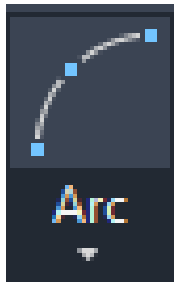
Engineering Drawing with Autocad

Assistant Professor
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Lecture 6
Advanced Object Types

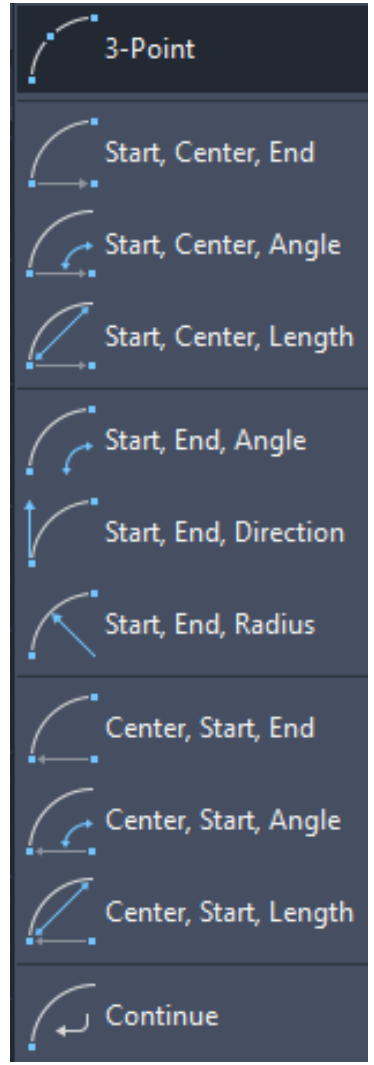
1 - Drawing Arcs

- The **arc** is defined as the smooth curve formed by joining two or more points.
- The arc of a circle is defined as the portion of the circumference of a circle.
- By default, the arc is drawn counter-clockwise. We are required to press the **Ctrl** key to change the direction of the arc in the clockwise.
- The arc can be drawn by specifying the starting point, center, and the endpoint.
- We can also draw an arc by determining the angle, radius, and direction. The icon of Arc on the ribbon panel looks like the below image:



Types of Arc

The arrow below the arc consists of the drop-down list specifying the **types of arcs**. The list will look like the below image:



Let's discuss each type of arc with examples.

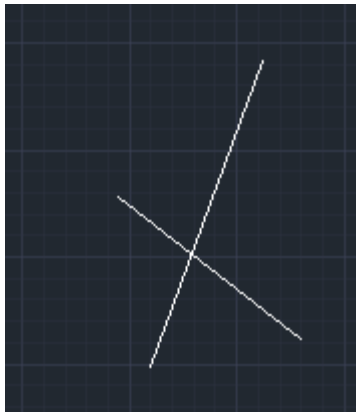
- **3 Point**

Example: To create an arc on two intersecting lines.

Here, we need to specify **three** points to create an arc.

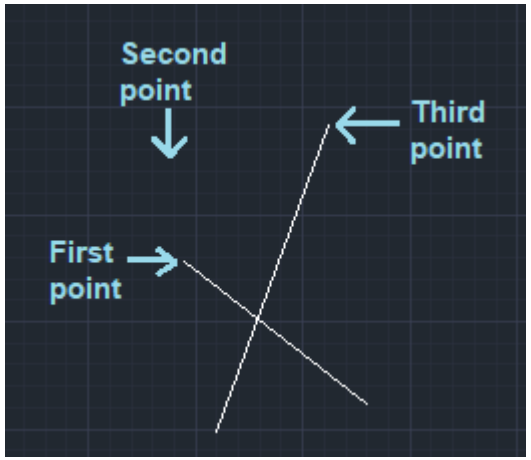
The steps to create a 3-point arc are listed below:

1. Create two intersecting lines, as shown in the below image:



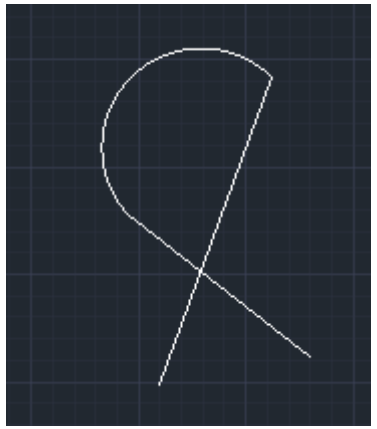
2 . Select the **Arc** icon from the ribbon panel.
Or
Type **A** on the command line and press **Enter**

3, Specify **first**, **second**, and the **third** point over the top of two lines, as shown in the below image:



We can change the position of points accordingly.

4. The arc is shown in the below image:

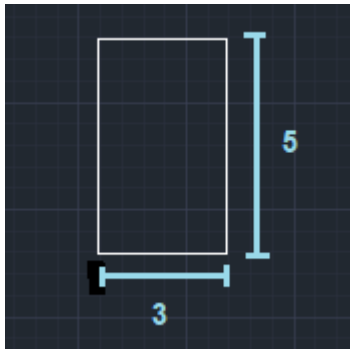


- **Start, Center, End**

Example: Arc on a rectangle.

The steps to create an **arc** are listed below:

5. Create a rectangle. Here, we have created a rectangle with length 3 and width 5, as shown in the below image:

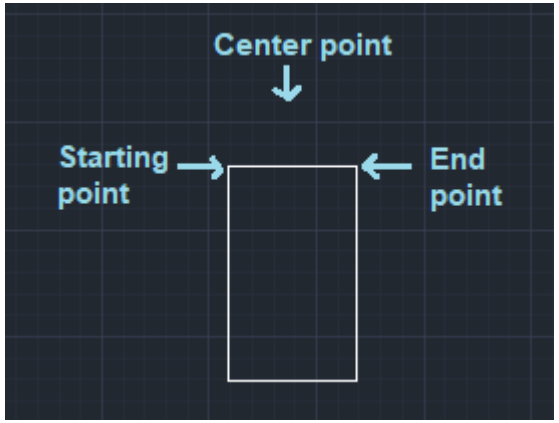


6. Select the **Arc** icon from the ribbon panel.

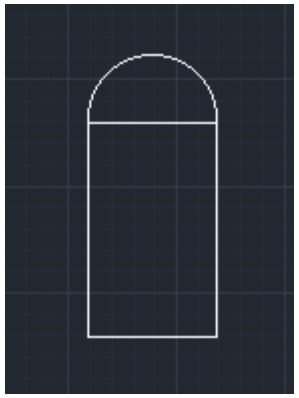
Or

Type **A** on the command line and press **Enter**.

7. Specify the **starting, center,** and **end** point of the arc on the rectangle, as shown in the below image



8. The arc on the rectangle is shown in the below image



2 - Drawing Polylines

To Draw Polylines

1. Click Home tab Draw panel Polyline. Find.
2. Specify the first point of the polyline.
3. Specify the endpoint of the first segment.
4. Continue specifying segment endpoints as needed.
5. Press Enter to end, or enter c to close the polyline.

