

Міністерство освіти і науки України
Харківська національна академія міського господарства

**Creation of AutoCAD entities: constructing a stands plan and
small architectural forms arranging.**

**Guidance for laboratory works for “Informatics and computer
modeling basics” course /for foreign students of 2nd year studying by
orientation 6.060102 «Architecture»/**

Харків – ХНАМГ – 2009

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Theme: Creation of AutoCAD entities: constructing a stands plan and small architectural forms arranging

Purpose: confirming skills of work with drawing and displaying procedures, learning how to draw ellipses, polygons and rings in AutoCAD

Work order:

1. Start AutoCAD and open the drawing *tsk1.dwg*.
2. Create a new layer.
3. Set SNAP and GRID equal to 2 m
4. Around the basketball court, draw stands in the form of five ellipses. The centers of all the ellipses coincide with the center of basketball court, and the axes are magnified by 2 m.
5. Create a new layer.
6. Near the basketball court, draw a booth of 9-side polygon described around a circle of 3 m diameter.
7. Create a new layer.
8. Near the basketball court, draw a 7-side booth inscribed into a circle of 4 m diameter.
9. Create a new layer.
10. Set SNAP and GRID equal to 0.1m

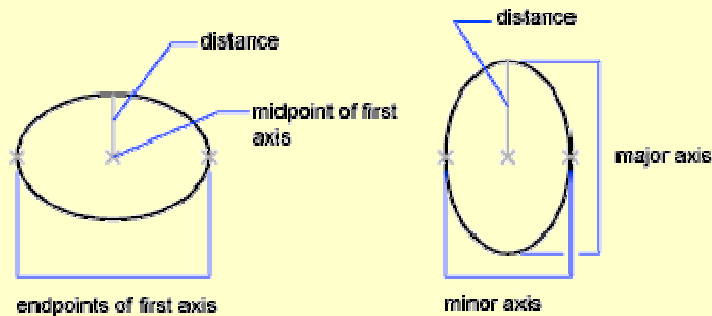
11. Near the basketball court, draw 3 flowerbeds as rings (using the DONUT command). Internal diameters are 2m, 2.5m, and 3m. The widths of the rings are 0.2m, 0.3m, 0.4m.

12. Save the drawing in the personal folder and compress it (Zip).

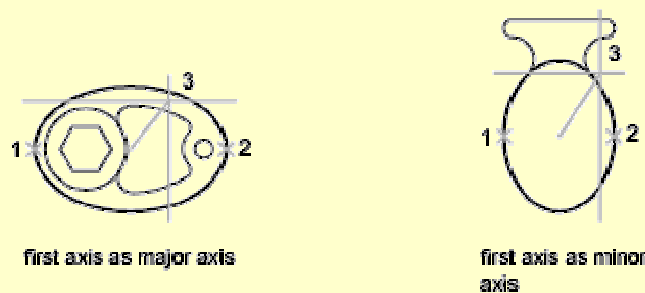
13. Save this archive in the Academy distance learning system.

Draw Ellipses

The shape of an ellipse is determined by two axes that define its length and width. The longer axis is called the major axis, and the shorter one is the minor axis.



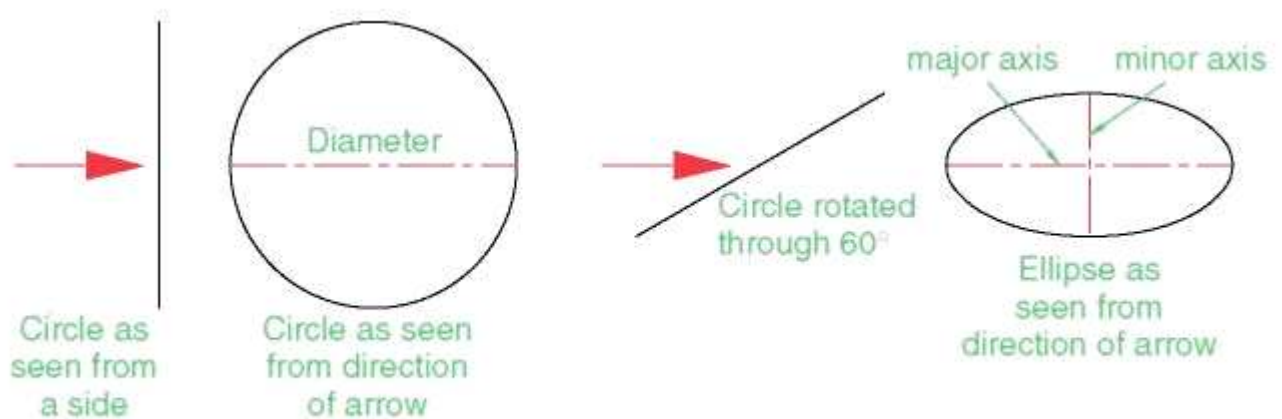
The illustrations below show two different ellipses created by specifying axis and distance. The third point specifies only a distance and does not necessarily designate the axis endpoint.



If you are drawing on isometric planes to simulate 3D, you can use ellipses to represent isometric circles viewed from an oblique angle. First you need to turn on Isometric Snap in the Drafting Settings dialog box.

Drawing with the Ellipse tool examples

Ellipses can be regarded as what is seen when a circle is viewed from directly in front of the circle and the circle rotated through an angle about its horizontal diameter. Ellipses are measured in terms of two axes - a **major axis** and a **minor axis**, the major axis being the diameter of the circle, the minor axis being the height of the ellipse after the circle has been rotated through an angle.



To call the **Ellipse** tool, *click on* its tool icon in the **2D Draw** control panel or *click* on its name in the **Draw** drop-down menu. The abbreviation for calling the **Ellipse** tool is **el**.



Left-click the **Ellipse** tool icon. The command line shows:

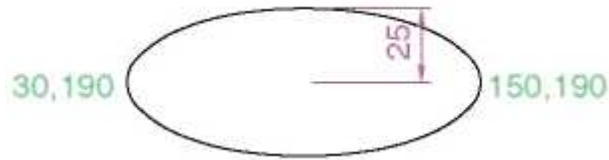
Command: `_ellipse`

Specify axis endpoint of elliptical arc or [Center]: 30,190

Specify other endpoint of axis: 150,190

Specify distance to other axis or [Rotation]: 25

Command:



Second example

In this second example, the coordinates of the centre of the ellipse (the point where the two axes intersect) are *entered*, followed by *entering* coordinates for the end of the major axis, followed by *entering* the units for the end of the minor axis.

Command: *right-click*

ELLIPSE

Specify axis endpoint of elliptical arc or [Center]: c

Specify center of ellipse: 260,190

Specify endpoint of axis: 205,190

Specify distance to other axis or [Rotation]: 30

Command:



Third example

Command: *right-click*

ELLIPSE

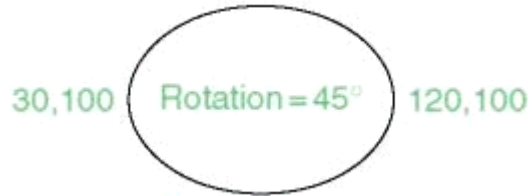
Specify axis endpoint of elliptical arc or [Center]: 30,100

Specify other endpoint of axis: 120,100

Specify distance to other axis or [Rotation]: r (Rotation)


Specify rotation around major axis: 45

Command:



Draw Rectangles

Use RECTANG command to create closed polylines in a rectangular shape. You can specify the length, width, area, and rotation parameters. You can also control the type of corners on the rectangle—fillet, chamfer, or square.

Toolbar: Draw 

Menu: Draw ► RectangleAt the Command prompt, enter rectang.

Command entry: rectang or rectangle

Drawing with the Rectangle tool examples

Call the **Rectangle** tool - either, with a *click* on its tool icon in the **2D Draw** control panel, or by *entering* **rec** or **rectangle** at the command line.



The tool can be called from the **Draw** drop-down menu.

The command line shows:

Command: _rectang

Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/ Width]:

25,240

Specify other corner point or [Area/Dimensions/Rotation]:

160,160

Command:



Command: _rectang

[prompts]: c (Chamfer)

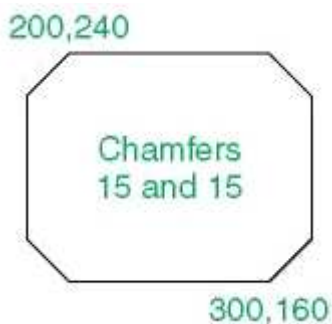
Specify first chamfer distance for rectangles <0>: 15

Specify first chamfer distance for rectangles <15>: *right-click*

Specify first corner point: 200,240

Specify other corner point: 300,160

Command:



Command: _rectang

Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]: w

(Width)

Specify line width for rectangles <0>: 4

Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/ Width]: c

(Chamfer)

Specify first chamfer distance for rectangles <0>: 10

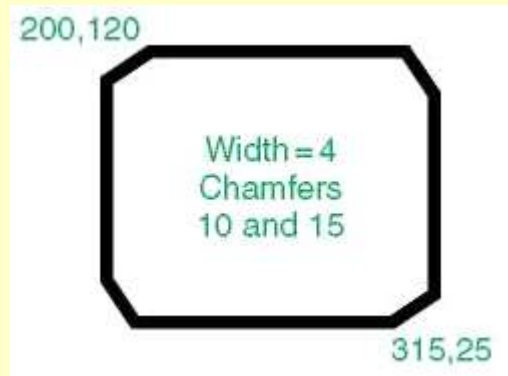
Specify second chamfer distance for rectangles <10>: 15

Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/ Width]:

200,120

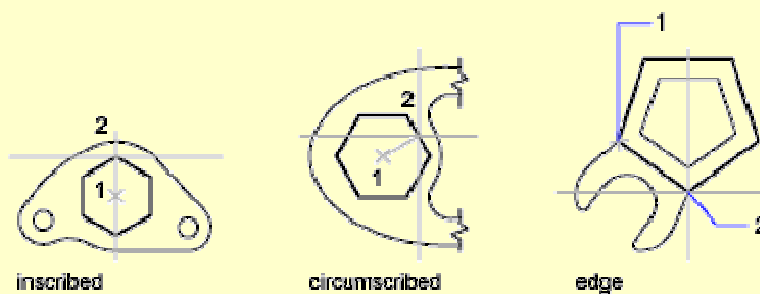
Specify other corner point or [Area/Dimensions/Rotation]: 315,25

Command:



Draw Regular Polygons

Use POLYGON command to create closed polylines with between 3 and 1,024 equal-length sides. The following illustrations show polygons created using three methods. In each case, two points are specified.

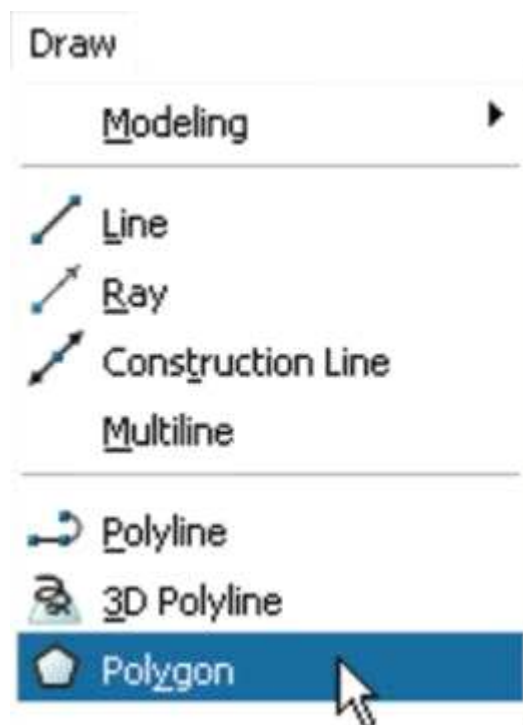


Drawing with the Polygon tool examples

Call the **Polygon** tool - either with a *click* on its tool icon in the **2D Draw** control panel, by *entering* **pol** or **polygon** at the command line.



It can be called from the **Draw** drop-down menu.



The command line shows

Command: _polygon Enter number of sides <4>: 6

Specify center of polygon or [Edge]: 60,210

Enter an option [Inscribed in circle/Circumscribed about circle] <I>: right-click

(accept Inscribed)

Specify radius of circle: 60

Command:

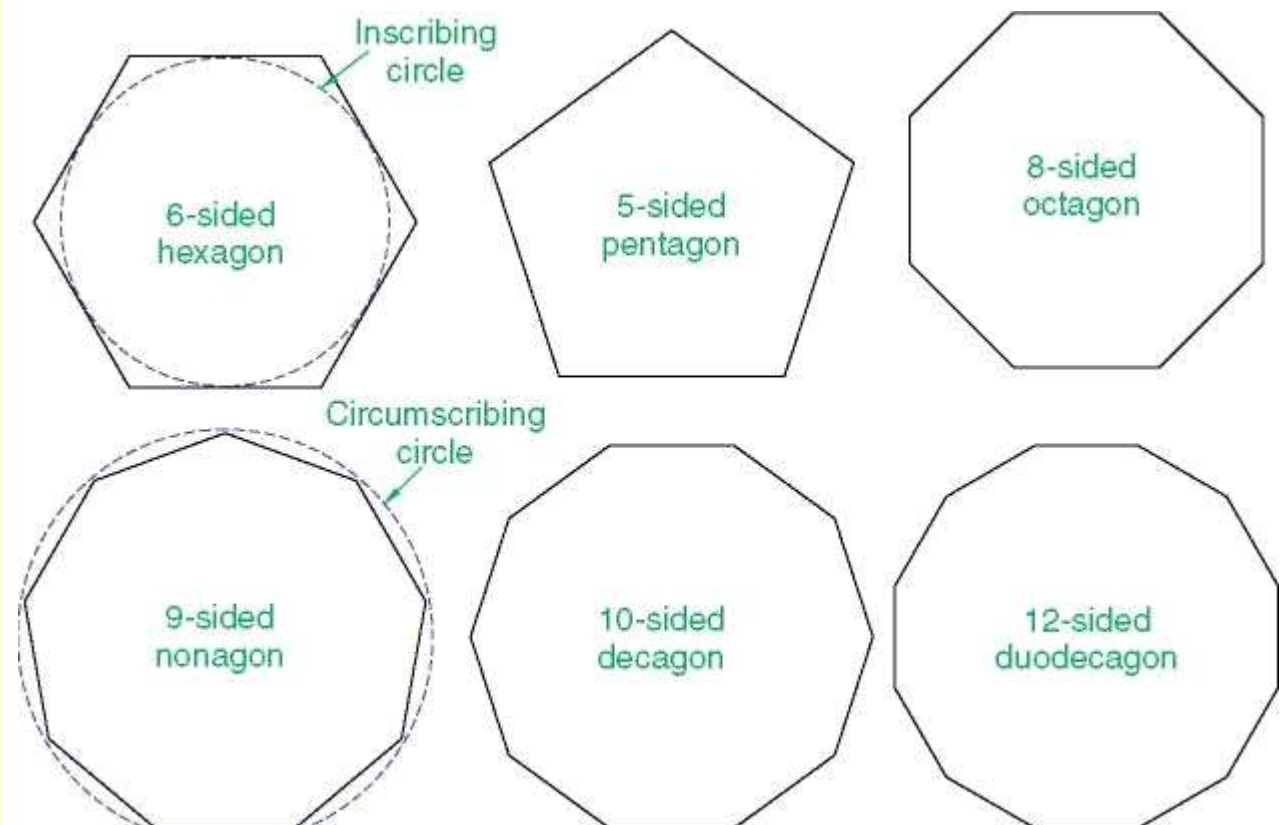
In the same manner construct a **5-sided** polygon of centre **200,210** and of radius **60**.

Then, construct an **8-sided** polygon of centre **330,210** and radius **60**.

Repeat to construct a **9-sided** polygon circumscribed about a circle of radius **60** and centre **60,80**.

Construct yet another polygon with **10** sides of radius **60** and of centre **200,80**.

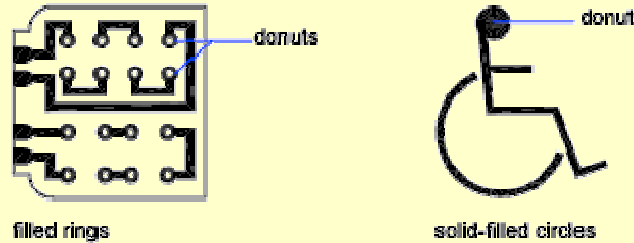
Finally another polygon circumscribing a circle of radius **60**, of centre **330,80** and sides **12**.



Draw Donuts

Donuts are filled rings or solid-filled circles that actually are closed polylines with width.

To create a donut, you specify its inside and outside diameters and its center. You can continue creating multiple copies with the same diameter by specifying different center points. To create solid-filled circles, specify an inside diameter of 0.



To create a donut

1. Click Draw menu > Donut. At the Command prompt, enter donut.
2. Specify the inside diameter (1).
3. Specify the outside diameter (2).
4. Specify the center of the donut (3).
5. Specify the center point for another donut, or press ENTER to complete the command.

