

LEARNING OBJECTIVES

After completing this lesson, you will be able to:

1. Understand Object Snap
2. Use Running Object Snap
3. Use the Zoom options to view the drawing
4. Change the Drawing Limits
5. Select the Units of Measurement and Precision

LESSON 4

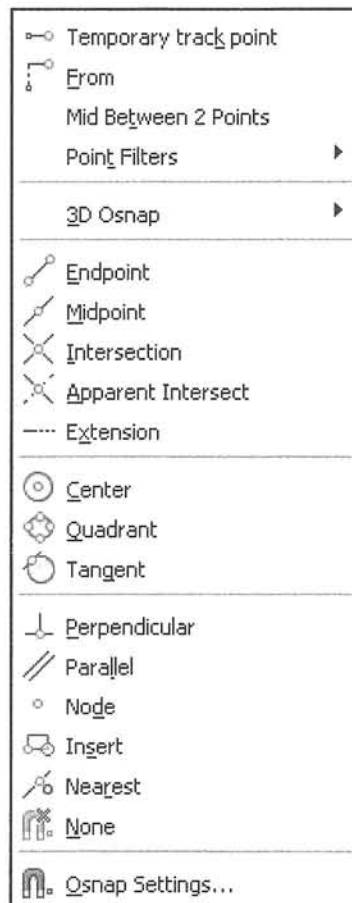
OBJECT SNAP

In Lesson 3 you learned about Increment Snap. Increment Snap enables the cursor to move in an incremental movement. So you could say your cursor is “snapping to increments” preset by you.

Now you will learn about Object Snap. If Increment Snap snaps to increments, what do you think Object Snap snaps to? That’s right; “objects”. Object snap enables you to snap to “objects” in very specific and accurate locations on the objects. For example, the endpoint of a line or the center of a circle.

How to select from the Object Snap Menu

1. You must select a command, such as LINE, before you can select Object Snap.
2. While holding down the shift key, press the right mouse button The menu shown below should appear.
3. Highlight and press left mouse button to select.



The following object snaps will be discussed in this Lesson:

Endpoint, Midpoint, Intersection, Center, Quadrant, Perpendicular and Tangent. Refer to their descriptions on the next page. The remaining will be discussed in future lessons.

OBJECT SNAP....continued

Object Snap Definitions

Object snap is used when AutoCAD prompts you to place an object. Object snap allows you to place objects very accurately.

A step by step example of “How to use object snap” is shown on the next page.

Note: You may type the **3 bold letters** shown rather than select from the menu.



ENDpoint

Snaps to the closest endpoint of a Line, Arc or polygon segment. Place the cursor on the object close to the end and the cursor will snap like a magnet to the end of the line.



MIDpoint

Snaps to the middle of a Line, Arc or Polygon segment. Place the cursor anywhere on the object and the cursor will snap like a magnet to the midpoint of the line.



INTersection

Snaps to the intersections of any two objects. Place the cursor directly on top of the intersection or select one object and then the other and Autocad will locate the intersection.



CENter

Snaps to the center of an Arc, Circle or Donut. Place the cursor on the object, or at the approximate center location and the cursor will snap like a magnet to the center.



QUAdrant

Snaps to a 12:00, 3:00, 6:00 or 9:00 o'clock location on a circle or ellipse. Place the cursor on the circle near the desired quadrant location and the cursor will snap to the closest quadrant.



TANgent

Calculates the tangent point of an Arc or Circle. Place the cursor on the object as near as possible to the expected tangent point.



PERpendicular

Snaps to a point perpendicular to the object selected. Place the cursor anywhere on the object then pull the cursor away from object and press the left mouse button.

How to use OBJECT SNAP

The following is an example of attaching a line segment to previously drawn vertical lines. The new line will start from the upper endpoint, to the midpoint, to the lower endpoint.

1. Turn Off **SNAP**, **ORTHO** and **OSNAP** on the Status Bar. (Gray is OFF)



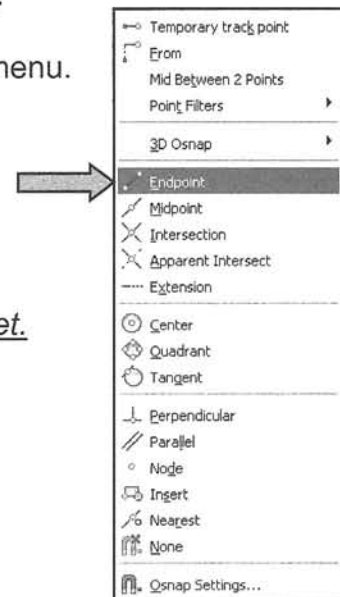
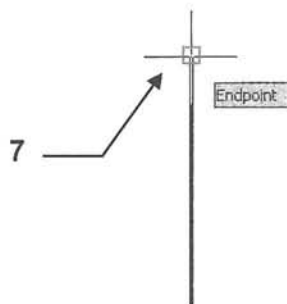
2. Select the **Line** command.
3. Draw two vertical lines as shown below (they don't have to be perfectly straight)



4. Select the **Line** command again.
5. Hold the shift key down and press the right mouse button.
6. Select the Object snap **Endpoint** from the object snap menu.

7. Place the cursor close to the upper endpoint of the left hand line.

The cursor should snap to the end of the line like a magnet. A little square and an "Endpoint" tooltip are displayed.

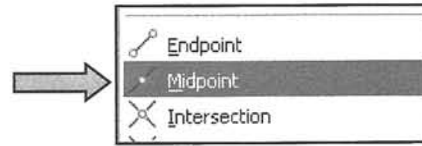


8. Press the left mouse button to attach the new line to the upper endpoint of the previously drawn vertical line. (Do not end the Line command yet.)

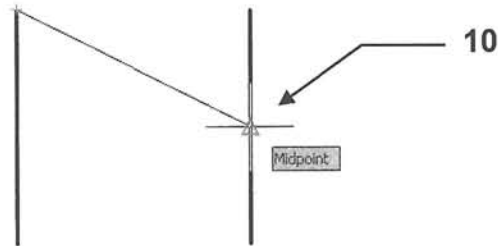
Continued on the next page...

How to use OBJECT SNAP....continued

- Now hold the shift key down and press the right mouse button and select the **Midpoint** object snap option.

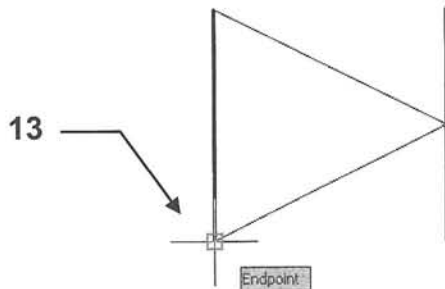


- Move the cursor to approximately the middle of the right hand vertical line.



The cursor should snap to the midpoint of the line like a magnet .
A little triangle with a "Midpoint" tool tip are displayed.

- Press the left mouse button to attach the new line to the midpoint of the previously drawn vertical line. (Do not end the Line command yet.)
- Now hold the shift key down and press the right mouse button and select the object snap **Endpoint** again.
- Move the cursor close to the lower endpoint of the left hand vertical line.