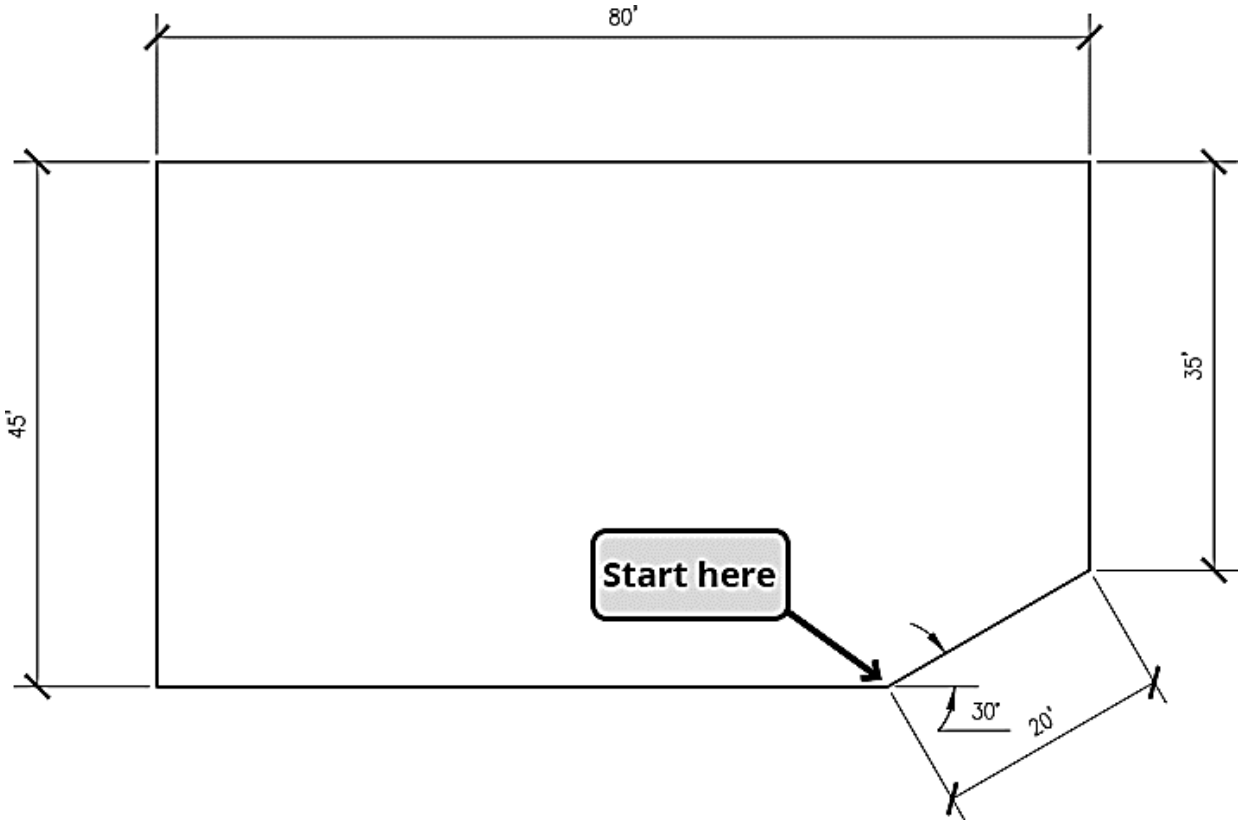
Example:

1 - Start a new drawing

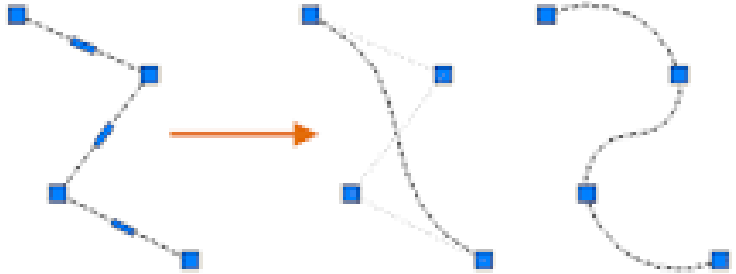
2 - Set the Polar Tracking angle to 35˚

3 - Press the **Polyline** (**PLINE**) tool button  on the Draw Panel (as shown below) or Toolbar, or type **PL Enter**.

4 - Draw a polyline as shown in the diagram below to make the patio around the pool. By default, the Polyline tool behaves just like the Line tool. Press **C Enter** to use the Close option for the last line segment.



