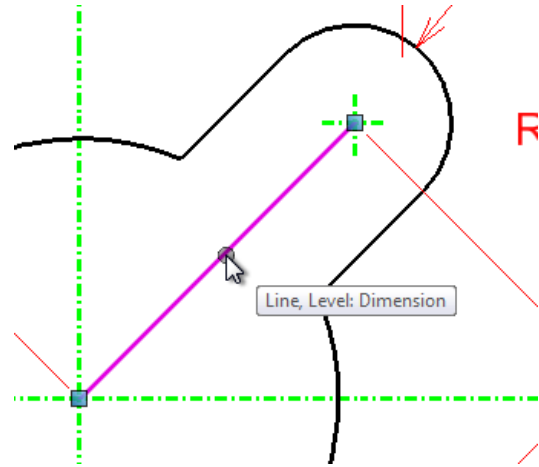
Figure 3.32 – Adding a Line
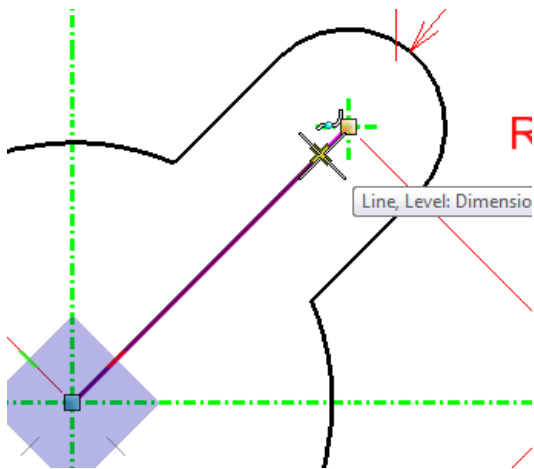

Figure 3.33 – Selecting the Line

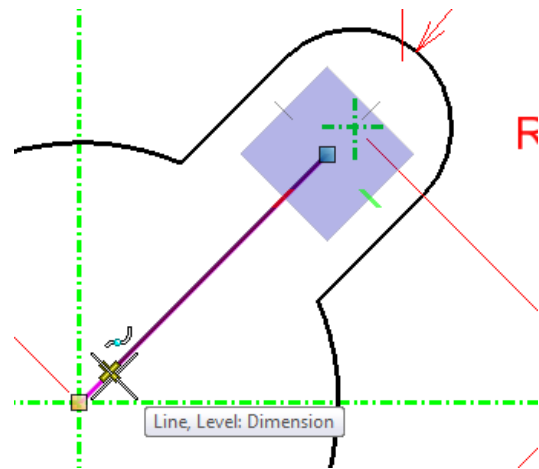**Figure 3.34 – Moving the Top Handle**
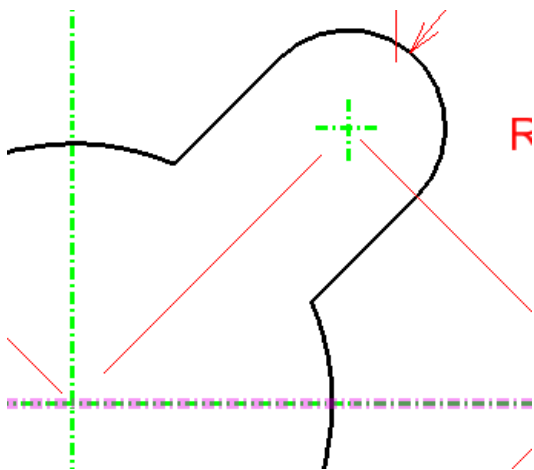

Figure 3.35 – Moving the Bottom Handle

Figure 3.36 – The Resized Line

When you select the line, two blue squares will appear at each end (Figure 3.33). These are called handles. You can click and reposition them to change the size and position of any object. Click the top handle first, and the AccuDraw compass will appear (Figure 3.34). Staying in line with the original angle, pull the endpoint away from the center of the arc, as shown in Figure 3.34. Click to place the handle at its new position. Select the bottom endpoint and move it back from the center of the drawing (Figure 3.35). Click to place the handle. Your resized line should appear similar to the one shown in Figure 3.36.

Using the Angular Dimension Tool

_____

Before selecting the Dimension Angular tool from the Dimensioning toolbar, turn
AccuSnap back on by selecting the Toggle AccuSnap button on the Snap Mode toolbar.
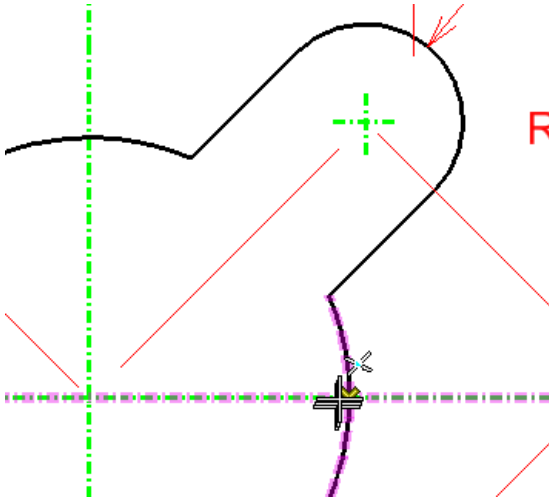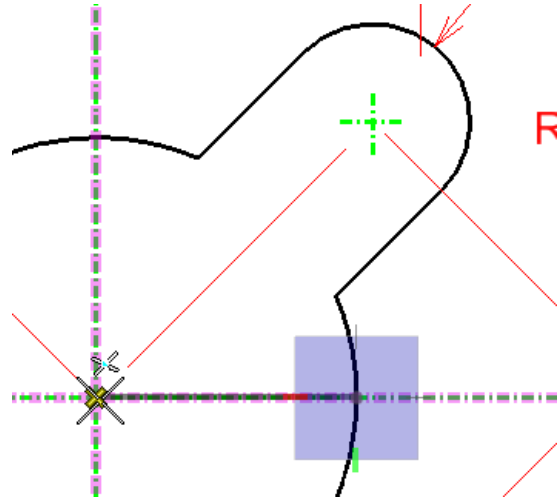
Figure 3.37 – The Dimension Start Point   Figure 3.38 – Extension Line Length

First, select the intersection of the horizontal centerline and the center hole as shown in Figure
3.37. Next, select the center of the hole around which the angle will be measured (Figure 3.38).
Select the extension line you just drew to set the angle to 45 degrees (Figure 3.39). Finally, pull
the dimension in closer to the hole to make it clearer to read (Figure 3.40). Click to place the 45
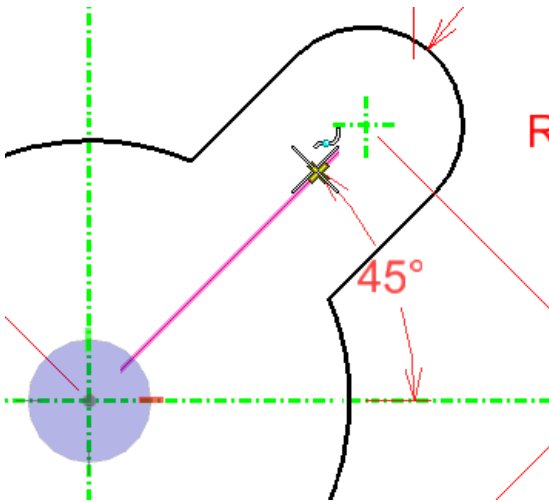degree dimension, and then right-click twice to reset the command.
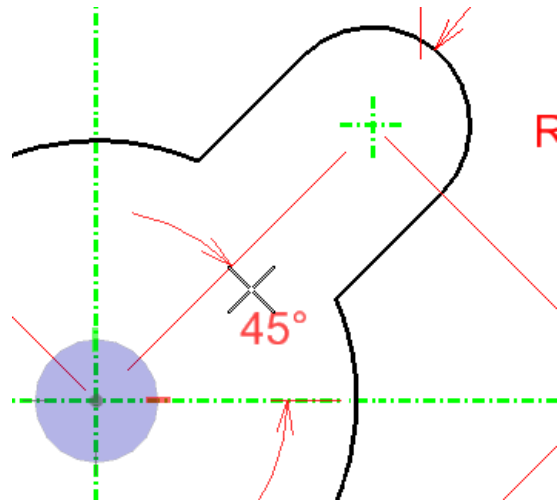
Figure 3.39 – The Point on the Axis   Figure 3.40 – The Angle Endpoint

Using the Place Text Tool

_____

You need to add some additional information to the 0.50 diameter. First, select the 0.50 diameter with the Element Selection tool. Now when you select the Place Text tool from the Text toolbar, the text formatting will match the dimension. Type "4 holes" into the Text Editor- Word Processor window. Use the cursor to place the text right below the 0.50 diameter, as shown in Figure 3.41.
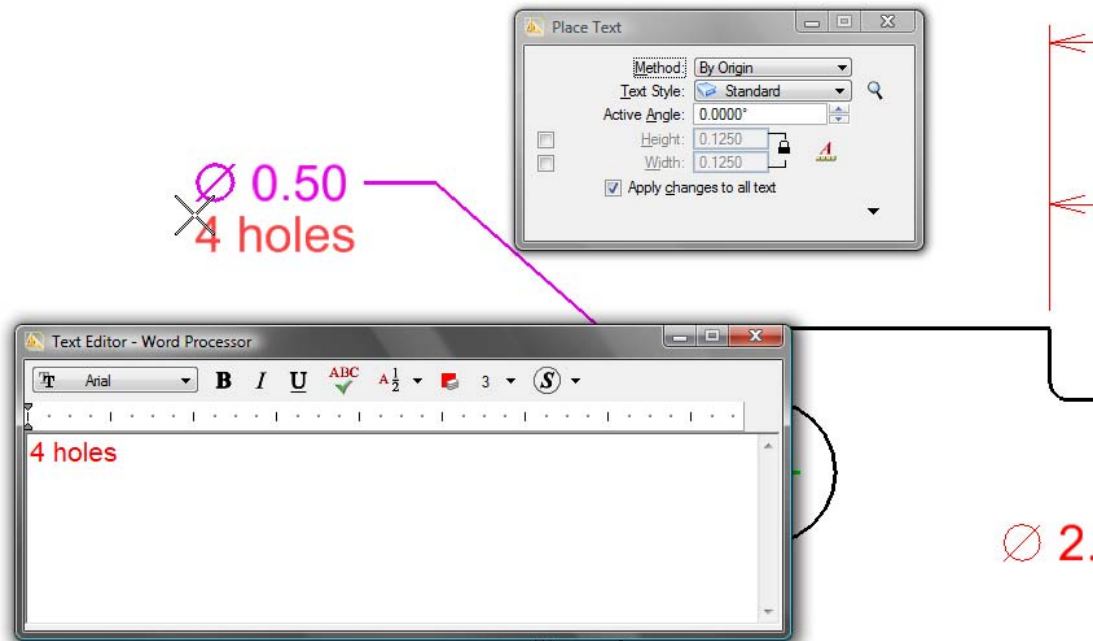
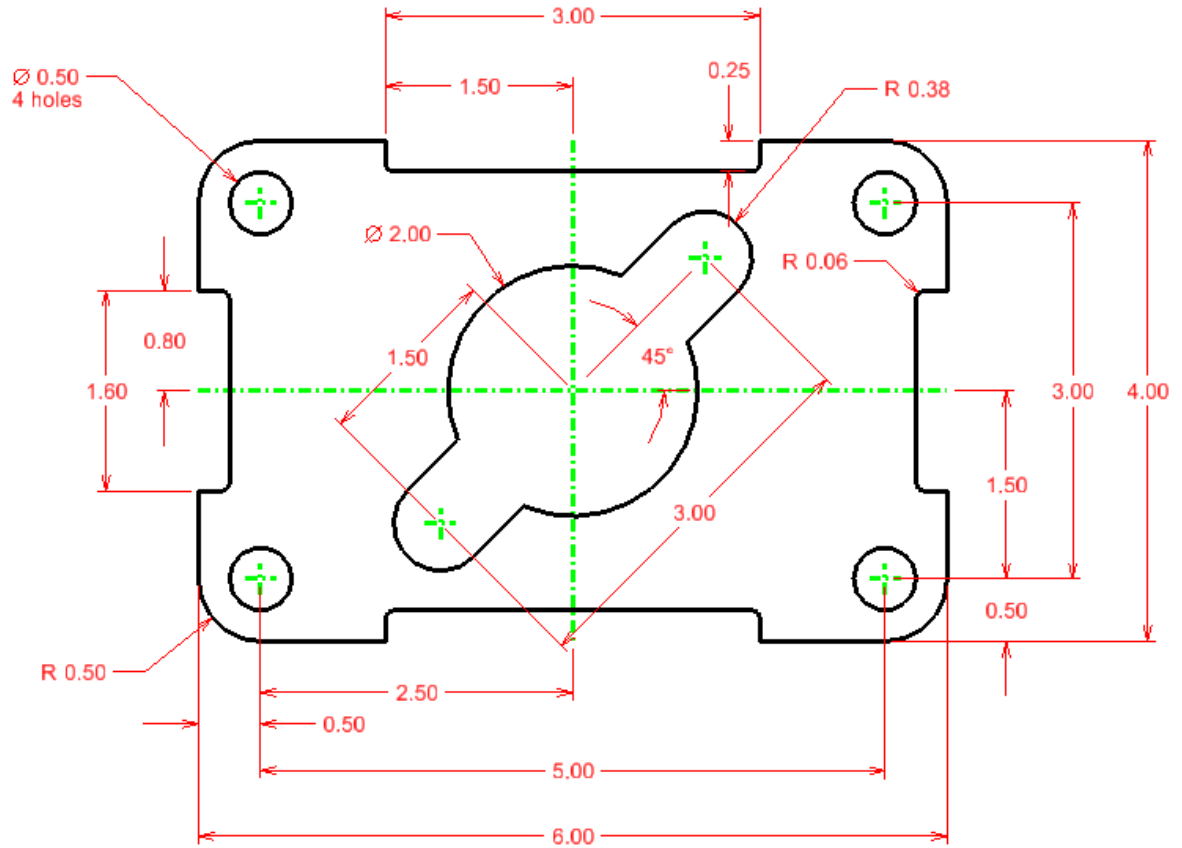

Figure 3.41 – Placing the Text

Figure 3.42 – The Finished Rectangular Problem

* World Class CAD Challenge 02-08 * - Close this drawing file. Create a New file and draw the entire rectangular problem on proper layers, using proper dimensions on the drawing. Continue this drill four times, each time completing the drawing under 10 minutes to maintain your World Class ranking. If you are under 10 minutes, you may proceed to the next chapter, the Circular Problem.