The cursor should snap to the end of the line like a magnet.
A little square and a tooltip are displayed.

- Press the left mouse button to attach the new line to the endpoint of the previously drawn vertical line.
- Stop the Line command and disconnect by pressing **<enter>**.

RUNNING OBJECT SNAP

Selecting Object Snap is not difficult but AutoCAD has provided you with an additional method to increase your efficiency by allowing you to preset select frequently used object snap options. This method is called **RUNNING OBJECT SNAP**.

When **Running Object Snap** is active the cursor will automatically snap to any preset object snap locations thus eliminating the necessity of invoking the object snap menu for each locations.

First you must set the running object snaps and second you must turn ON the Running Object Snap option.

SETTING RUNNING OBJECT SNAP

1. Select the **Running Object Snap** dialog box using one of the following:

Keyboard = DS <enter>

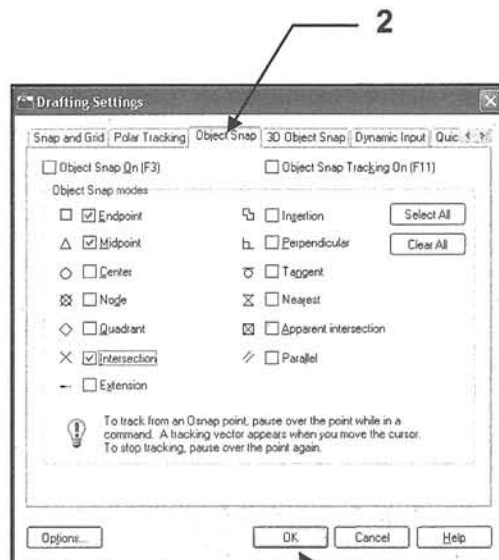
or

Status Bar = Right Click on OSNAP button and select SETTINGS.

2. Select the **Object Snap** tab.

3. Select the Object Snaps desired.

(In the example below object snap Endpoint, Midpoint and Intersection have been selected.



Note:

Try not to select more than 3 or 4 at one time.

If you select too many the cursor will flit around trying to snap to multiple snap locations. And possibly snap to the wrong location. You will lose control and it will confuse you.

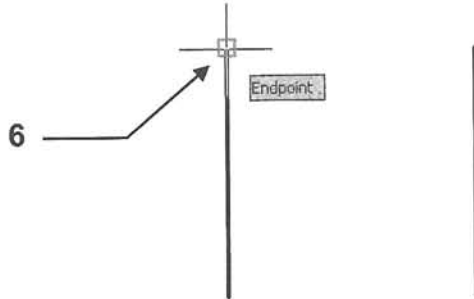
4. Select the **OK** button.

5. Turn ON the **OSNAP** button on the Status Bar. (blue is ON)

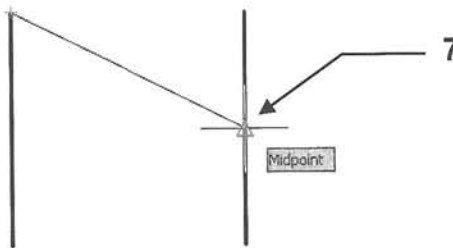


RUNNING OBJECT SNAP....continued

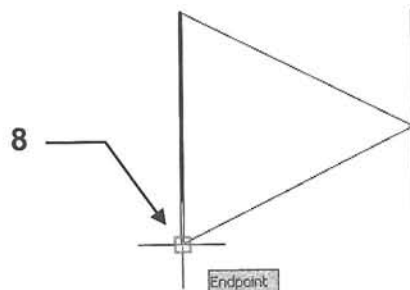
- Now try drawing the line from the endpoint to the midpoint again **but this time do not select the "Object Snap Menu"**. Just move the cursor close to the endpoint and the cursor will automatically snap to the end of the line.



- Move the cursor to approximately the middle of the right hand vertical line and the cursor will automatically snap to the midpoint of the line.



- Move the cursor close to the lower endpoint of the left hand vertical line and the cursor will automatically snap to the lower endpoint of the left line.



Running Object snap is very handy but remember do not select more than 3 or 4 at a time. The selections will fight each other and you may end up snapping to a location that you did not want.

If you wish to snap to a location that is not preset merely select the Object Snap Menu, as shown on page 4-2, and select the one you want. Running Object Snap and Object snap work together very well but it may take a little practice.

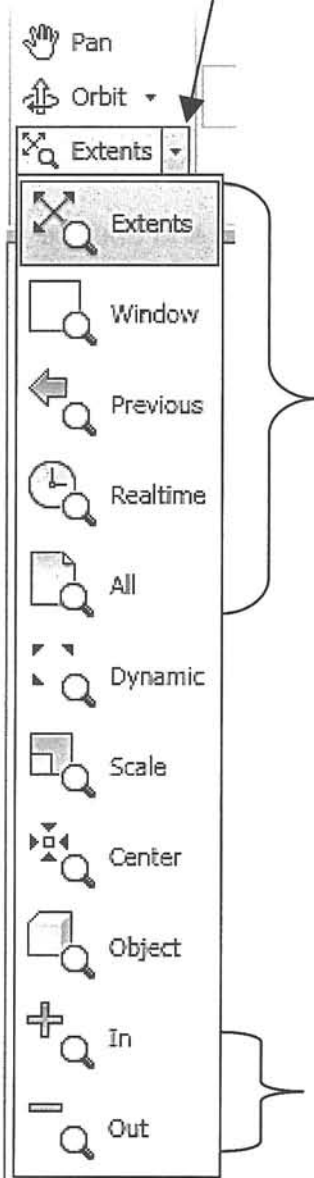
ZOOM

The **ZOOM** command is used to move closer to or farther away from an object. This is called Zooming In and Out.

1. Select the Zoom command by using the following:

Ribbon = View tab / Navigate panel

2. Select the ▼ down arrow by to display all of the selections.



The following are descriptions of the most commonly used zoom tools.

EXTENTS = Displays all objects in the drawing file, even objects outside of the drawing limits.

WINDOW = zoom in on an area by specifying a window around the area.

PREVIOUS = returns the screen to the previous display.
(Limited to 10)

REAL TIME = Interactive Zoom. You can zoom in or out by moving the cursor vertically up or down while pressing the left mouse button.
To stop, press the Esc key.

All = Zooms to drawing limits or Extents, whichever is greater.

IN or OUT = moves in 2X or out 2X

You may also select the Zoom commands using one of the following:

Right Click and select Zoom from the Short cut menu.