Some reasons you may choose to use polylines include the following: Vertices remain joined even after grip editing. Absolute line width (as an alternative to relative line weight) that can be constant or tapered across a segment. Move and copy a polyline as a unit

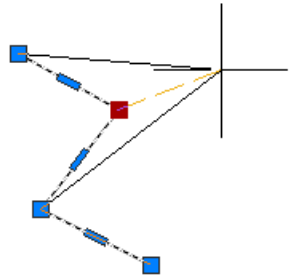


3 - Editing Polylines

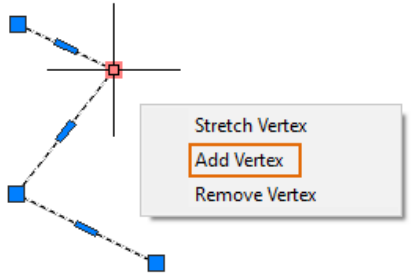
To Modify Polylines With PEDIT

- Click Modify > Object > Polyline.
- Select the polyline to modify. ...
- If the selected object is a spline, line, or an arc, the following prompt is displayed: ...
- Edit the polyline by entering one or more of the following options: ...
- Enter x (Exit) to end a command option

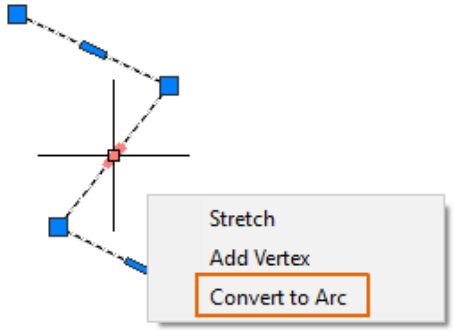
1 - Stretch a Segment



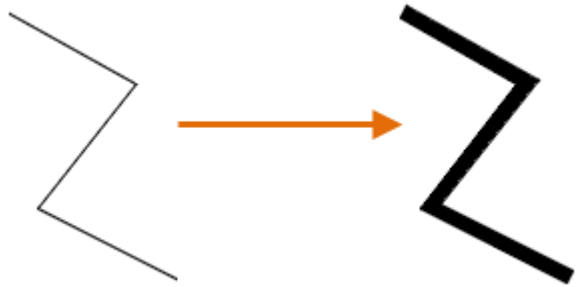
2 - Add a Vertex



3 - Convert a Line Segment to an Arc Segment



4 - Change the Polyline Width



4 - Drawing Polygons

A polygon is a figure formed by the finite number of line segments connected to form a closed circuit.
The categories of the polygon are **triangle, quadrilateral, pentagons, hexagon, heptagon (or septagon), octagon,** etc. The triangle is a figure with three sides, and an octagon is a figure with eight sides.
The polygon command is used to create polygons in AutoCAD. We need to specify the number of sides to create a polygon.
The maximum number of lines available to create a polygon is **1024**

The shortcut command to create a polygon is '**pol**'.

Types (Methods to use Polygon)

There are two types of the polygon, which are given below:

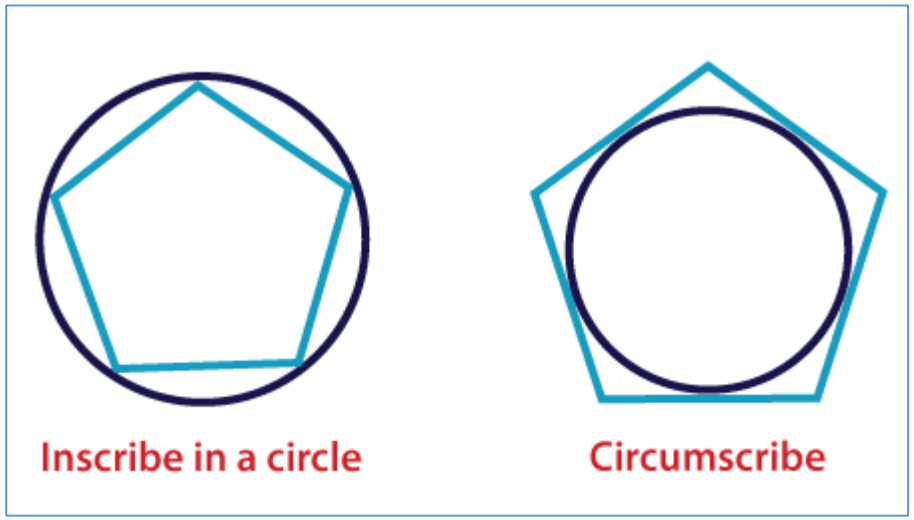
1. Inscribe in Circle

The polygon formed will be drawn inside the circle. The command is best used when we want to create any polygon with its vertices or corners touching the circle.
The shortcut command for inscribing is **I**.

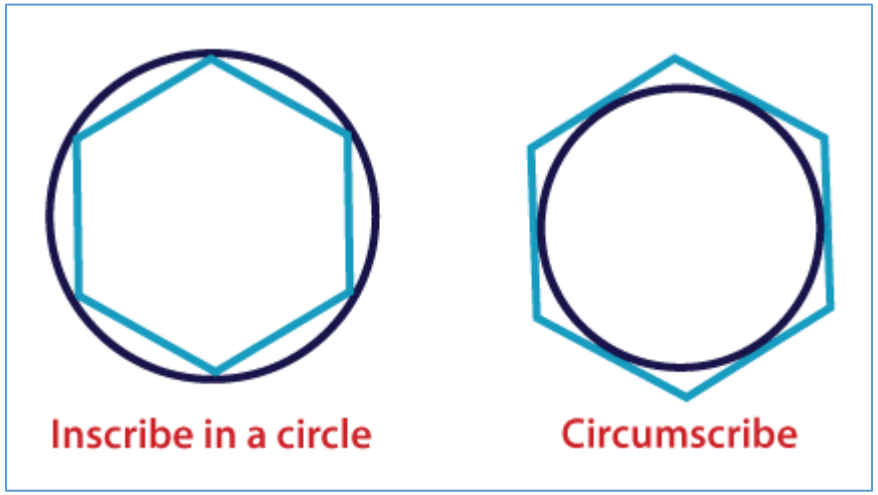
2. Circumscribe about Circle

The polygon formed will be drawn outside the circle. The shortcut command for circumscribing is **C**.

Example 1: We will consider the **pentagon** as a polygon for this example. The image for such an example is shown below:



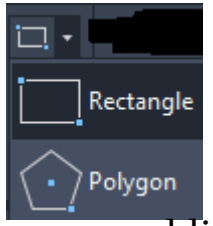
Example 2: We will consider **hexagon** as a polygon for this example.The image for such an example is shown below:



Example 1:

The steps to create a pentagon (polygon with five sides) are listed below:

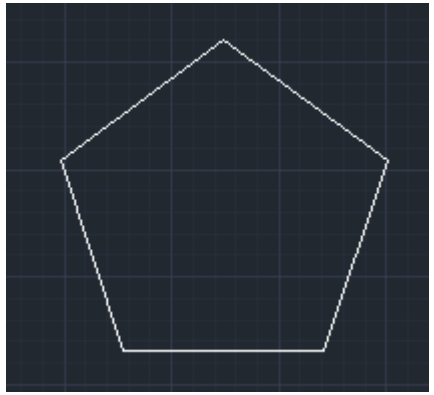
1. Select **Polygon** from the drop-down list of the **Rectangle** present on the ribbon panel, as shown in the below image:



Or

Type **POL** on the command line and press **Enter**.

2. Specify the number of sides of a polygon. Here, we are creating a pentagon, so we will enter **5**.
3. Press **Enter**.
4. Specify the center of polygon on the viewport or workspace.
5. Enter **I** or **C** for Inscribe or Circumscribe.
6. Press **Enter**.
7. Specify the radius of the polygon. For example, **4**.
8. Press **Enter**. The polygon will be drawn, as shown in the below image:



5 - Drawing Ellipses

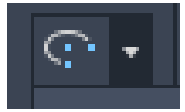
The **Ellipse** is defined as a curve surrounding two focal points.

