

## UNIT 5 – EXAMPLES ON DRAWING TECHNIQUES

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This unit covers some examples to illustrate the use of commands to construct drawings. You have to note that there is more than one way to construct the same drawing. You have to explore the alternative methods.

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The examples are:

Example 1 - How to construct a circle with radius  $R$  which touches another two circles.

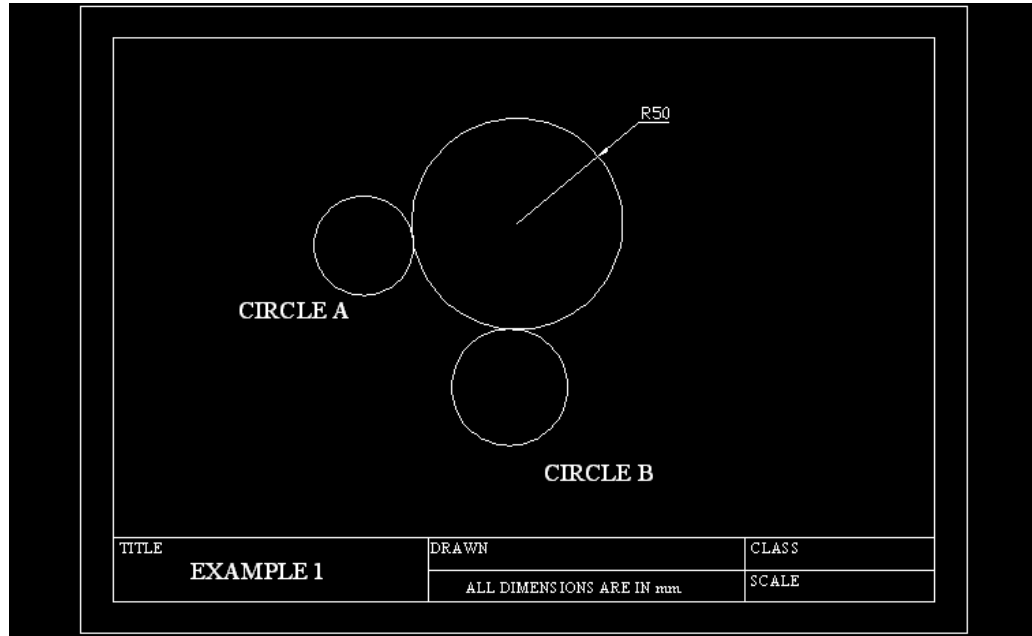
Example 2 - How to construct a circle with radius  $R$  which touches the endpoints of two lines.

Example 3 - Create a drawing template on an A3 paper.

Example 4 - Geometrical drawing with ALL the steps.

More guided examples will be uploaded in Blackboard.

(1) **Example 1:** How to construct a circle with radius 50 which touches another two circles.

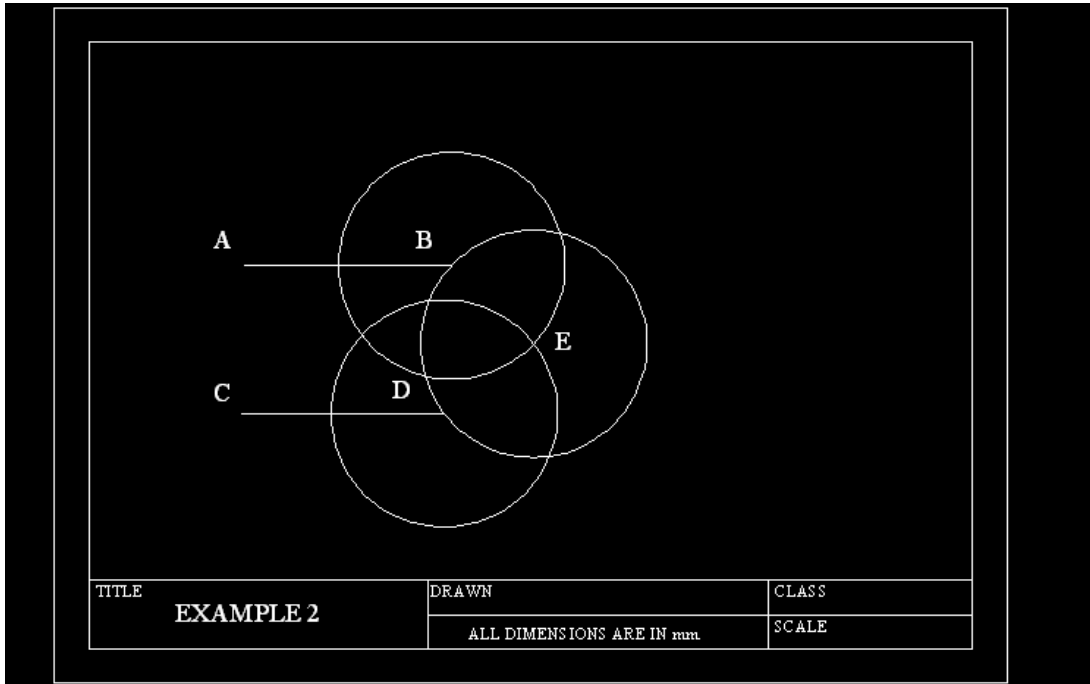


**Figure 5-1:** Example 1

The steps for **Figure 5-1** are shown below:

- ❶ Use circle command to construct circles A and B.
- ❷ Command: **CIRCLE**
  - ➔ *Specify center point for circle or [3P/2P/Ttr (tan tan radius)]: T* //Choose tangent, tangent, radius.
  - ➔ *Specify point on object for first tangent of circle:* //Choose circle A with yellow circle and bar on top, then left click.
  - ➔ *Specify point for second tangent of circle:* //Choose circle B.
  - ➔ *Specify radius of circle <0.0000>: 50*

(2) **Example 2:** How to construct a circle with radius 50 which touches the endpoints of two lines.



**Figure 5-2:** Example 2

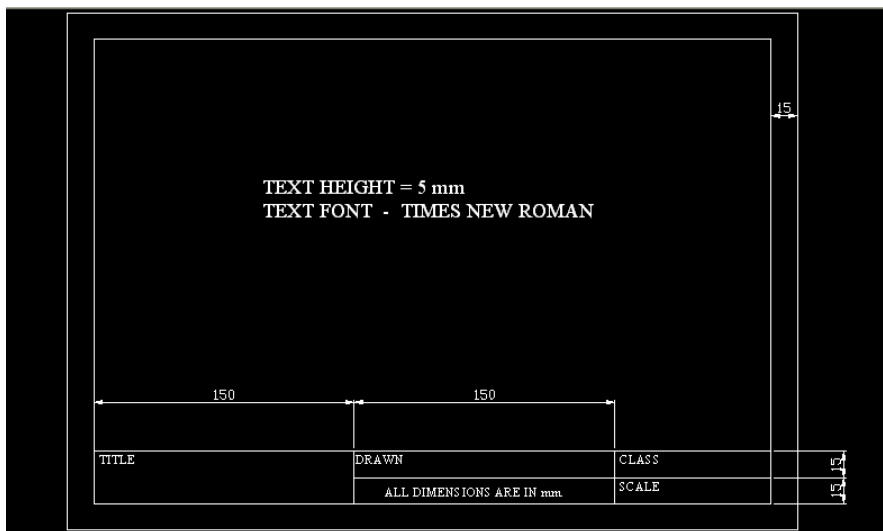
The steps for **Figure 5-2** are shown below:

- ❶ Use line command to construct lines AB and CD.
- ❷ Command: **CIRCLE**
  - ➔ Specify center point for circle or [3P/2P/Ttr (tan tan radius)]:  
//Snap at point B with yellow square, then left click.
  - ➔ Specify radius of circle or [Diameter]: **50**
- ❸ Right click to repeat circle command.
  - ➔ Specify center point for circle or [3P/2P/Ttr (tan tan radius)]:  
point D with yellow square, then left click. //Snap at
  - ➔ Specify radius of circle or [Diameter]: **50**

- ④ Right click to repeat circle command.  
 ➔ *Specify center point for circle or [3P/2P/Ttr (tan radius)]:*  
 point E with yellow cross, then left click.  
 ➔ *Specify radius of circle or [Diameter]:* **50**

//Snap at

(3) **Example 3:** Drawing template on an A3 paper



**Figure 5-3:** Example 3

The steps for **Figure 5-3** are shown below:

① Command: **LIMITS**

➔ *Specify lower left corner or [ON/OFF] <0.0000, 0.0000>:* //ENTER to choose the default 0,0. If the default is not 0,0, just type 0,0 on the command line.

➔ *Specify upper right corner <420.0000, 297.0000>:* //ENTER to choose the default 420, 297. If the default is not 420, 297, just type 420, 297 on the command line.

**② Command: RECTANGLE**

- ➔ *Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]: 0,0*
- ➔ *Specify other corner point or [Dimensions]: 420, 297*

**③ Command: ZOOM**

- ➔ *Specify corner of window, enter a scale factor (nX or nXP), or [All/Center/Dynamic/Extents/Previous/Scale/Window] <real time>: A //Choose ALL. It is the same as VIEW → ZOOM → ALL.*

**④ Command: OFFSET**

- ➔ *Specify offset distance or [Through] <Through>: 15*
- ➔ *Select object to offset or <exit>: //Left click on the rectangle.*
- ➔ *Specify point on side to offset: //Left click anywhere inside the rectangle.*
- ➔ *Select object to offset or <exit>: //ENTER to end command.*

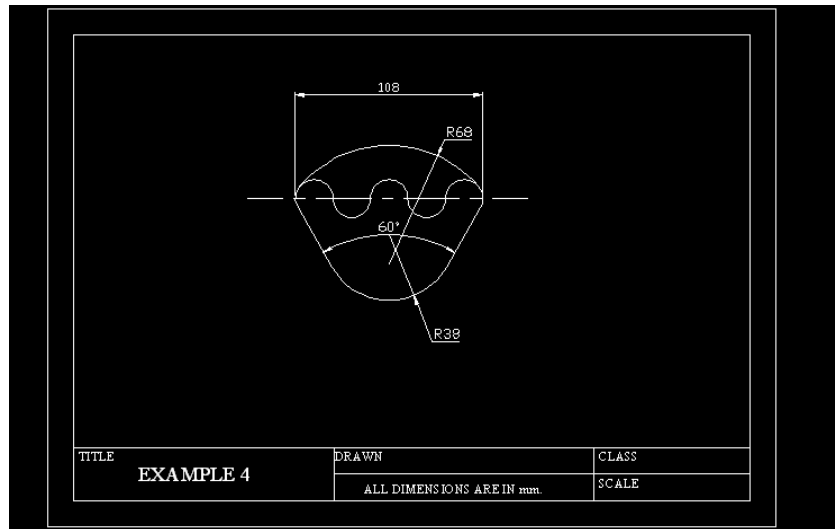
**⑤ Command: EXPLODE**

- ➔ *Select objects: //Left click on the inner rectangle.*
- ➔ *Select objects: //ENTER*

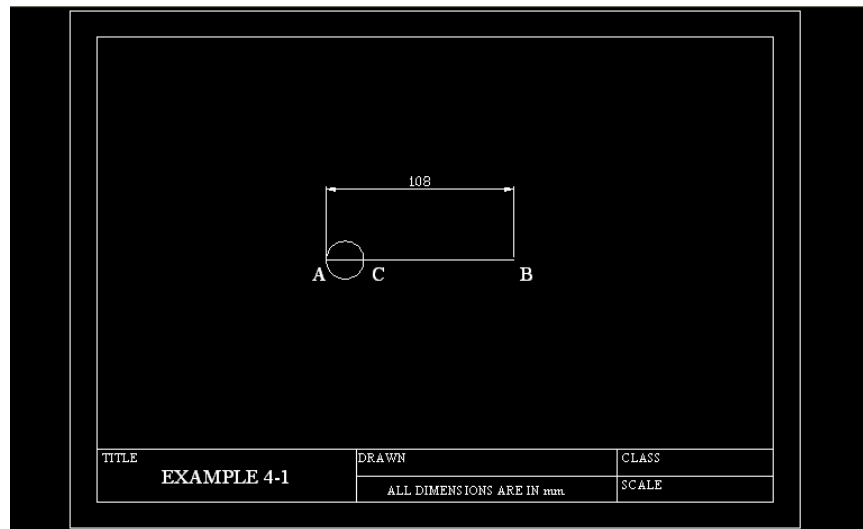
**⑥** Use offset and trim commands to complete the drawing. Insert text as shown in **Figure 5-3**.

(4) **Example 4:** Geometrical Drawing

- Try to draw the object with dimensions shown in **Figure 5-4**.
- If you have any doubt, you should approach your lecturer.



**Figure 5-4:** Example 4

**GUIDE TO DRAW FIGURE 5-4 Example 4****Figure 5-5: Example 4 (Cont'd)**

The steps to draw **Figure 5-5** are shown below:

**❶ Command: LINE**

- ➔ *Specify first point:* //Choose point A.
- ➔ *Specify next point or [Undo]: 108* //Turn-ON OTHO, F8, to ensure it is a horizontal line. You can turn it OFF after line AB is constructed.
- ➔ *Specify next point or [Undo]:* //ENTER, end line command.

**❷ Command: DIVIDE**

- ➔ *Specify object to divide:* //Choose line AB.
- ➔ *Enter the number of segments or [Block]: 5*

**❸ Command: CIRCLE**

- ➔ *Specify center point for circle or [3P/2P/Ttr(tan tan radius)]: 2P*
- ➔ *Specify first end point of circle's diameter:* //Choose point A. Turn-ON OSNAP, F3, snap at point A with yellow square.
- ➔ *Specify second end point of circle's diameter:* //Choose point C. Snap

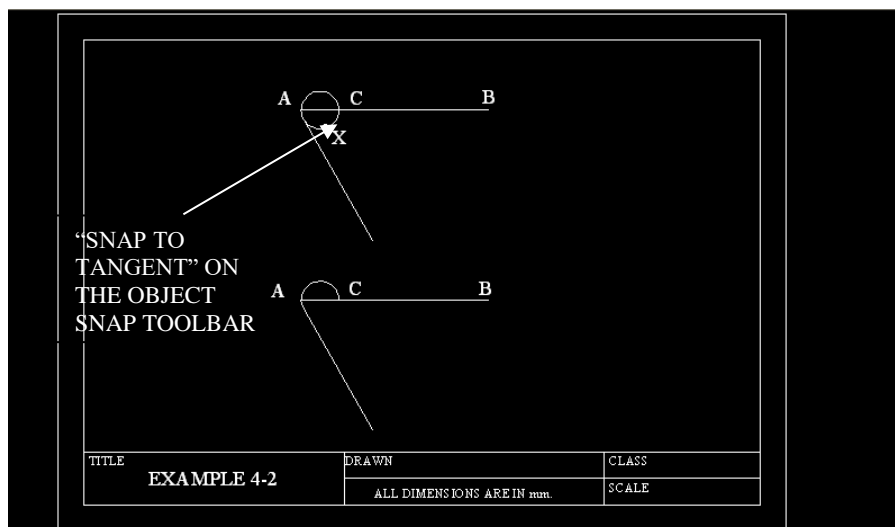


Figure 5-6: Example 4 (Cont'd)

The steps for Figure 5-6 are shown below:

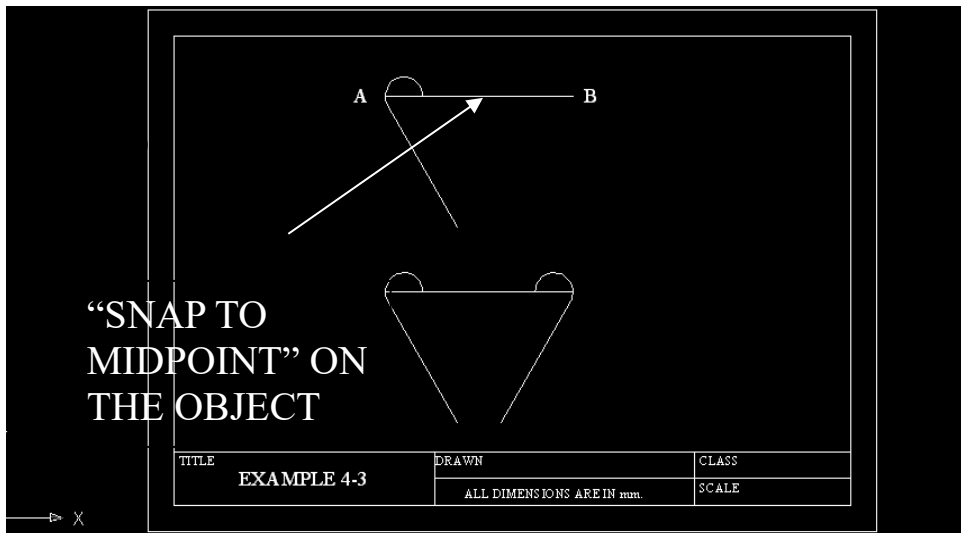
❶ Command: **LINE**

- ➔ *Specify first point:* //Click “Snap to Tangent”, then click on circle, with yellow circle and bar on top.
- ➔ *Specify next point or [Undo]:* @80<-60 //80 is the estimated length of the inclined line required.
- ➔ *Specify next point or [Undo]:* //ENTER to end command.

❷ Command: **TRIM**

- ➔ *Select objects:* //ENTER. Second ‘enter’ allows you to remove any part of the drawing.
- ➔ *Select object to trim or shift-select to extend or [Project/Edge/Undo]:* //Click point X.
- ➔ *Select object to trim or shift-select to extend or [Project/Edge/Undo]:* //ENTER to end command.



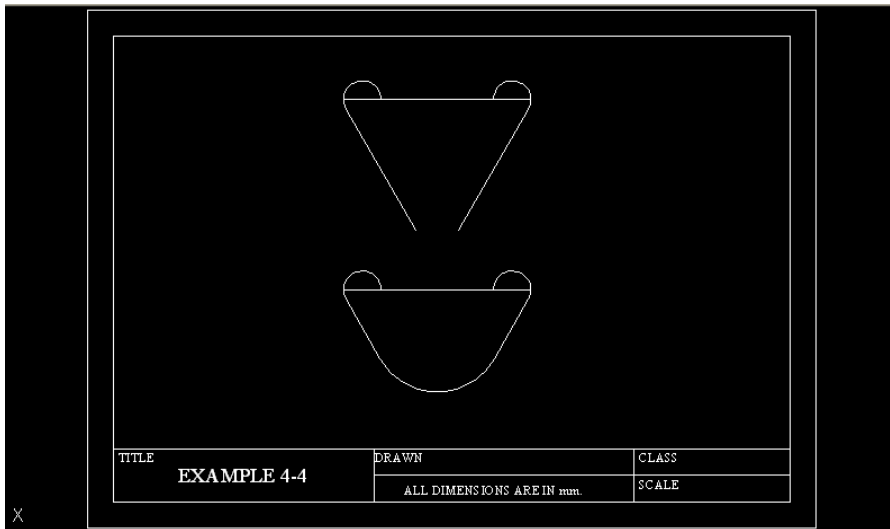


**Figure 5-7:** Example 4 (Cont'd)

The steps to draw **Figure 5-7** are shown below:

❶ Command: **MIRROR**

- ➔ *Select objects:* //Choose semi-circle.
- ➔ *Select objects:* //Choose inclined line.
- ➔ *Select objects:* //ENTER to end the selection of objects.
- ➔ *Specify first point of mirror line:* //Click “Snap to Midpoint”, then click line AB, with yellow triangle.
- ➔ *Specify second point of mirror line:* //Bring cursor vertically downwards until whole image appears. Then, left click.
- ➔ *Delete source objects? [Yes/No] <N>:* //ENTER to choose NO.



**Figure 5-8:** Example 4 (Cont'd)

The steps to draw **Figure 5-8** are shown below:

**① Command: FILLET**

➔ *Select first object or*

*[Polyline/Radius/Trim/mUltiple]:* **R**

➔ *Specify fillet radius <0.0000>:* **38**

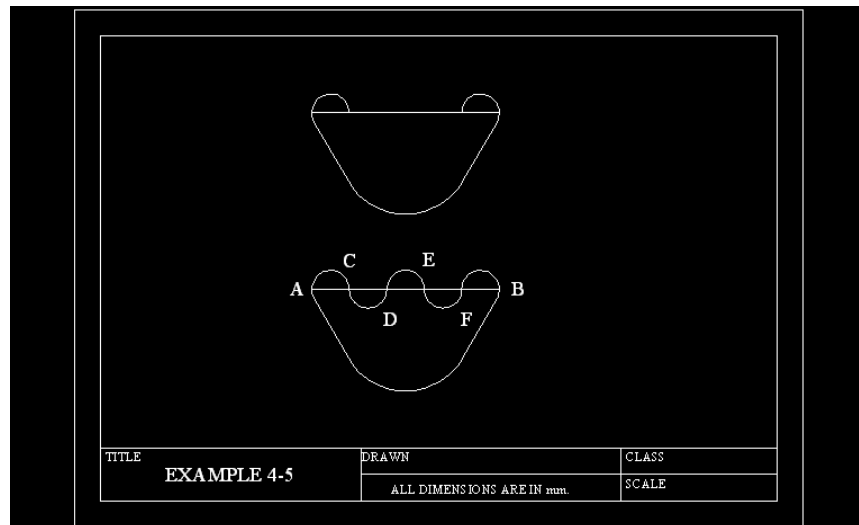
➔ *Select first object or*

*[Polyline/Radius/Trim/mUltiple]:*  
inclined line.

//Choose first

➔ *Specify second object:*  
inclined line.

//Choose second

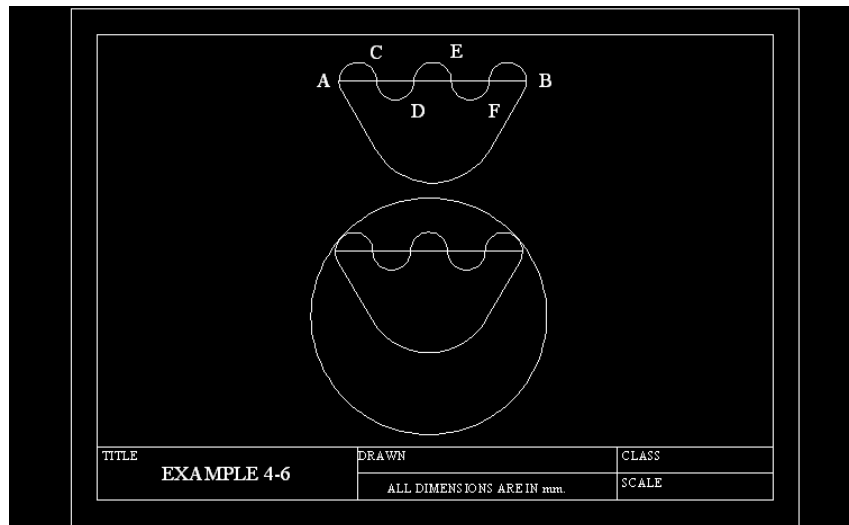


**Figure 5-9:** Example 4 (Cont'd)

The steps to draw **Figure 5-9** are shown below:

❶ Command: **PLINE**

- ➔ *Specify start point:* //Choose point C.  
Snap at C with yellow square, then left click.
- ➔ *Specify next point or*  
[Arc/Halfwidth/Length/Undo/Width]: **A** //Choose Arc.
- ➔ *Specify endpoint of arc or*  
[Angle/Center/Direction/Halfwidth/Line/Radius/Second  
pt/Undo/Width]: **A** //Choose ANGLE.
- ➔ *Specify included angle:* **180**
- ➔ *Specify endpoint of arc or [CEnter/Radius]:* //Choose point  
D. Snap at Node D with yellow circle and cross, then left click.
- ➔ *Specify endpoint of arc or*  
[Angle/CEnter/Direction/Halfwidth/Line/Radius/Second  
pt/Undo/Width]: //Choose point E.
- ➔ *Specify endpoint of arc or*  
[Angle/CEnter/Direction/Halfwidth/Line/Radius/Second  
pt/Undo/Width]: //Choose point F.
- ➔ *Specify endpoint of arc or*  
[Angle/CEnter/Direction/Halfwidth/Line/Radius/Second  
pt/Undo/Width]: //ENTER to end command.

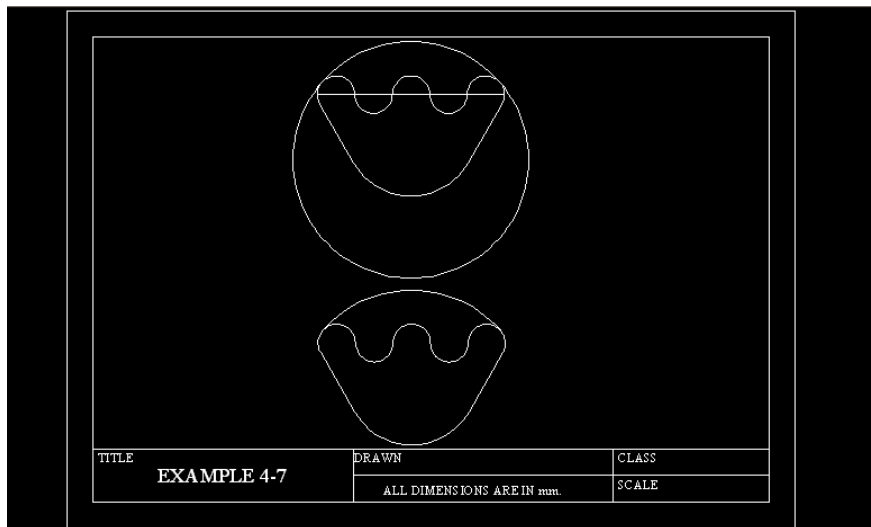


**Figure 5-10: Example 4 (Cont'd)**

The steps to draw **Figure 5-10** are shown below:

❶ Command: **CIRCLE**

- ➔ *Specify center point for circle or [3P/2P/Ttr (tan tan radius)]: T* //Choose tangent, tangent, radius.
- ➔ *Specify point on object for first tangent of circle:* //Choose arc AC with yellow circle and bar on top, then left click.
- ➔ *Specify point for second tangent of circle:* //Choose arc BF.
- ➔ *Specify radius of circle <0.0000>: 68*



**Figure 5-11: Example 4 (Cont'd)**

The steps for **Figure 5-11** are shown below:

**❶ Command: TRIM**

➔ *Select objects:*

//ENTER. Second

enter

allows you to trim any part of the

drawing.

➔ *Specify object to trim or shift-select  
to extend or [Project/Edge/Undo]:*

//Choose any part of

the

drawing to

trim.

➔ *Specify object to trim or shift-select  
to extend or [Project/Edge/Undo]:*

//ENTER to

end command.

☺ **Congratulations! You have completed EXAMPLE 4.**

----- END OF UNIT 5 -----