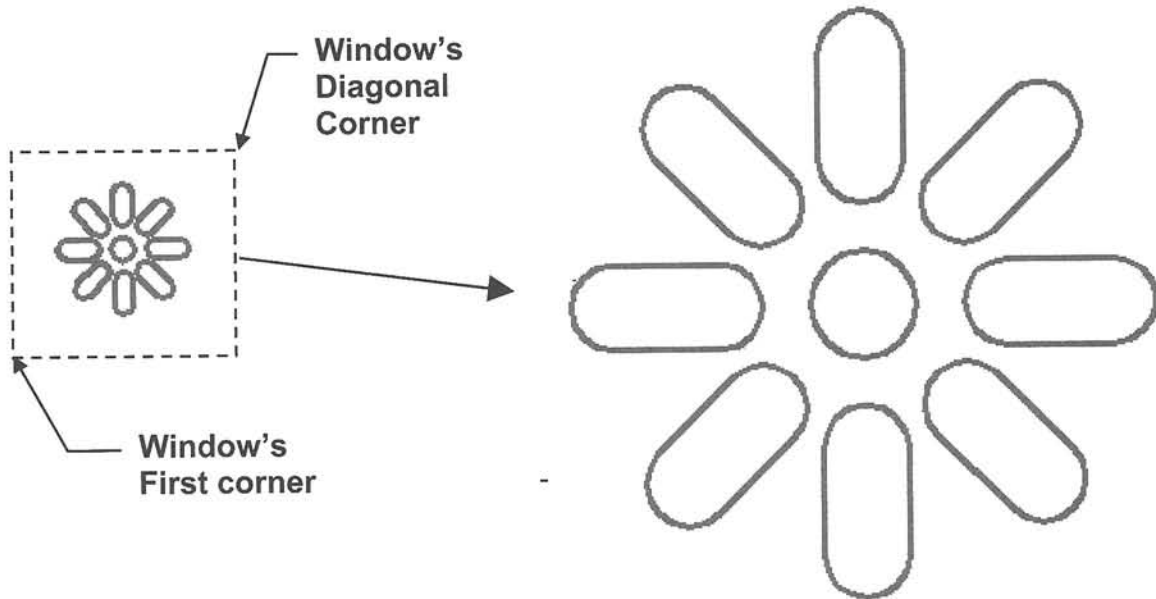
(Refer to Intro-5 for "right-click" settings)

Keyboard = Z <enter> Select from the options listed..

ZOOM....continued

How to use ZOOM / WINDOW

1. Select Zoom / Window (Refer to previous page)
2. Create a window around the objects you want to enlarge.
(Creating a "window" is a similar process to drawing a rectangle. It requires a first corner and then diagonal corner)

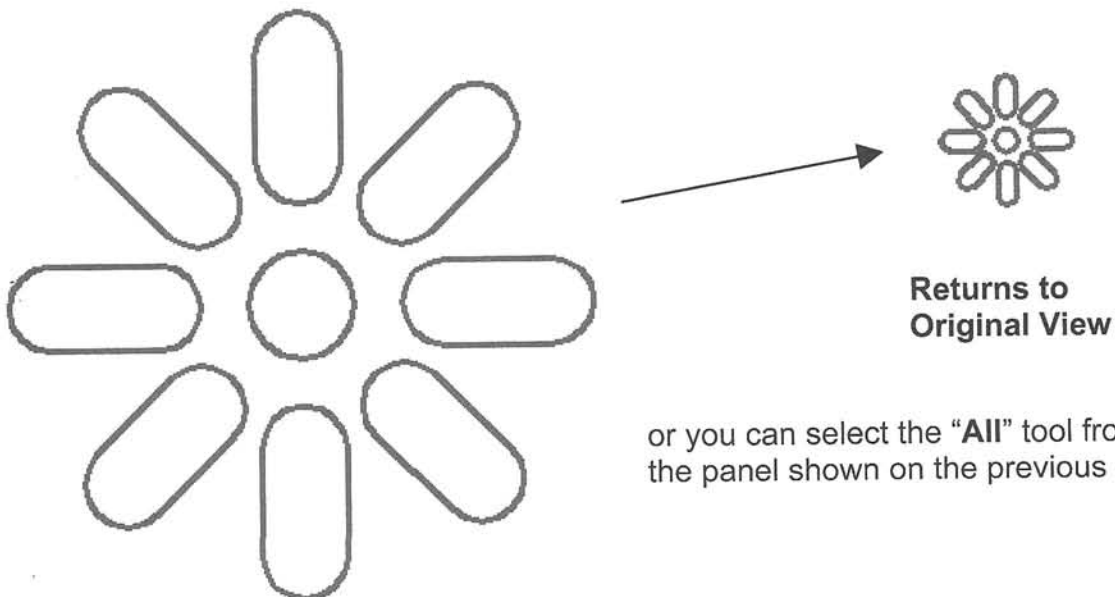


Magnified to this view

Note: the objects have been magnified.
But the actual size has not changed.

How to return to Original View

1. Type: **Z** <enter> **A** <enter> (This is a shortcut for Zoom / All)



or you can select the "All" tool from
the panel shown on the previous page.

DRAWING SETUP

When drawing with a computer, you must “set up your drawing area” just as you would on your drawing board if you were drawing with pencil and paper. You must decide what size paper you will need, what Units of measurement you will use (feet and inches or decimals, etc) and how precise you need to be. In CAD these decisions are called “Setting the **Drawing Limits, Units and Precision**”.

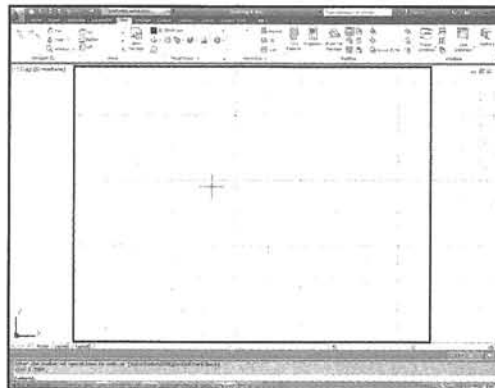
DRAWING LIMITS

Consider the drawing limits as the size of the paper you will be drawing on. You will first be asked to define where the lower left corner should be placed, then the upper right corner, similar to drawing a Rectangle. An 11 x 8.5 piece of paper would have a **lower left corner** of 0,0 and an **upper right corner** of 11, 8.5. (*11 is the horizontal measurement X-axis and 8.5 is the vertical measurement Y-axis.*)

HOW TO SET THE DRAWING LIMITS

EXAMPLE

1. Start a **NEW** drawing using the **2013 - Workbook Helper** template.
(Refer to page 2-6)



2. Select the **DRAWING LIMITS** command by typing: **Limits <enter>**

3. The following prompt will appear:

```
Command: '_limits  
Reset Model space limits:  
Specify lower left corner or [ON/OFF] <0.0000,0.0000>:
```

Displays the current
lower left corner
coordinates before
change

DRAWING SETUP

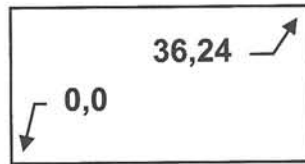
4. Type the X,Y coordinates **0, 0 <enter>** for the new lower left corner location of your piece of paper .