The shape of the ellipse is determined by two of its axis, which defines the length and width.

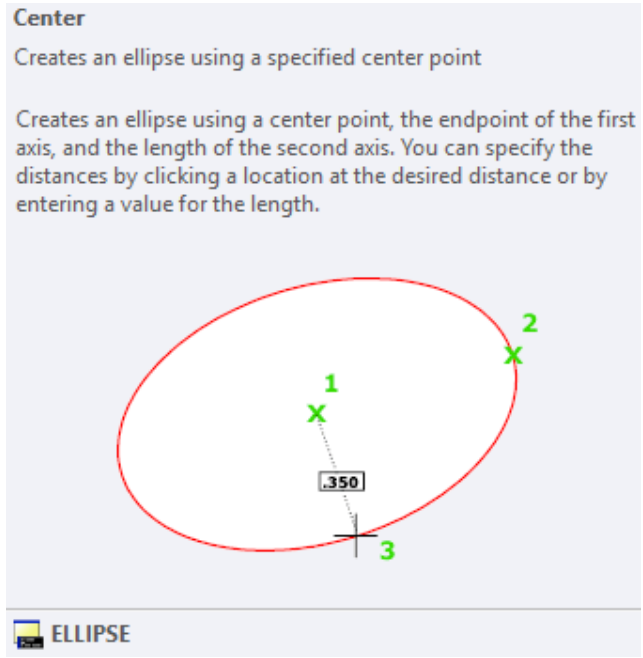
The **Ellipse** is a general command to create ellipse on the AutoCAD display. We can create the ellipse by specifying the two-point on an axis and the endpoint on another axis.

The first axis and the second axis of the Ellipse can be determined either as minor or major axis, depending on the specification.

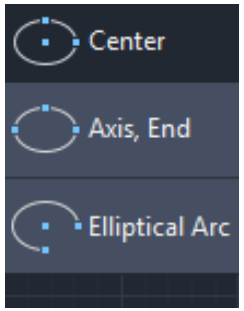
The icon of Ellipse will look like the below image:



Move the pointer of your mouse on the Ellipse icon to view the dialogue box for **Ellipse** in AutoCAD. It will look like the given image:



It consists of the drop-down list, which includes other options such as **Elliptical Arc, Center,** and **Axis**. The list will look like the given image:



Draw an Elliptical Arc Using Start and End Angles

Click Home tab Draw panel Ellipse drop-down Elliptical Arc. Find.

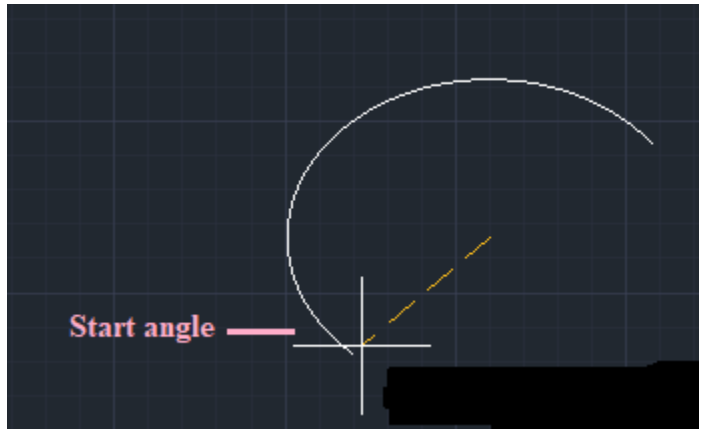
1. Choose Elliptical Arc from the drop-down list of the Ellipse
2. Specify the endpoint or the center of the elliptical arc.
3. Specify endpoint of the axis, as shown below:



4. Specify endpoint of other axis, as shown



5. Specify the start angle. For example, **30**. It is shown in the below image



6. Specify the end angle. For example, **120**.
7. The created elliptical arc is shown in the below image:

