

# Learning DraftSight™ for Windows®

A Self Directed Approach

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## Chapter 3- Creating Entities

### Objectives:

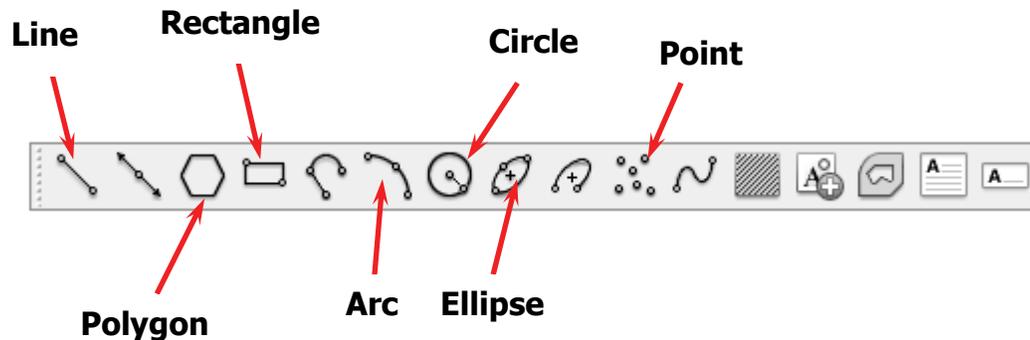
1. Explore the Draw Toolbar
2. Draw circles, arcs and ellipses
3. Draw rectangles, polygons and points

### What are “Entities”?

You already created a few entities in Chapter 2. A line is an entity. So are circles, arcs, polygons, rectangles (when created using the rectangle command) and so on. There will be more on this subject later in Chapter 4, since you'll need to be able to pick entities in order to edit them.

### The Draw Toolbar

Start a new drawing using the **standard** template. Make sure the **Draw** toolbar is active (if you don't see it, right-click on an existing toolbar, left-click on **MAIN** pick it from the list). Here's what it looks like, together with the commands we'll be using in this chapter:



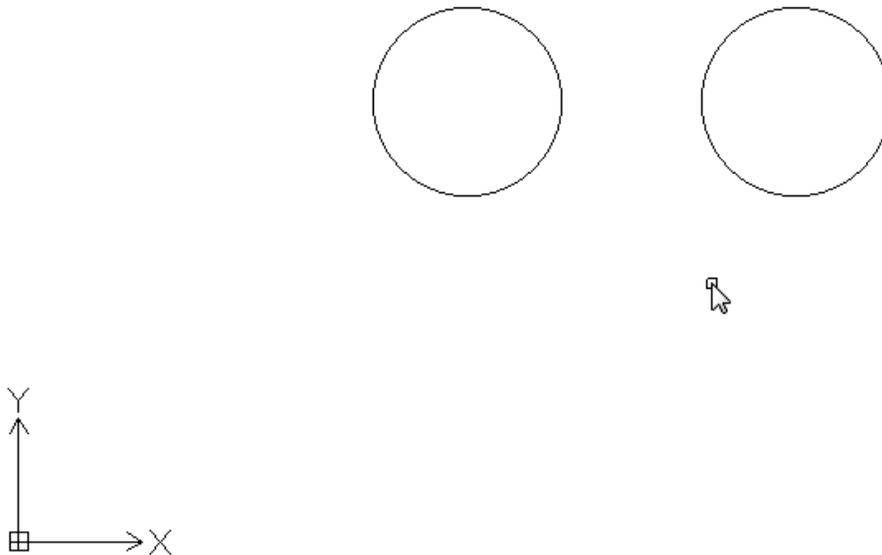
### Drawing Circles

1. Select the **Circle** command. What does the command window ask for? 
2. Notice you have many options, but for now left-click near the center of the screen to specify the center point of the circle.

## Creating Entities

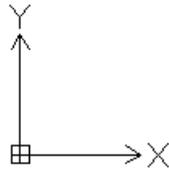
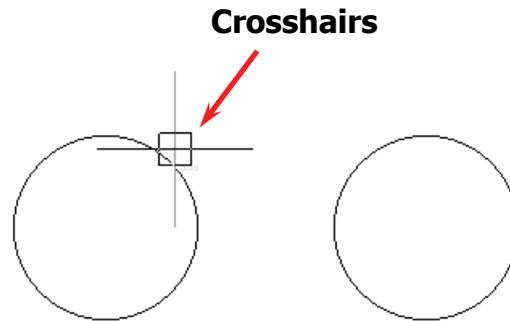
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3. Move the mouse around. What happens? Notice the size of the circle grows and shrinks depending on the position of the mouse on the screen.
4. At this point, you may either enter a number for the **radius** of the circle (or you can enter the **diameter** by typing "d" first), or simply left-click when the circle is looks about the right size.
5. On your own, create at least two more circles using the **3P** and **2P** options. What does **3P** and **2P** mean?
6. There is one more very useful option called **TTR**, or tangent-tangent radius. Let's try it. Draw two circles of 4 units in diameter, one on each side of the center of the drawing area as shown below:

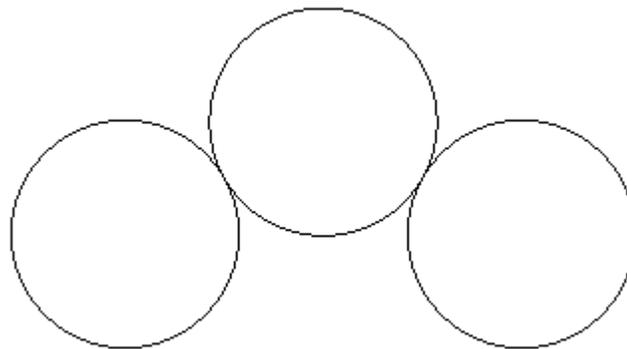


7. Next, start the **Circle** command again by selecting the **Circle** icon. Type "t" in the command window. What does DraftSight ask for?

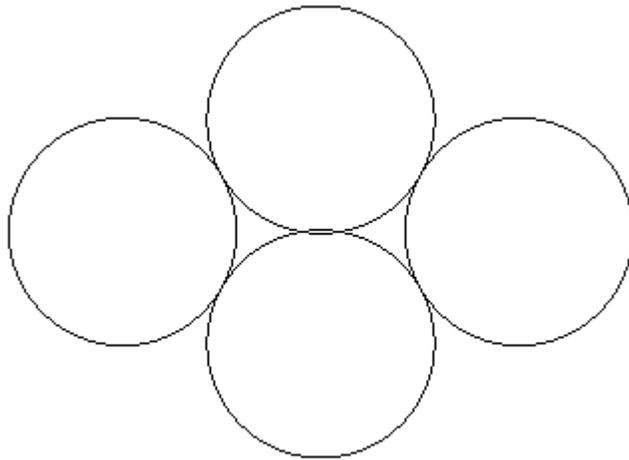
8. Position the crosshairs near the upper-right area of the circle on the left and left-click to define the first tangency:



9. For the second tangency, left-click on the upper-left portion of the right circle.
10. When prompted, enter a value for the radius of "1" in the command window. Note that the last value that you entered is the "Default". If the default number happens to be the value you want, just press enter to accept it.



11. You should get a third circle that just touches (tangent) the other two (if you get an error that reads "circle does not exist" your circles are too far apart. Try it again with a larger value for the radius).
12. On your own, place a 4<sup>th</sup> circle opposite of the last one and tangent to the first two, so your drawing looks something like this:



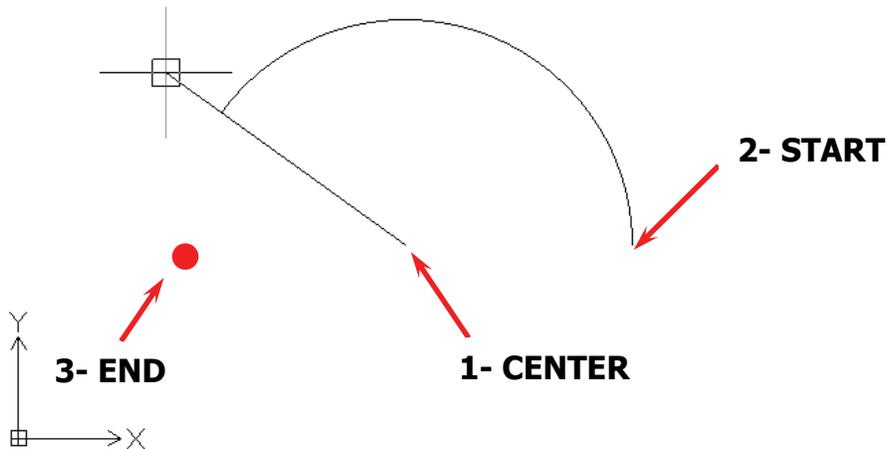
## Creating Arcs

Arcs are just portions of circles. In most cases you'll find it more helpful to draw a circle and change it into an arc using the modify commands discussed later. However, we will try a few ways to create arcs here:

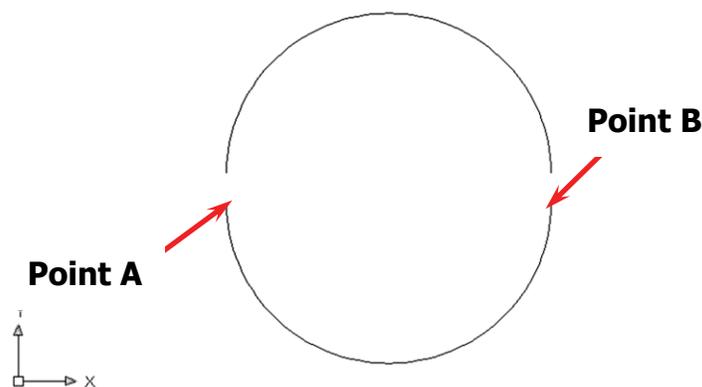
1. Start with a clean drawing area either by starting a **New** drawing or deleting the circles done previously in this chapter. A quick way to do this is to type "e" in the command window (for "erase" or "delete") and press **Enter**. This invokes the **Delete** command. Now type "all" in the command window and press the **Enter** key. Everything should be deleted now.
2. Locate and left-click on the **Arc** icon in the **Draw** toolbar. What does DraftSight ask you to do next?



3. Specify a start point near the center of the drawing area. Then click two more places on the drawing area and observe how the arc is created. This is a 3-point method, similar to the **3P** option in the **Circle** command.
4. Now, let's try the **arc center** method. The important thing to consider here is that DraftSight creates arcs counter-clockwise. Left-click on the **Arc** icon and enter "**c**" in the command window followed by the **Enter** key.
5. Once more, position the crosshairs in the center of the screen and left-click.
6. For the start point of the arc, left-click to the right of the center point you just defined in step 4. For the end point move the crosshairs to the left of the center point and left-click. Note how the arc "sweeps" counterclockwise, over the top of the center point.



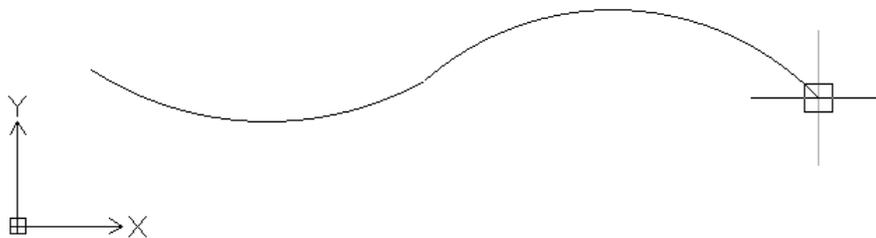
7. On your own, create another arc opposite of the first one using the center option, so your drawing area looks like this:



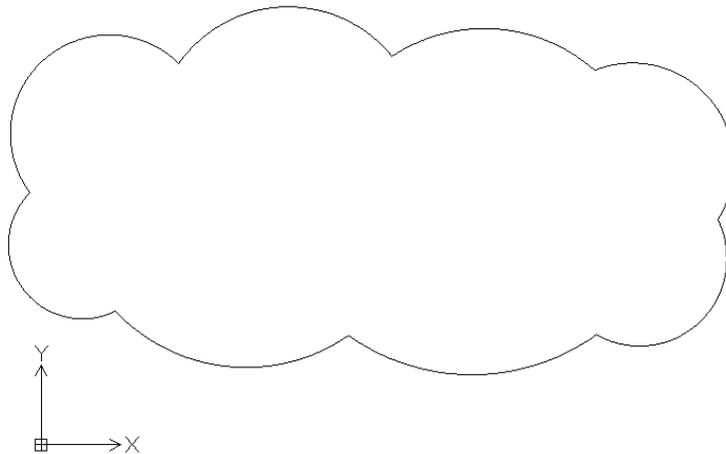
## Creating Entities

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8. Which point did you have to specify first? Point A or B?
9. Last, try the **continue from last point** option. Create a small, somewhat open arc in the lower left-hand corner of the screen using the three point (default) option.
10. After specifying the last point, press the **space-bar** on your computer keyboard twice. What happens?
11. The **Arc** command should start again and pick up where you left off from the last arc.



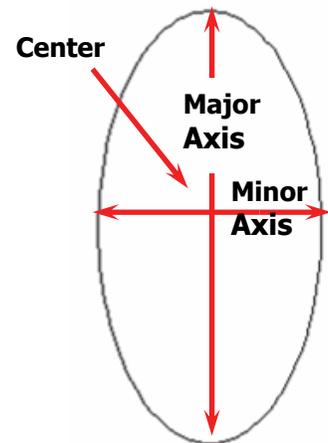
12. Continue this method until you create a sketch of a cloud similar to the one below:



**Tip:** Pressing the **space-bar** is just like using the **Enter** key. In the example above, DraftSight initiated the previous command. Pressing either key again will specify the last point picked. This works with many of the draw commands, not just Arc.

## Creating Ellipses

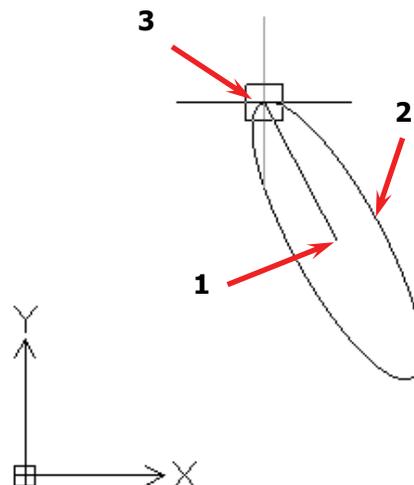
An ellipse is an ob-round circle. There are three major features to an ellipse: The **center**, **minor axis** and **major axis**. Ellipses are useful for many things, as will be shown in the learning activities at the end of this chapter. To create an ellipse:



1. Locate and left-click on the **Ellipse** icon in the **Draw** toolbar. DraftSight requests an **axis start point**. This is the default three-point method for creating an ellipse. Position the crosshairs on the left side of the drawing area and left-click.



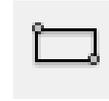
2. Next, DraftSight asks for the **axis end point**. Go ahead and pick any point.
3. Finally, DraftSight asks for the **other axis end point**. Pick yet another point and left-click. Note that the major and minor axes are up to you to decide, depending on which three points you select.
4. Try drawing other ellipses with the **Ortho** option in the **status bar** turned off or on. What is the difference using or not using **Ortho**?



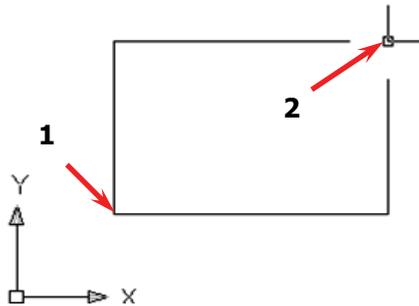
5. Now try drawing ellipses using the other two options available. After initiating the **Ellipse** command, entering "e" in the command window will draw an **elliptical arc**. An "r" for rotation allows you to enter a number (in degrees) that it will appear the ellipse has been rotate from its circular form.

## Drawing Rectangles

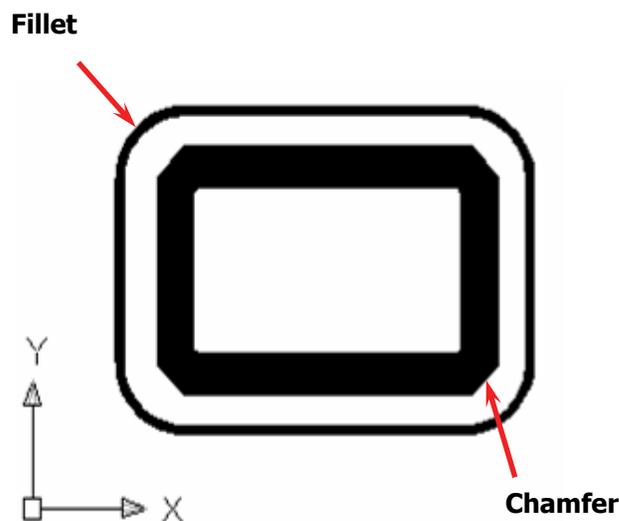
The Rectangle command allows the user to quickly create a rectangle (or square) by specifying the opposite corners of the rectangle.



1. Locate and left-click on the **Rectangle** icon in the **Draw** toolbar. Pick two points on the screen for the opposing corners.

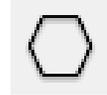


2. Click on the **Rectangle** icon again. Note that before you pick the second point that there are other options: "**A**" for area, "**D**" for dimensions, and "**R**" for rotation. Try each of these.
3. Once again, initiate the **Rectangle** command. Before you select the first point, note the options available. The most useful ones are **Chamfer**, **Fillet** and **Width**. A chamfer "breaks" the corners, fillets (pronounced "fill-its") rounds corners, and the width will thicken the lines of the rectangle. On your own try to duplicate the two rectangles shown below (one inside the other). Use the **Chamfer**, **Fillet** and **Width** options.

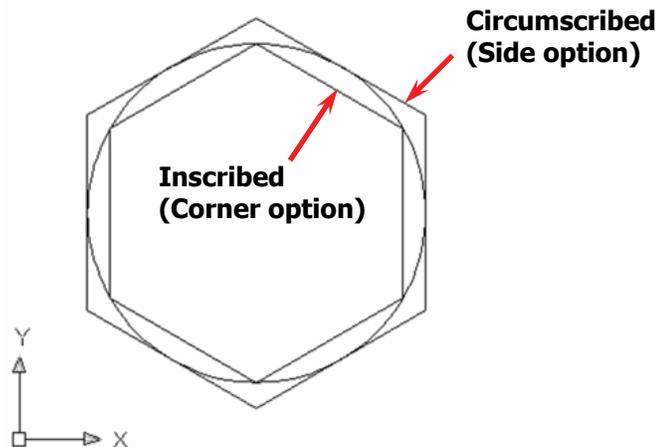


## Creating Polygons

Polygons are many-sided objects such as triangles, squares, pentagons, hexagons, etc. DraftSight will either create them inscribed within a circle (circle through the points), or circumscribed about a circle (circle tangent to the sides). The method you chose depends on what you need at the time.



1. For this exercise, create a large **Circle** near the center of the drawing area.
2. Locate and left-click on the **Polygon** icon in the **Draw** toolbar. The first parameter is the number of sides. Enter "6".
3. Left-click near the center of the circle you drew in step one to specify the center of the polygon (Tip: Turn on the **Esnap** option in the status bar to get the exact center- more on this later). Now type "s" for "side" (creates a circumscribed polygon).
4. Click on the edge of the circle. The polygon should exist more or less outside of the circle. Try creating another hexagon in the same place, but this time using "co" for "corner" (creates an inscribed polygon). Try to make the resulting hexagons and circle look like the ones below:



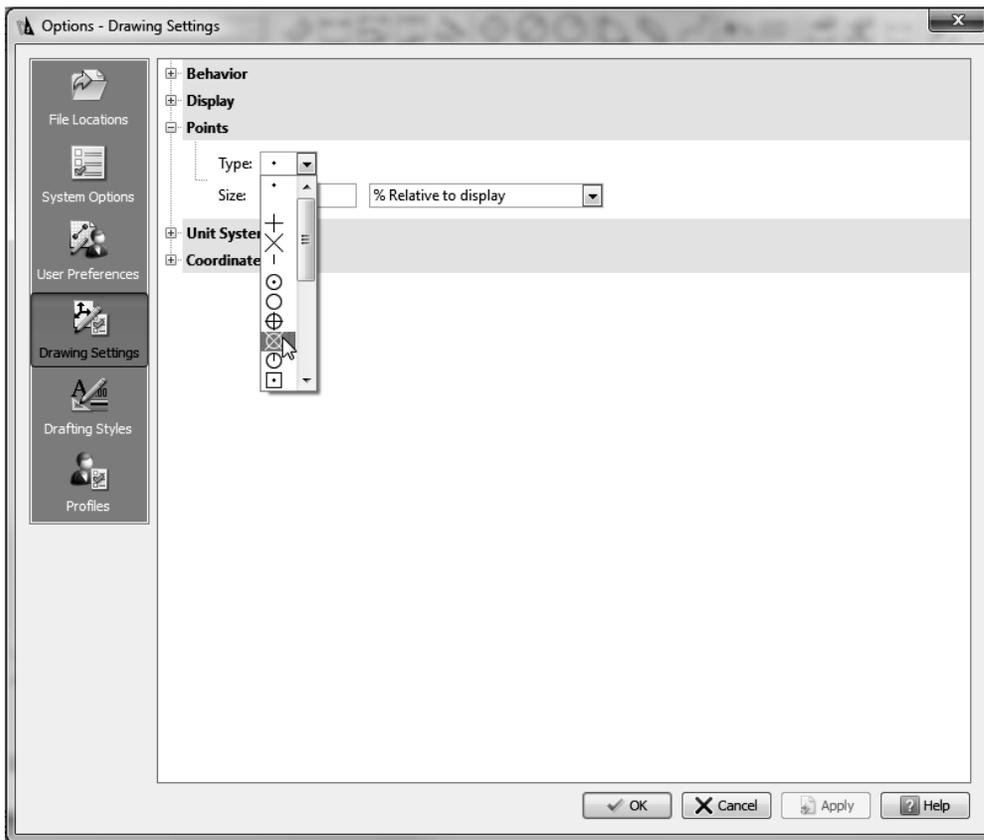
5. On your own, try the **Side length** (rather than center) option. Type "S" and press enter after entering the **Polygon** command. What is the difference between **Side length** and **Center**?

## Creating Points

DraftSight has the capability of creating points at locations specified by the user in the drawing area. This command is used by drafters of various CAD disciplines. The type and size of the points are specified in the **Options** window.

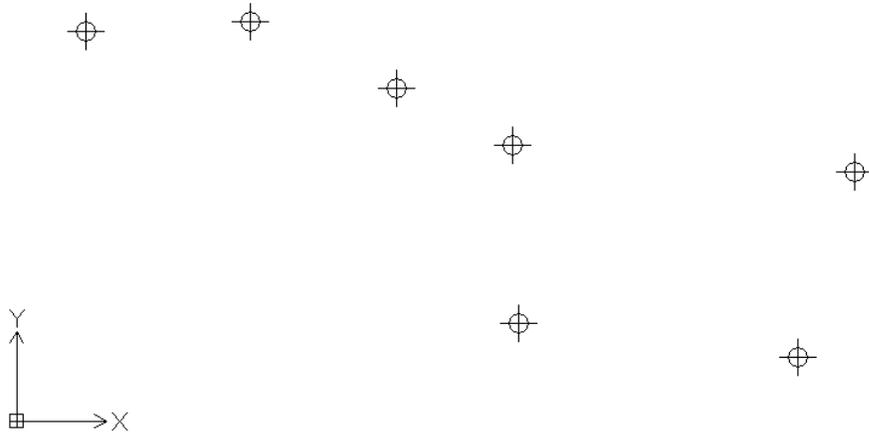


1. Select the **Tools** menu, and choose **Options** and **Drawing Settings**. Click on the plus sign next to **Points** to expand the point options.



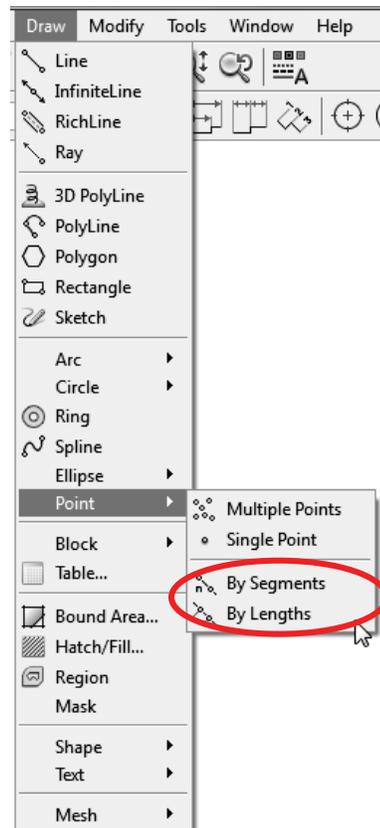
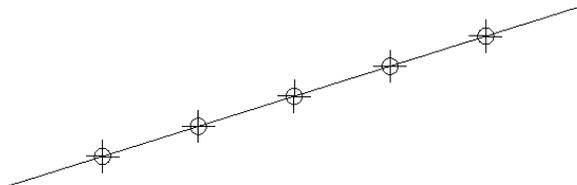
2. Note you can set the point type and size. Additionally, the point size can be relative to the drawing area, or an absolute value.

3. On your own, using the **Point** command create the representation of the Big Dipper shown below:



**Note:** Changing the point style and size variables effects **all** the points the drawing, even the ones you've drawn previously!

4. Finally from the **Draw** menu, locate the **Point** cascading menu. Notice that you can use the **Point** command to divide-up another entity equally by segments and lengths.
5. On your own, draw a random line and divide it into six segments like the one below:



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## Chapter 3 Suggested Learning Exercises

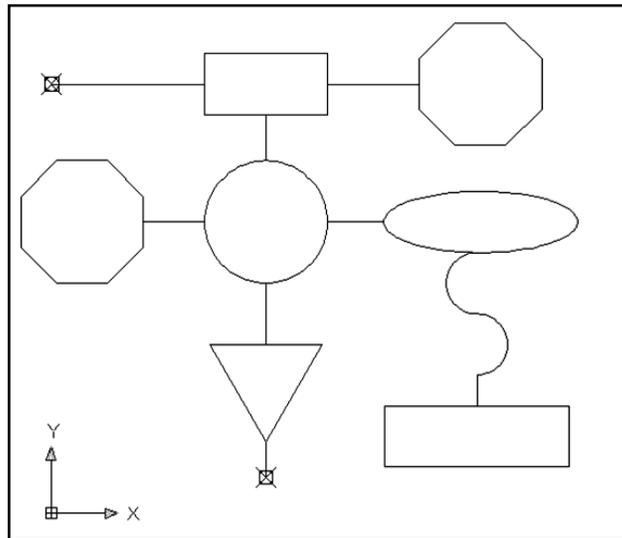
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Based on your chosen drafting emphasis (mechanical or architectural), choose from the following exercises:

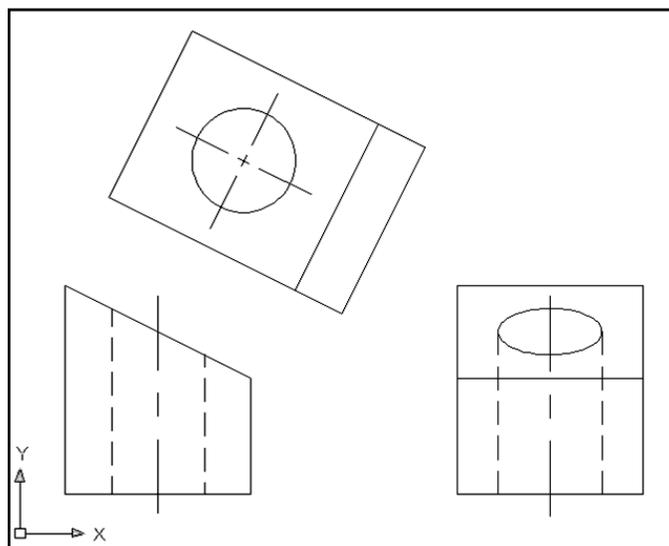
### ***Mechanical-***

Start new drawings for each of the sketches that follow. Use the commands and command options discussed in this chapter along with the **Line** command and **Ortho** mode. **Save** your drawings with the drawing name (e.g., "lamp.dwg"). Don't worry about things lining up perfectly; we'll cover that in a later chapter.

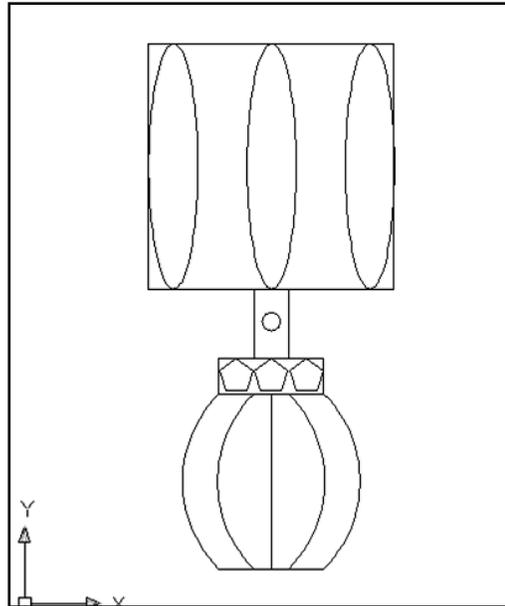
1. Schematic:



2. End Block (use a series of short lines to make the hidden & center lines):



3. Lamp:



**Architectural-**

Using the commands discussed in this chapter along with **Line** and **Ortho** mode, sketch a landscape plan like the one shown in the drawing below. Save it as "landscape.dwg".