5. The following prompt will appear:

Specify upper right corner <12.0000, 9.0000>:

Displays the current upper right corner coordinates before change

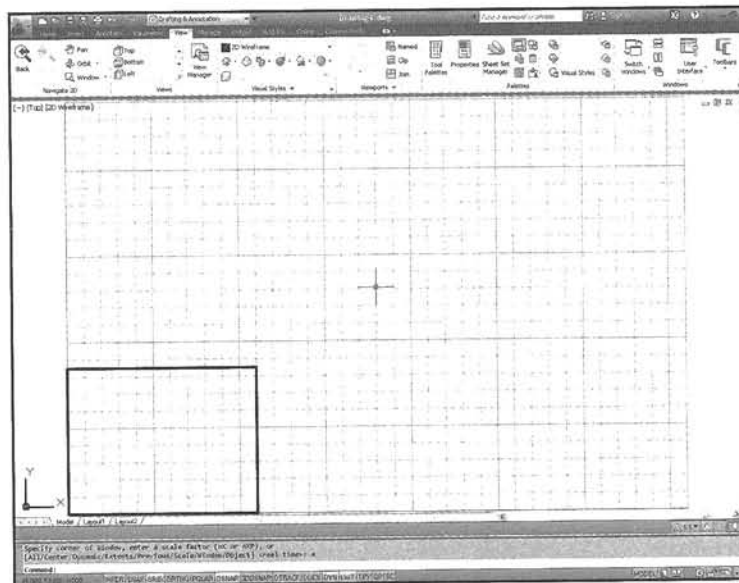
6. Type the X,Y coordinates **36,24 <enter>** for the new upper right corner of your piece of paper .



Note: visually the screen has not changed. Do the next step and it will.

7. **This next step is very important:**

Type **Z <enter> A <enter>** to make the screen display the new drawing limits. (This is the shortcut for Zoom / All. Refer to page 4-9)

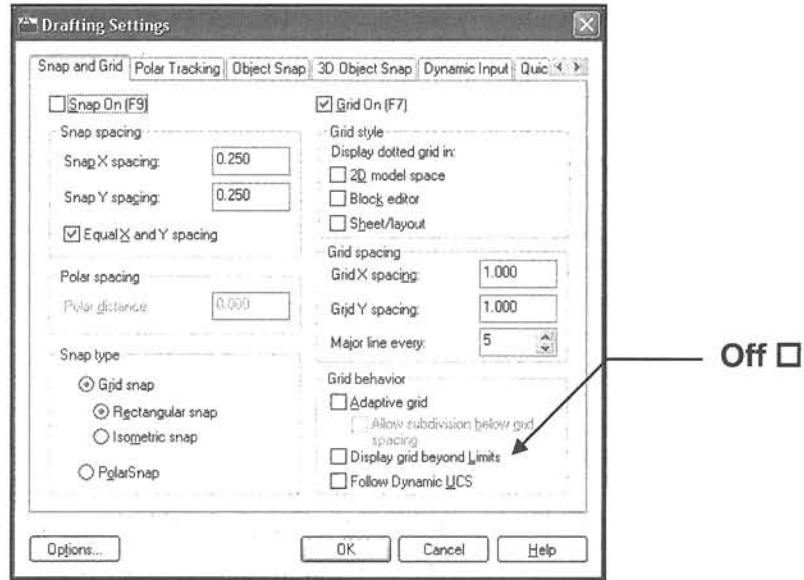


The drawing limits (area) is now 36 wide X 24 high. The rectangle did not change size or location. But the drawing area around it got larger so the rectangle appears to have move and smaller. Think about it.

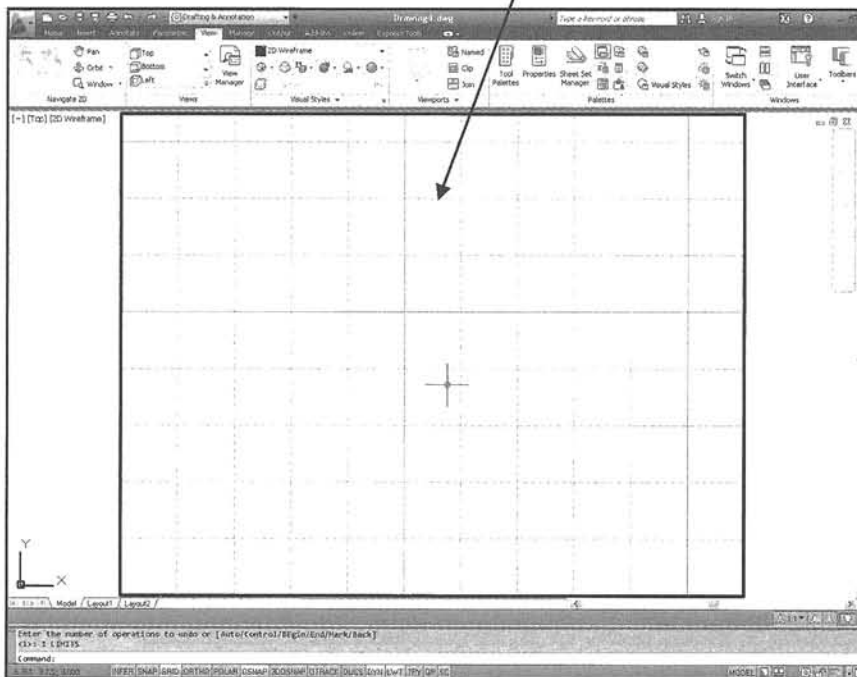
DRAWING SETUP continued....

Grids within Limits

If you have your **Grid behavior** setting **Display grid beyond Limits** is turned Off (no check mark) the grids will only be displayed within the Limits that you set.



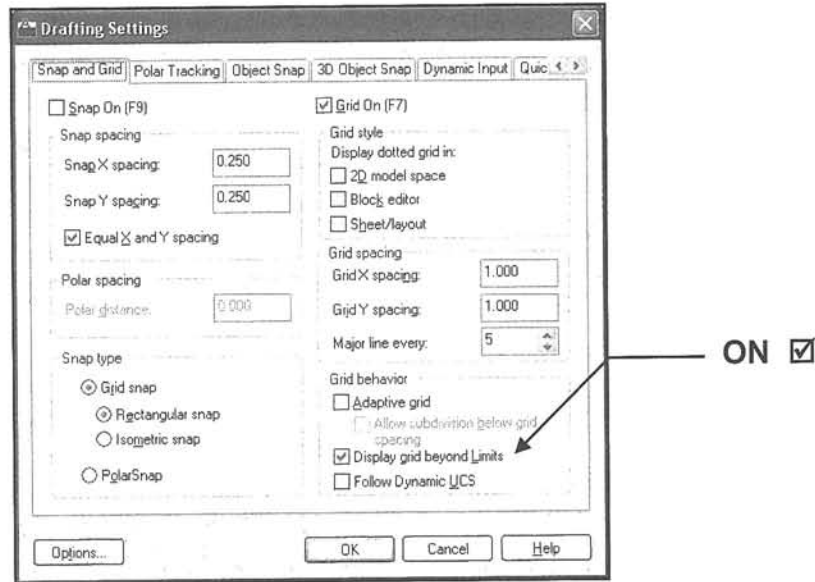
Grids displayed within Limits only.



