050228

Dwg #10 — TAN-TAN-RADIUS

T.E. Lab 347/547 - Computer Assisted Design and Drafting

INTRODUCTION:

The Tangent-Tangent-Radius (TTR) function of the Circle command can be used to place a circle that is tangent to 2 existing circles. The diameter of the circle being drawn must exceed the distance between the adjacent edges of the 2 existing circles.

OBJECTIVES:

Following the completion of this activity, the learner will be able to:

1. Locate the initial drawing point using the absolute coordinate system.
2. Position the remaining circles using the relative coordinate system.
3. Locate concentric circles using the Snap to Center command.
4. Create the necessary fillets using the Circle(TTR) command.
5. Remove unnecessary lines using the Trim tool.
6. Place the reference points using the Point tool.
7. Use the Horizontal Dimension, Radius Dimension, and Diameter Dimension tools in the Dimension toolbar.
8. Reposition dimension text using the Grips stretch option and dragging the dimension text to the desired position.

DIRECTIONS:

Read the specific information regarding this drawing. Attached to this tutorial is the drawing that you are to reproduce. Open a new drawing and save it to your storage media using the initials of your; last name, first name, and middle name, followed by -Dwg10 (i.e.; LFM-Dwg10). Set up the CADD program as indicated below.

After drawing #10 is complete, save it to your storage media, answer the questions about the drawing in the question section of this tutorial, and complete the Drawing #10 section of the Drawings #6-#10 Evaluation sheet.

When due, submit drawings #6-#10 with a title page, hard copy of the drawings on A size paper (in numeric order), and the Drawings #6-#10 Evaluation sheet stapled together with your storage media containing the finished drawing files.

Note: Drawings #6-#10 should be printed using the A title block template.

AutoCAD SETUP:

1. Open the appropriate title block template file (i.e.; A Title Block.dwt).
2. Click the Model tab to open the model workspace.
3. Choose Format➤Drawing Limits, set lower left corner = 0.0000,0.0000, set upper right corner = 13.0000,10.0000, then Zoom All (shortcut, type Z <ENTER>, A <ENTER>).
4. Choose Format➤Text Style..., set Style Name = Standard.
5. Choose Format➤Point Style..., set Style = +, set Size = 0.275, select Set Size in Absolute Units.
6. Choose Format➤Dimension Style..., click the Modify... button:
   A. Click the Lines and Arrows tab, under Extension Lines; set Extend beyond dim lines = 0.20, set Offset from origin = 0.10, under Arrowheads; set Arrow Size = 0.20, under Center Marks for Circles, set Type = Line, set Size = 0.10.

   Note: When placing the center marks in the circles, set Type = Line. When placing the dimensions, set Type = None.

B. Click the Text tab, under Text Appearance; set Text Style = Standard, set Text Height = 0.15, under Text Placement; set Offset from dim line = 0.10.
C. Click the Fit tab, Under Fit Options; select Both text and arrows.
D. Click the Primary Units tab, under Linear Dimensions; set Unit Format = Decimal, set Precision = 0.00.

7. Using the Layer Properties Manager tool in the Layers toolbar, verify or create:
   A. The 0 Layer: Color = White, Linetype = Continuous.
   B. The Dimension layer: Color = Blue, Linetype = Continuous.
   C. The Viewport layer: Color = Cyan, Linetype = Continuous.
8. Locate the center of the ø2.15 circle at X = 8.00 and Y = 5.50.
9. After drawing all major circles (8), select the Circle tool from the Draw toolbar and type TTR <ENTER> in the command line. Select the tangent side of each pair of circles between which the new circle is to be drawn.
10. After drawing the new TTR circles, remove all unnecessary lines using the Trim tool.
11. Convert the outside perimeter of the pattern and the holes into polylines using the Boundary command (shortcut = BO).
12. Change the line width of the pattern and the holes to ~~0.20.~~ .02
13. Place the center marks in the Dimension layer for all circles (4).
14. Set the center mark to none.
15. Place all dimensions on the Dimension layer.
16. Select the Point tool from the Draw toolbar and place the + at the lower end of the R4.00 and R2.00 TYP. dimensions.
17. Set text height of the drawing title; "Pattern" = 0.60 and position it as shown.

QUESTIONS:

Measure the areas of the inner circle, pattern, and bolt holes by selecting the Area command and typing O for Objects, then click on the desired circle or object. The area and perimeter will be displayed in the command line.

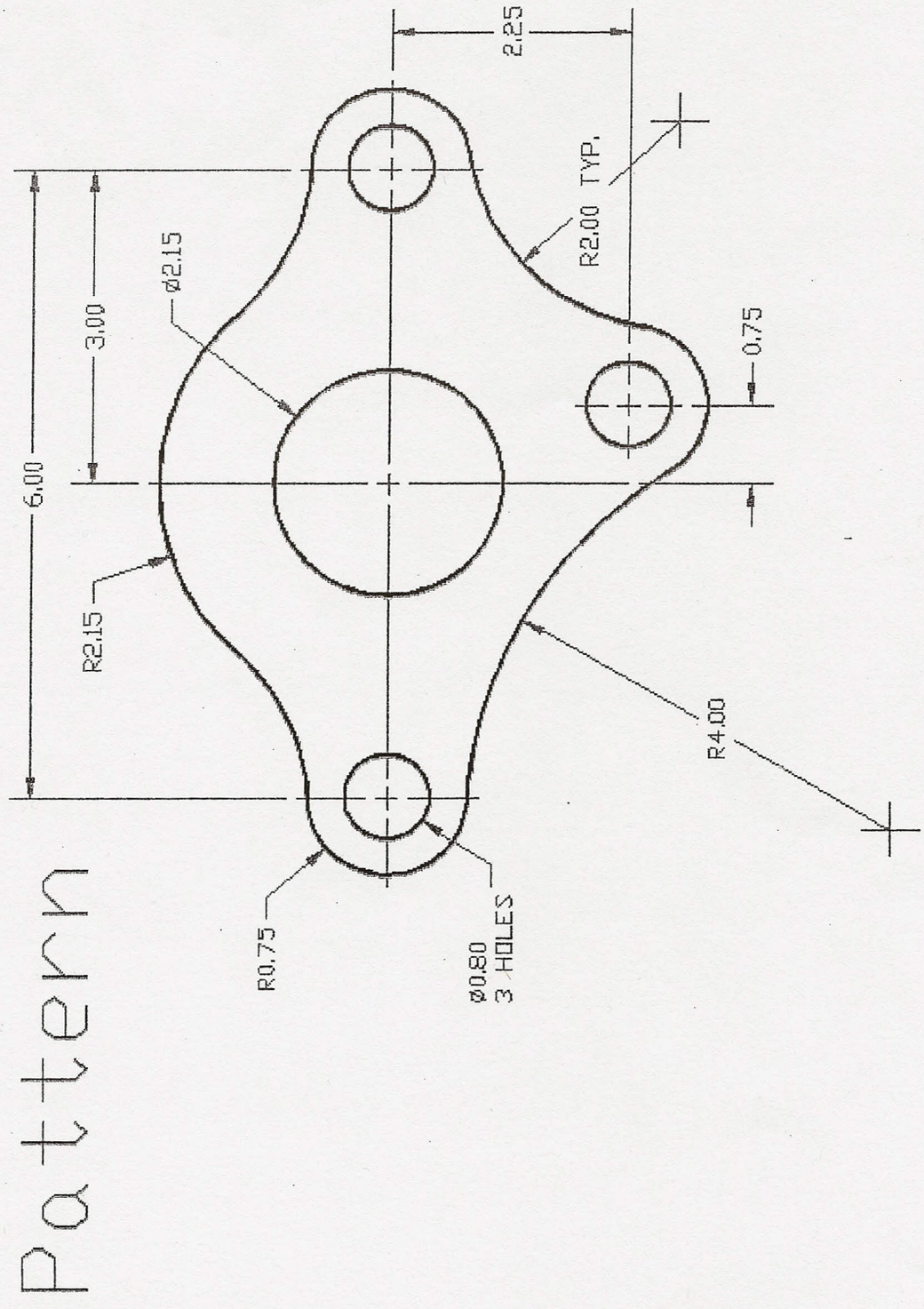
Measure the area of the pattern with all holes removed by selecting the Area command, type A for Add, then type O for Objects, click on the outer circle, and press Enter. Next type S for Subtract, then type O for Objects, click all other circles, and press Enter. The final area will be displayed in the command line.

Question 1: Measure area of large inner hole
(Precision, 4 decimal places) 3.6305

Question 2: Measure perimeter of the pattern
(Precision, 4 decimal places) 19.4614

Question 3: Measure combined area of the 3 bolt holes
(Precision, 4 decimal places) 1.5080

Question 4: Measure area of pattern with the large inner hole and the 3 bolt holes removed (Precision, 4 decimal places) 15.5704


Pattern
2.25
R2.00 TYP.
Ø2.15
3.00
6.00
0.75
R2.15
R4.00
R0.75
Ø0.80
3 HOLES