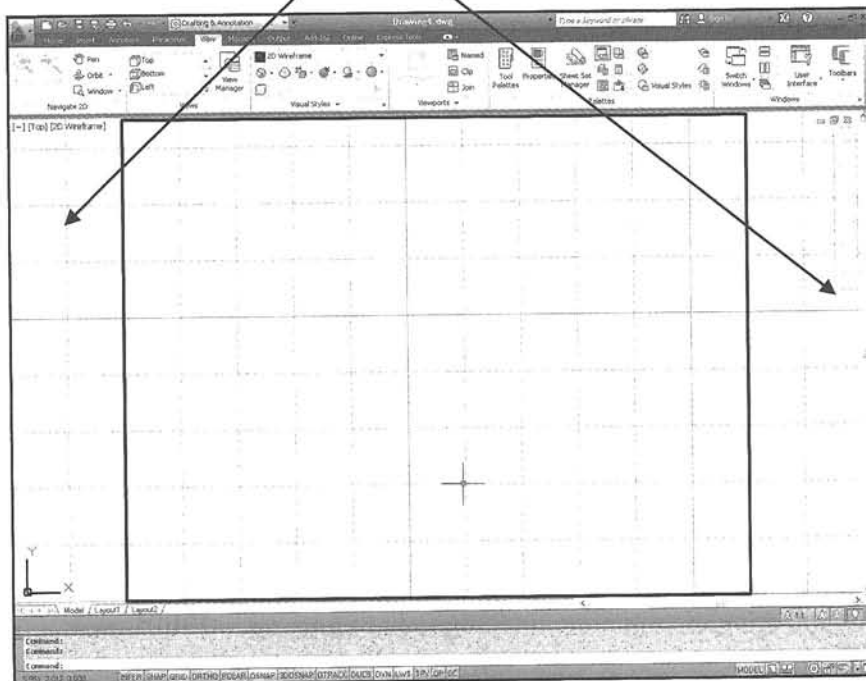
DRAWING SETUP continued....

Grids beyond Limits

If you have your **Grid behavior** setting **Display grid beyond Limits** is turned **ON** (check mark) the grids will be displayed beyond the Limits that you set.



Grids displayed beyond Limits.



DRAWING SETUP....continued

UNITS AND PRECISION

You now need to select what **unit of measurement** with which you want to work. Such as: Decimal (0.000) or Architectural (0'-0").

Next you should select how precise you want the measurements. For example, do you want the measurement limited to a 3 place decimal or the nearest 1/8".

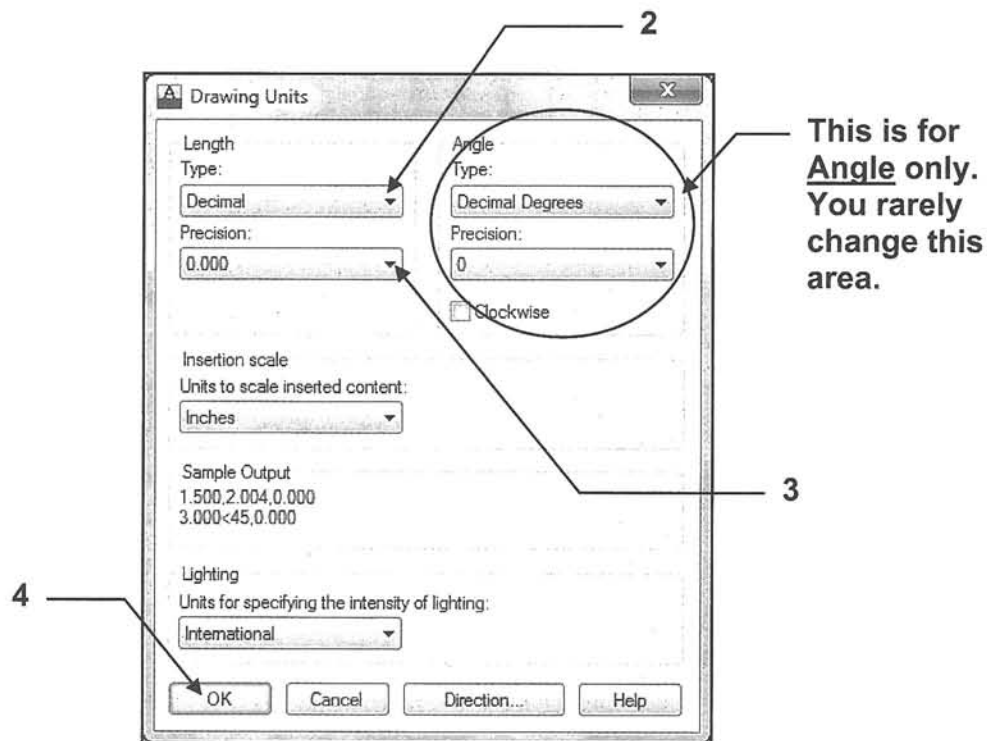
HOW TO SET THE UNITS AND PRECISION.

1. Select the **UNITS** command using one of the following:

Application Menu = Drawing Utilities / Units

or

Keyboard = Units <enter>



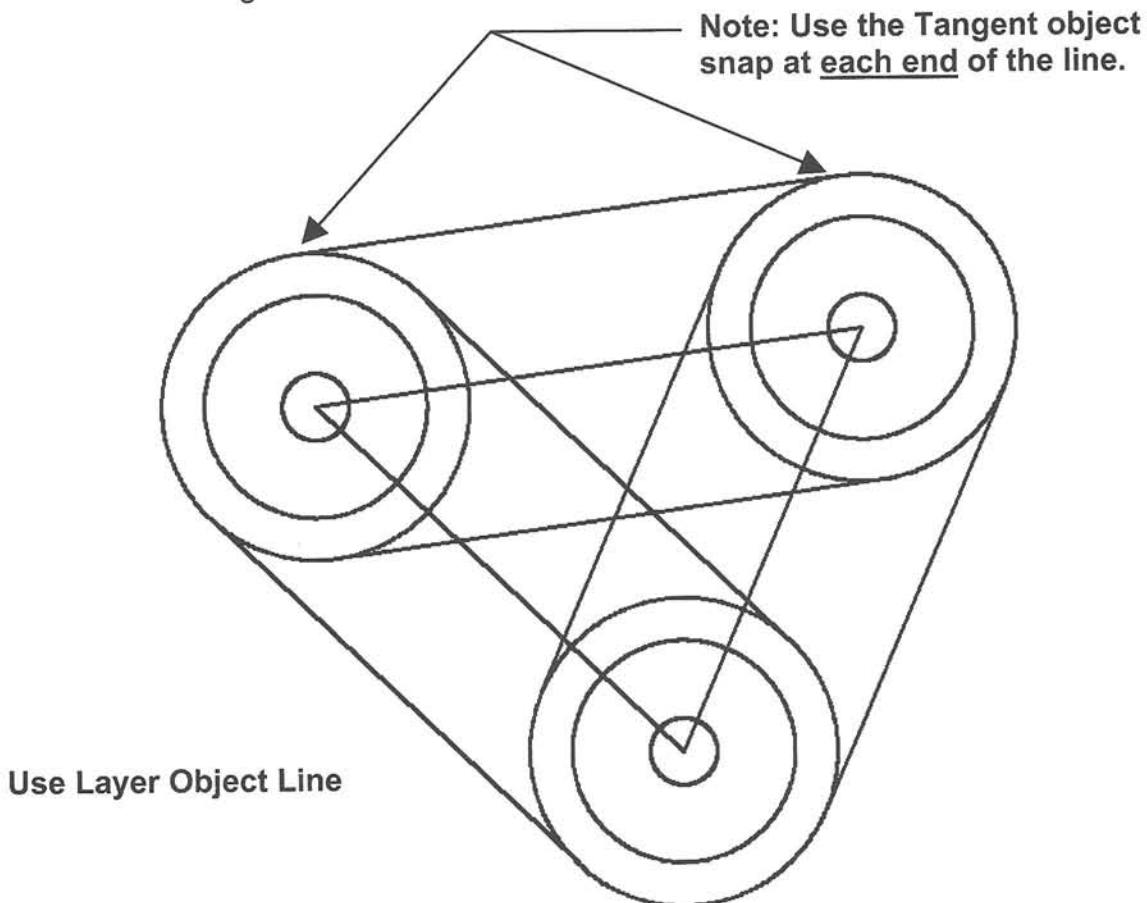
2. **Type:** Select the down arrow and select : **Decimals** or **Architectural**.
3. **Precision:** Select the down arrow and select the appropriate **Precision** associated with the "type".
Examples: 0.000 for Decimals or 1/16" for Architectural.
4. Select the **OK** button to save your selections.

Easy, yes?

EXERCISE 4A

INSTRUCTIONS:

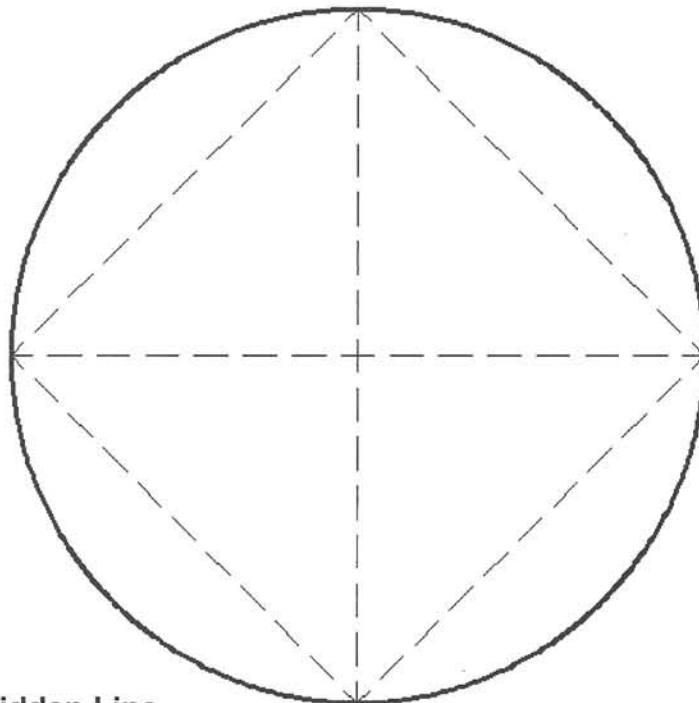
1. Start a **NEW** file using **2013-Workbook Helper.dwt**.
2. Set **Units** and **Precision**:
Units = Fractional **Precision** = 1/2"
3. Set **Drawing Limits**:
Lower Left corner = 0,0 Upper Right Corner = 20, 15
4. Make sure you use **Zoom / All** after setting Drawing Limits
5. Erase the Rectangle that appears with the template, it will appear too small.
6. Turn **OFF** the **Snap** and **Ortho**.
(Your cursor should move freely)
7. Draw the objects shown below using:
Circle, center radius and Line (Use Layer = Object Line)
Object snap = Center and Tangent
8. **Save** the drawing as: **EX4A**



EXERCISE 4B

INSTRUCTIONS:

1. Start a **NEW** file using **2013-Workbook Helper.dwt**.
2. Set **Units** and **Precision**:
Units = Fractional **Precision = 1/4"**
3. Set **Drawing Limits**:
Lower Left corner = 0,0 Upper Right Corner = 12, 9
4. Make sure you use **Zoom / All** after setting Drawing Limits
5. Turn **OFF** the **Snap** and **Ortho**.
(Your cursor should move freely)
6. Draw the objects shown below using:
Circle, center radius (Use Layer = Object Line)
Line (Use Layer = Hidden Line)
Object snap = Quadrant
7. **Save** the drawing as: **EX4B**

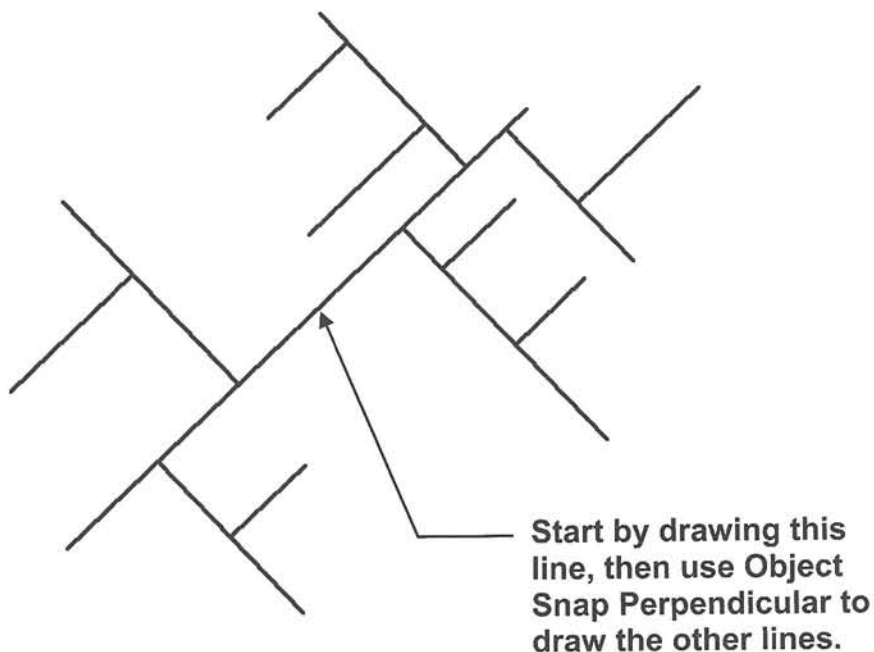


Use Layers:
Object Line and Hidden Line

EXERCISE 4C

INSTRUCTIONS:

1. Start a **NEW** file using **2013-Workbook Helper.dwt**.
2. Set **Units** and **Precision**:
Units = Architectural **Precision** = 1/2"
Note: A warning may appear asking you if you “are you sure you want to change the units? Select OK button.
3. Set **Drawing Limits**:
Lower Left corner = 0,0 Upper Right Corner = 25, 20
4. Make sure you use **Zoom / All** after setting Drawing Limits
5. Erase the Rectangle that appears with the template
6. Turn **OFF** the **Snap** and **Ortho**.
(Your cursor should move freely)
7. Draw the objects shown below using:
Line (Use Layer = Object Line)
Object snap = Perpendicular
8. **Save** the drawing as: **EX4C**



Use Layer = Object Line

EXERCISE 4D

INSTRUCTIONS:

1. Start a **NEW** file using **2013-Workbook Helper.dwt**.

2. Set **Units** and **Precision**:

Units = Decimals

Precision = 0.00

Note: A warning may appear asking you if you “are you sure you want to change the units? Select OK button.

3. Set **Drawing Limits**:

Lower Left corner = 0,0 Upper Right Corner = 12,9

4. Make sure you use **Zoom / All** after setting Drawing Limits

5. Turn **OFF Snap** and **Ortho**.

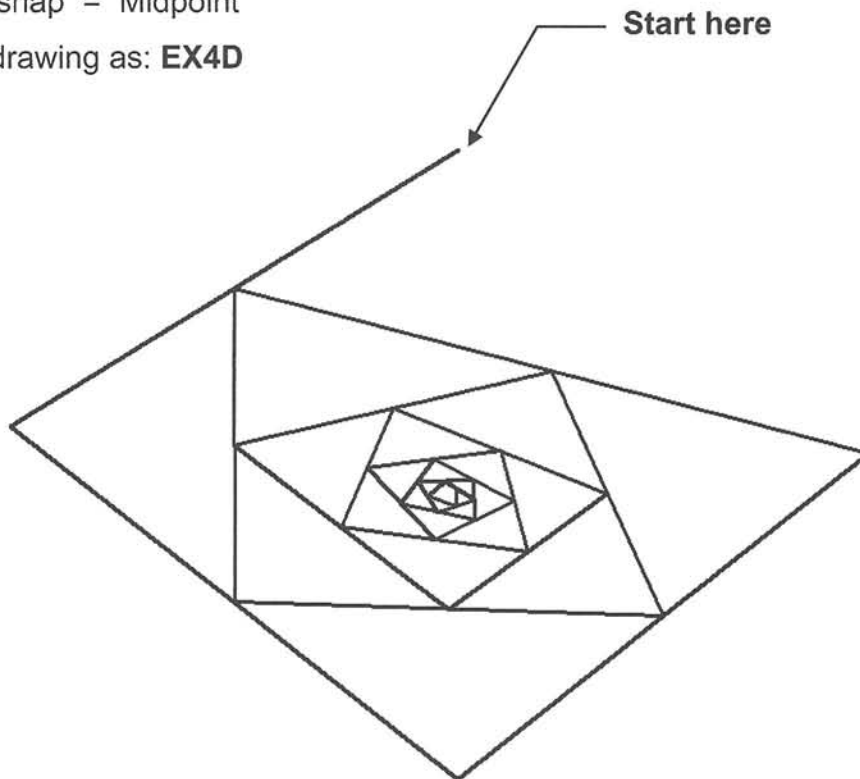
(Your cursor should move freely)

6. Draw the objects shown below using:

Line (Use Layer = Object Line)

Object snap = Midpoint

7. **Save** the drawing as: **EX4D**

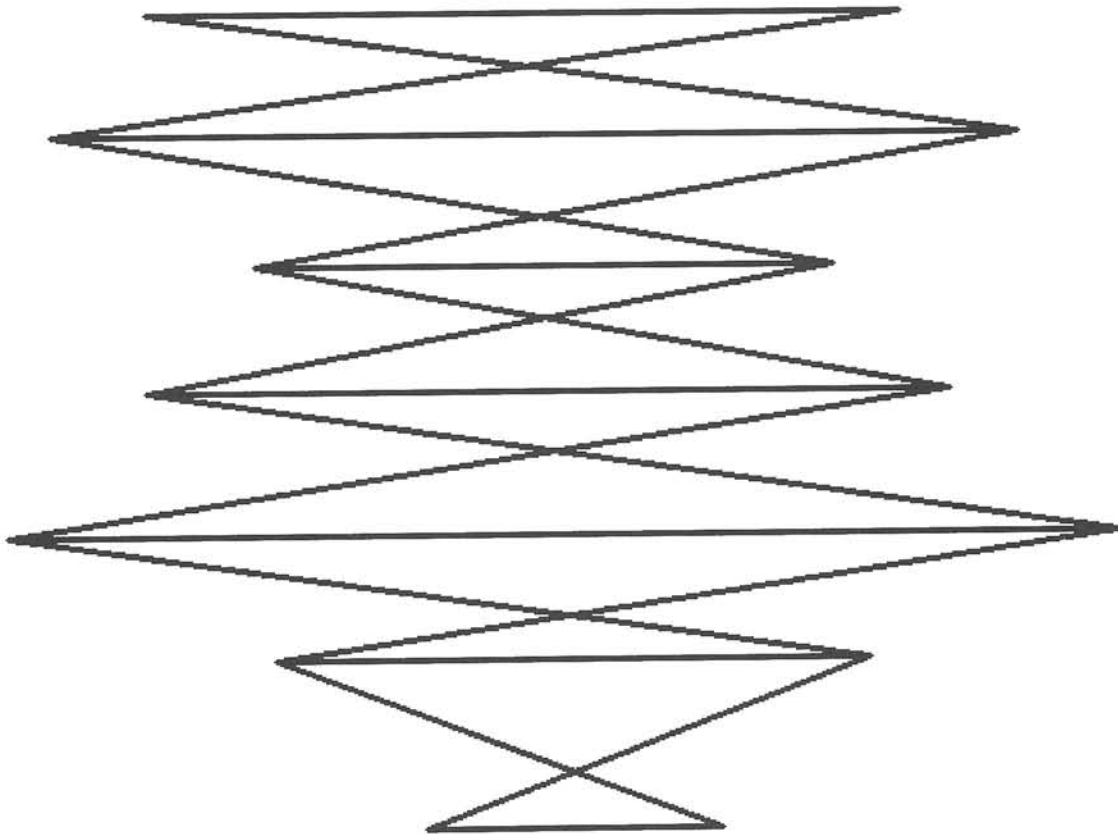


Use Layer = Object Line

EXERCISE 4E

INSTRUCTIONS:

1. Start a **NEW** file using **2013-Workbook Helper.dwt**.
2. Turn **OFF Snap**.
3. Turn **ON Ortho** for the Horizontal lines only.
4. Draw the Horizontal lines first with Ortho On
5. Turn Ortho Off and draw the angled lines using Object Snap Endpoint.
6. Draw the objects shown below using:
Line (Use Layer = Object Line)
Object snap = Endpoint
7. **Save** the drawing as: **EX4E**

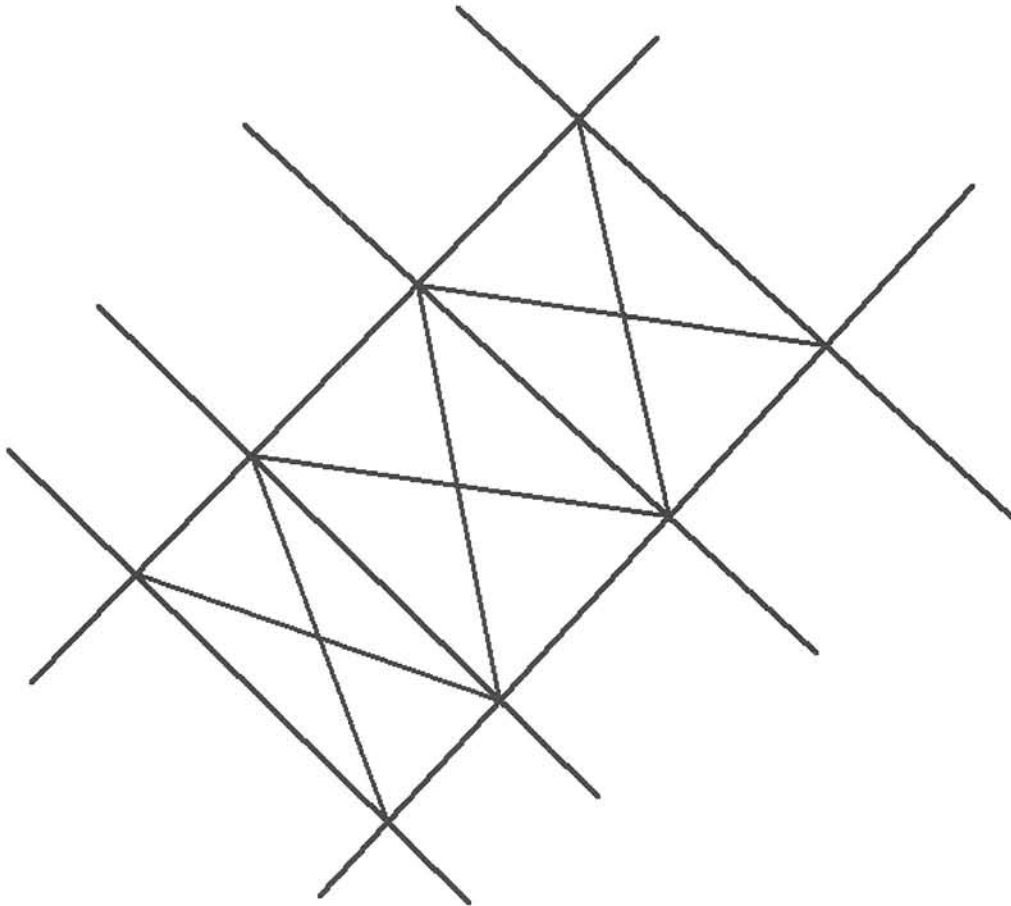


Use Layer = Object Line

EXERCISE 4F

INSTRUCTIONS:

1. Start a **NEW** file using **2013-Workbook Helper.dwt**.
2. Turn **OFF Snap** and **Ortho**.
3. Draw the objects shown below using:
Line (Use Layer = Object Line)
Object snap = Intersection
4. **Save** the drawing as: **EX4F**

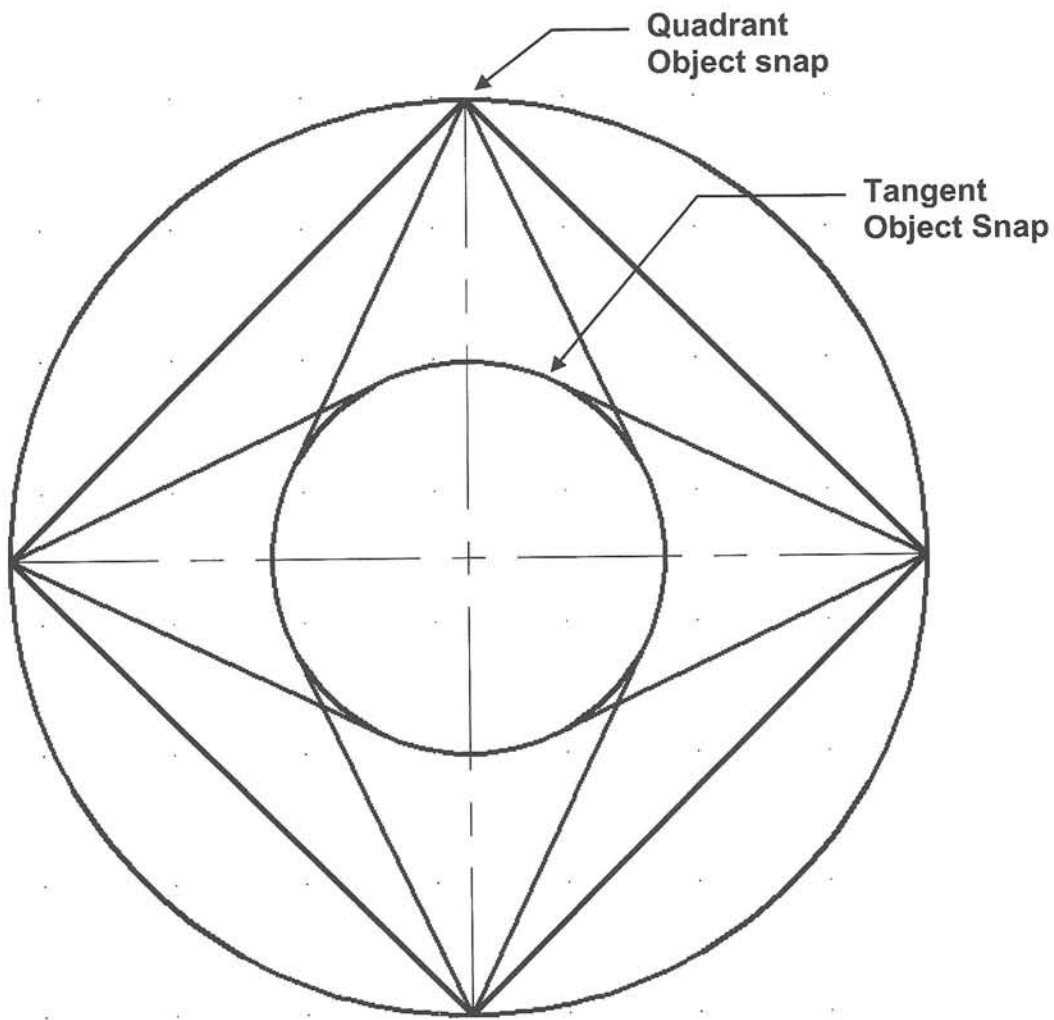


Use Layer = Object Line

EXERCISE 4G

INSTRUCTIONS:

1. Start a **NEW** file using **2013-Workbook Helper.dwt**.
2. Turn **OFF Snap** and **Ortho**.
3. Draw the 2 Circles on layer Object with the following Radii : 1.5 and 3.5.
(Use Object Snap: Center so both circles will have the same center)
4. Draw the Lines using **Layers: Object Line** and Centerline
5. Use **Object Snap** Quadrant and Tangent
6. **Save** the drawing as: **EX4G**



Use Layers = Object Line and Centerline

Notes: