

LESSON 4

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.

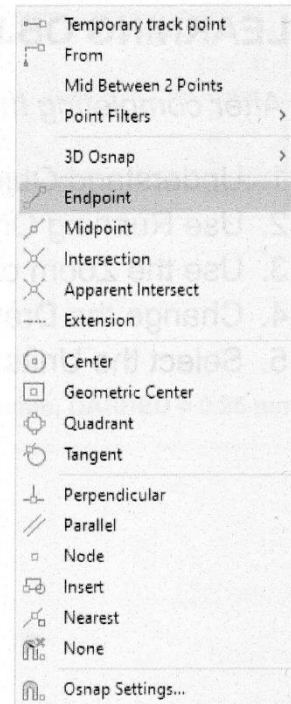
Object Snap

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 at right should appear.
3. Highlight and press the left mouse button to select an Object Snap.



The following Object Snaps will be discussed in this Lesson:

Endpoint, Midpoint, Intersection, Center, Geometric Center, Quadrant, Tangent, and Perpendicular. The remaining Object Snaps will be discussed in future lessons.

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.



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.

-  **CEN**ter 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.
-  **Geometric CE**nter Snaps to the centroid of any closed polylines and splines. Place the cursor anywhere on the object and the cursor will snap to the centroid of any closed polyline or spline.
-  **QUA**drant 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.
-  **TAN**gent Calculates the tangent point of an arc or circle. Place the cursor on the object as near as possible to the expected tangent point.
-  **PER**pendicular Snaps to a point perpendicular to the object selected. Place the cursor anywhere on the object, then pull the cursor away from the object and press the left mouse button.

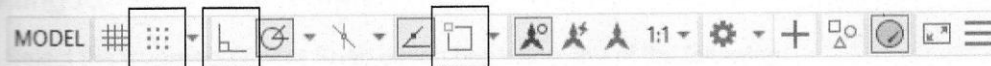


You may also type the **3 bold letters** shown rather than selecting from the menu. For example, type in **CEN** and then press **<Enter>** for the Center Snap.

How to Use Object Snap

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

1. Turn off **SnapMode**, **OrthoMode**, and **Object Snap** on the **Status Bar**. (Gray is **off**.)



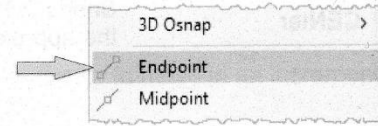
2. Select the **Line** command.
3. Draw two vertical lines as shown below (they don't have to be perfectly straight).



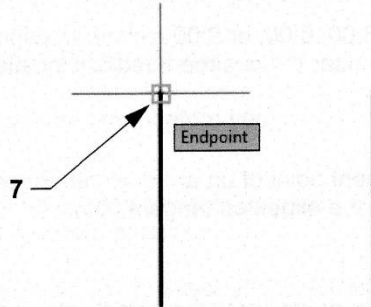
4. Select the **Line** command again.
5. Hold the **<Shift>** key down and press the right mouse button.

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6. Select the Object Snap **Endpoint** from the Object Snap Menu.

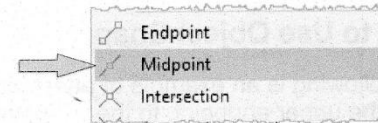


7. Place the cursor close to the upper endpoint of the left-hand line.

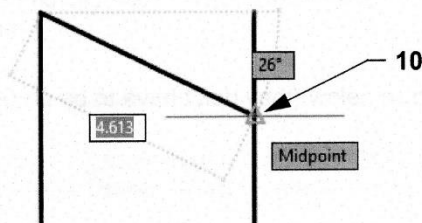


The cursor should snap to the end of the line like a magnet. A little square and an “**Endpoint**” tooltip will be displayed.

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.)
9. Now hold the **<Shift>** key down and press the right mouse button and select the **Midpoint** Object Snap option.

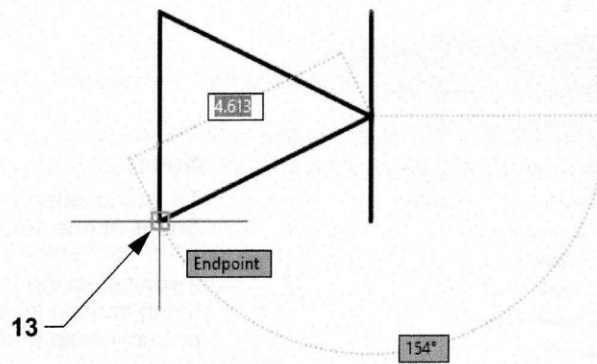


10. Move the cursor to approximately the middle of the right-hand vertical line.



The cursor should snap to the midpoint of the line like a magnet. A little triangle with a “**Midpoint**” tooltip will be displayed.

11. 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.)
12. Now hold the **<Shift>** key down and press the right mouse button and select the Object Snap **Endpoint** again.
13. 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 “**Endpoint**” tooltip will be displayed.

14. Press the left mouse button to **attach** the new line to the endpoint of the previously drawn vertical line.
15. 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 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.

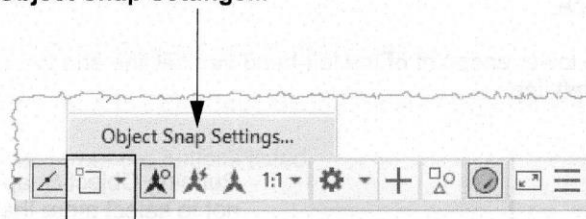
Setting Running Object Snap

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

Keyboard = **DS <Enter>**

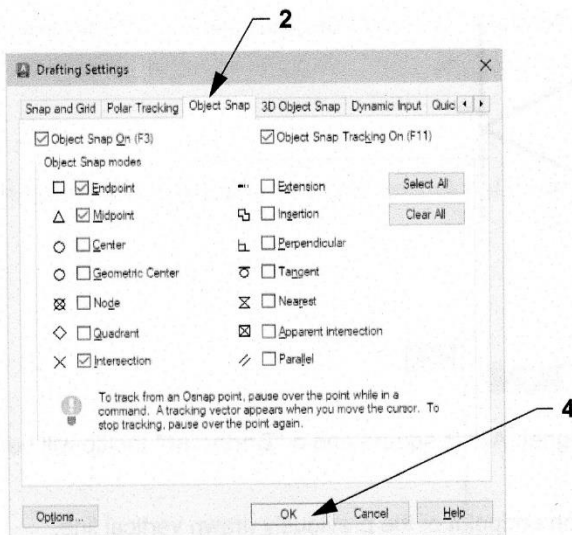
or

Status Bar = Left click on the **Object Snap** button down arrow ▼ and select **Object Snap Settings...**



2. Select the **Object Snap** Tab.
3. Select the Object Snaps desired.

(In the example on the next page, Object Snap **Endpoint**, **Midpoint**, and **Intersection** have been selected.)

**Note:**

Try not to select more than three or four Object Snaps at one time.

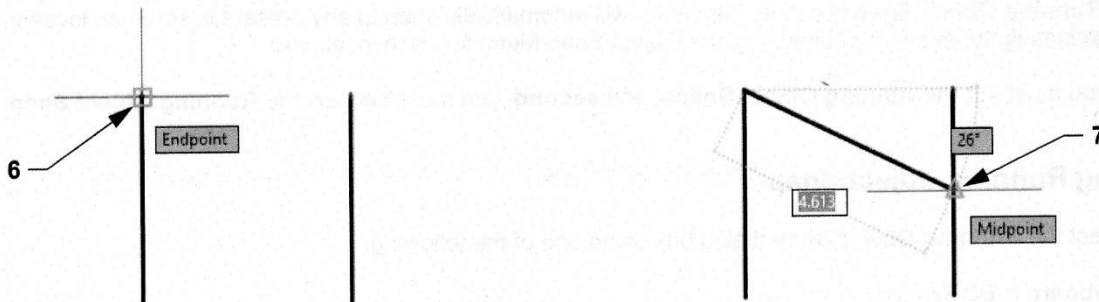
If you select too many, the cursor will flit around trying to snap to multiple snap locations. And possibly snap to the wrong location.

You will lose control and it will confuse you.

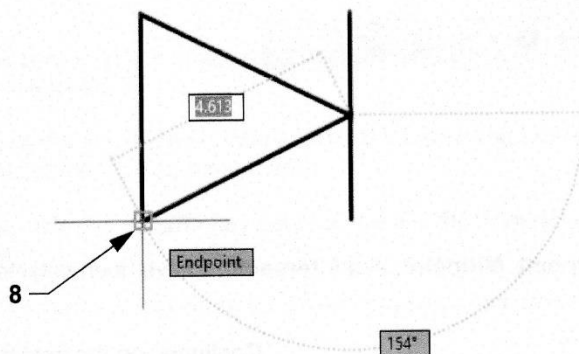
4. Select the **OK** button.
5. Turn on the **Object Snap** button on the **Status Bar**. (Blue is on.)



6. 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.



7. 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.
8. 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 not to select more than three or four 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 want to snap to a location that is not preset, just 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

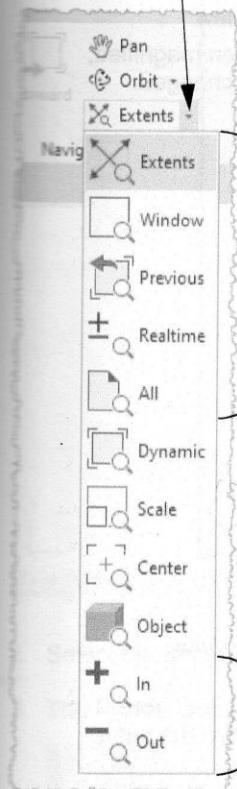
The **Zoom** command is used to move closer to or farther away from an object. This is called Zooming In and Out.

The Zoom commands are located on the **Navigate** Panel of the **View** Tab and are **off** by default. Select the **View** Tab, then right click on any Panel, select **Show Panels**, and activate the **Navigate** Panel. (To Show Panels, refer to page 1-11.)

1. Select the **Zoom** command by using the following:

Ribbon = View Tab / Navigate Panel

2. Select the ▼ down arrow 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.)

Realtime = 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 two times or out two times.

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

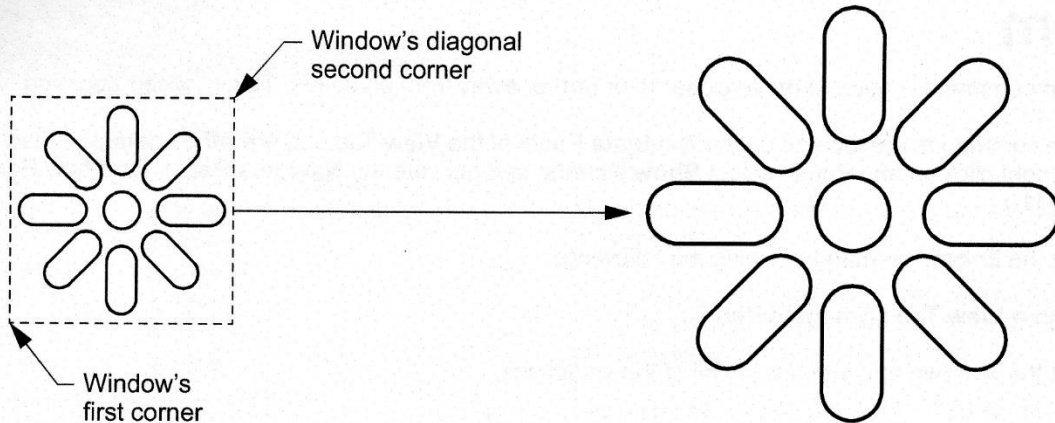
Right click and select Zoom from the Shortcut Menu. (Refer to page Intro-4 for right click settings.)

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

How to use Zoom / Window

1. Select **Zoom / Window**.
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 a diagonal corner.)

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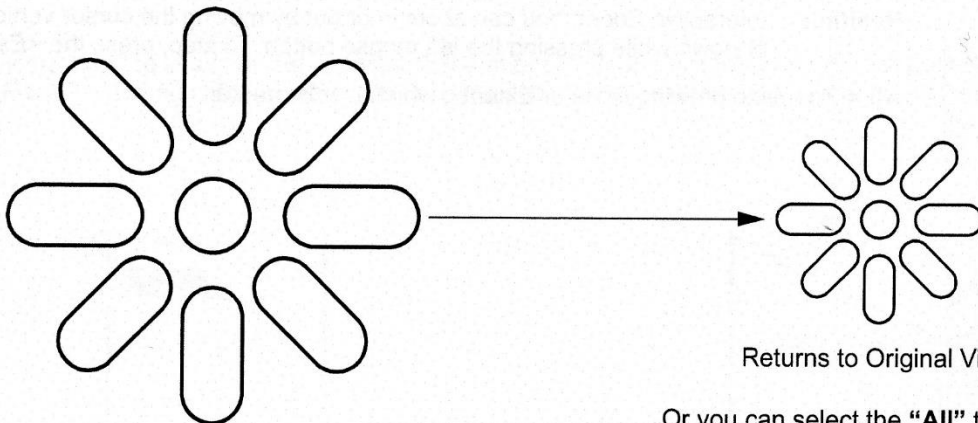


Magnified to this view

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**).



Returns to Original View

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 AutoCAD these decisions are called "**Setting the Drawing Limits, Units, and Precision**".

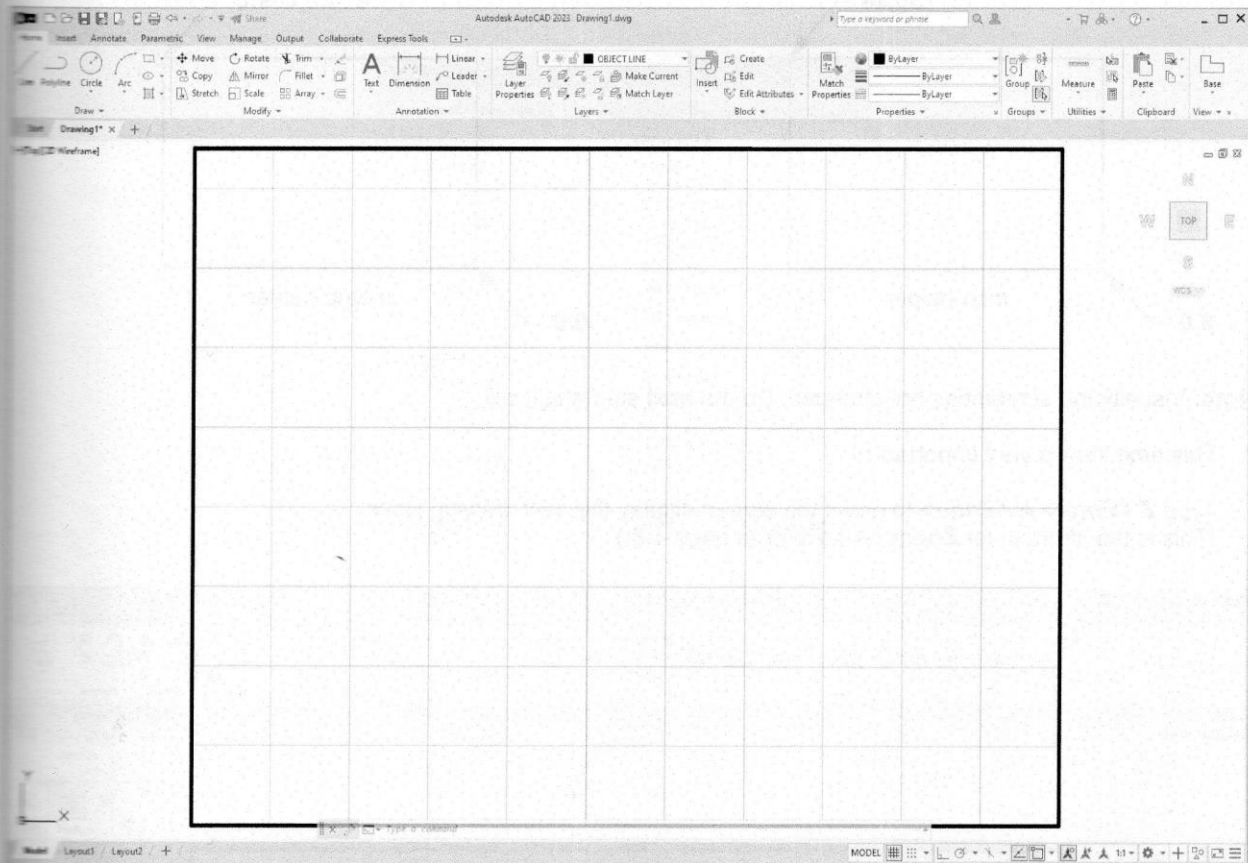
Drawing Limits

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" or 297 mm x 210 mm piece of paper would have a **lower left corner** of **0,0** and an **upper right corner** of **11, 8.5**, or 297, 210. (*11 or 297 is the horizontal measurement X axis, and 8.5 or 210 is the vertical measurement Y axis.*)

How to Set the Drawing Limits

Example:

1. Start a **New** drawing using either the **inch-helper.dwt** or the **metric-helper.dwt**. (Refer to page 2-5.)



2. Select the **Drawing Limits** command by typing **Limits** and then press **<Enter>**.

3. The following prompt will appear:

LIMITS Specify lower left corner or [ON OFF] <0.000,0.000>:

Displays the current lower left corner coordinates before change.

4. Type the X,Y coordinates **0,0 <Enter>** for the new lower left corner location of your piece of paper. Make sure you separate the two figures with a comma.

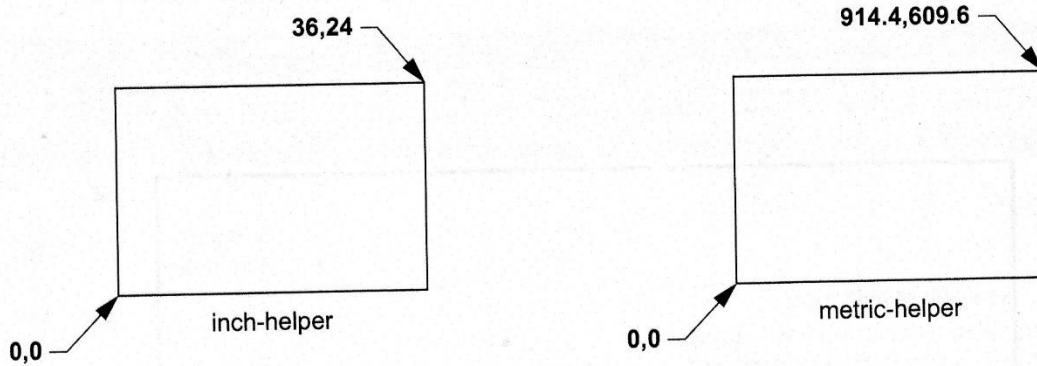
5. The following prompt will appear:

LIMITS Specify upper right corner <11.000,8.500>:

Displays the current upper right corner coordinates before change.

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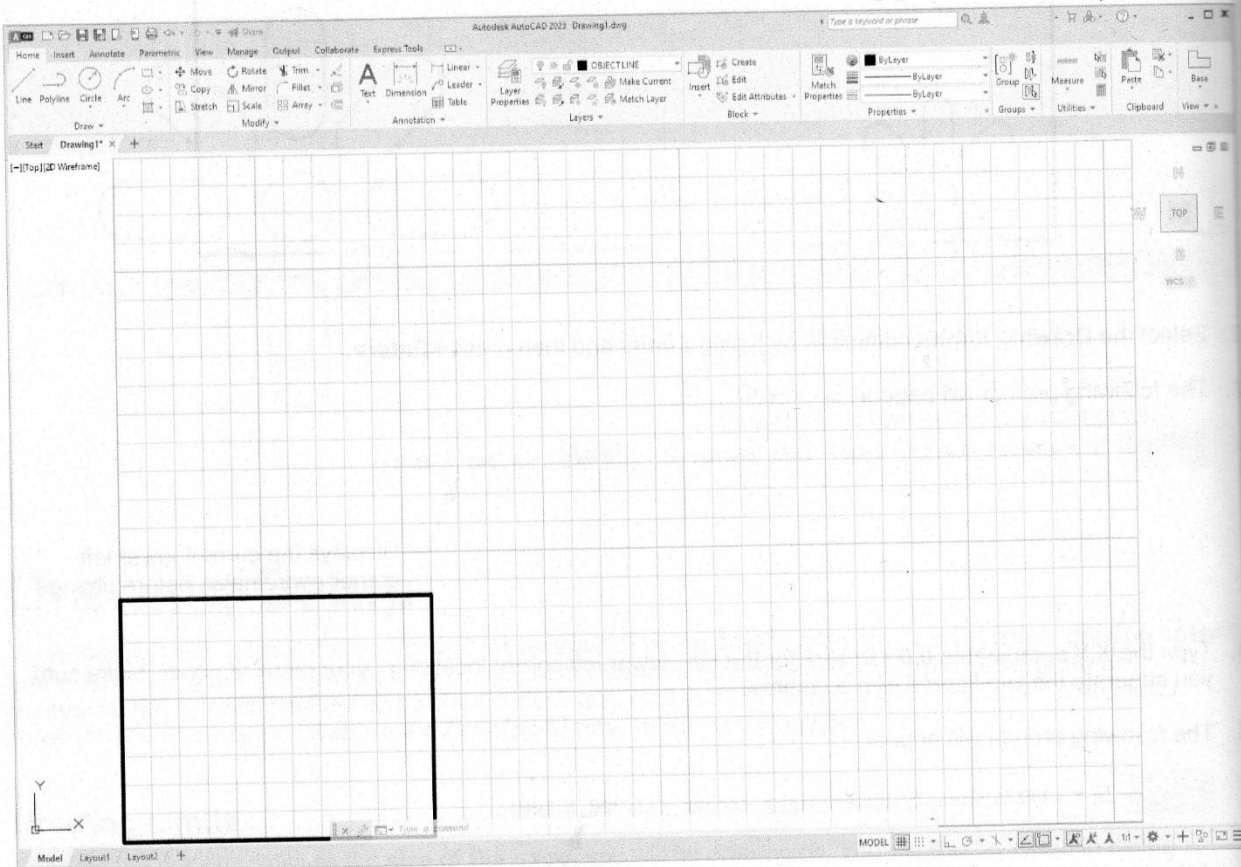
6. Type the X,Y coordinates **36,24 <Enter>** if you are using the **inch template**, or **914.4,609.6 <Enter>** if you are using the **metric template**, for the new upper right corner of your piece of paper. Make sure you separate the two figures with a comma.



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

7. This next step is very important:

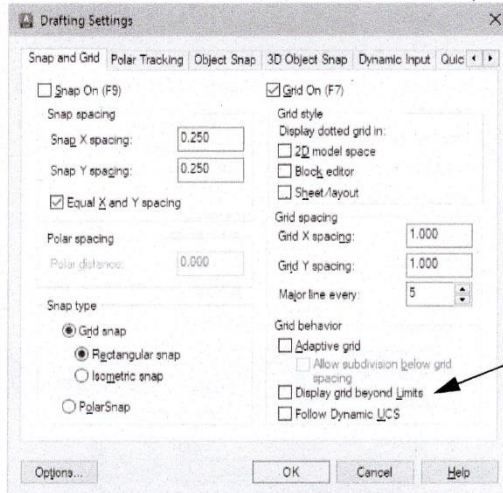
Type **Z <Enter> A <Enter>** to make the screen display the new drawing limits.
(This is the shortcut for **Zoom / All**. Refer to page 4-8.)



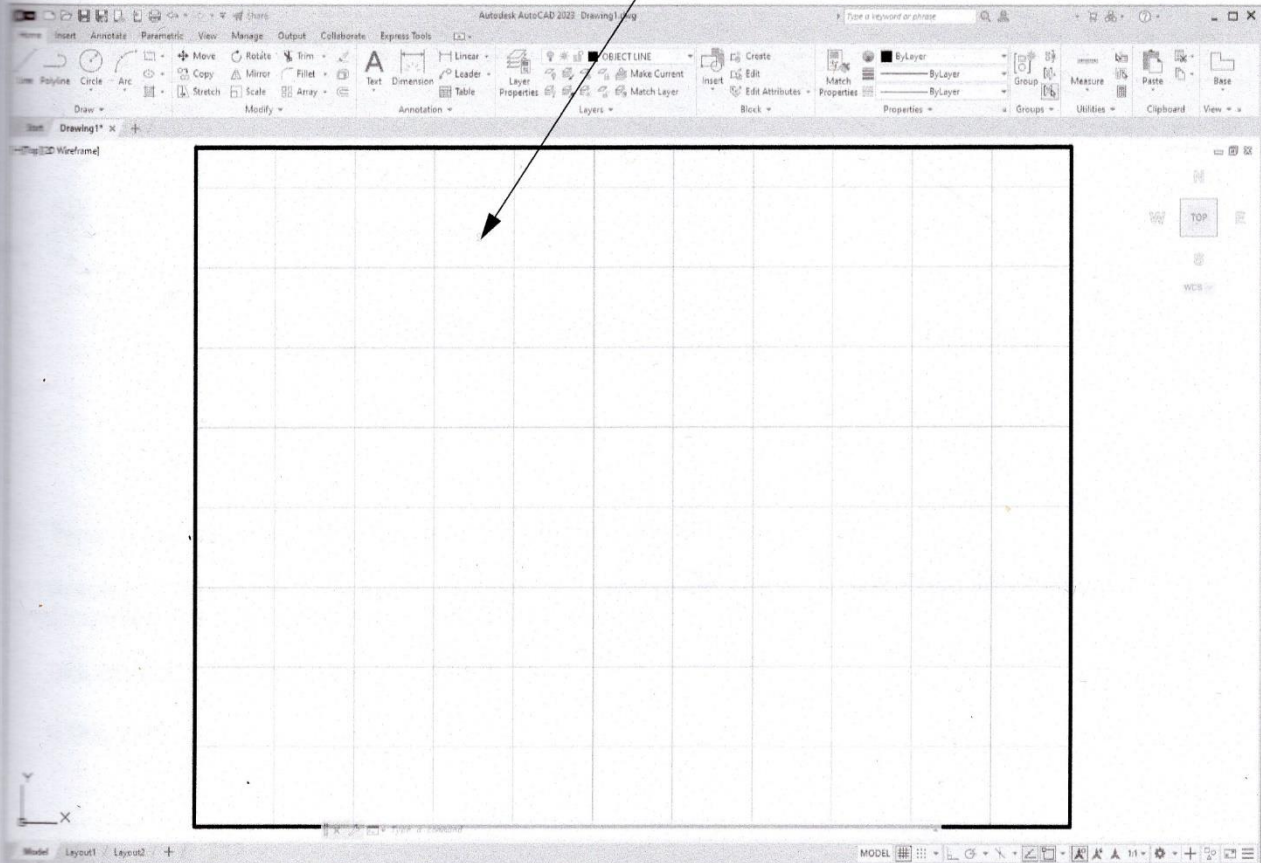
The drawing limits (area) are now 36" or 914.4 mm **wide** X 24" or 609.6 mm **high**. The rectangle did not change size or location, but the drawing area around it got larger so the rectangle appears to have moved and gotten smaller. Think about it.

Grids within Limits

If the Grid behavior setting is **Display grid beyond Limits** (no check mark), it is turned **off** and the grids will only be displayed within the Limits that you set.

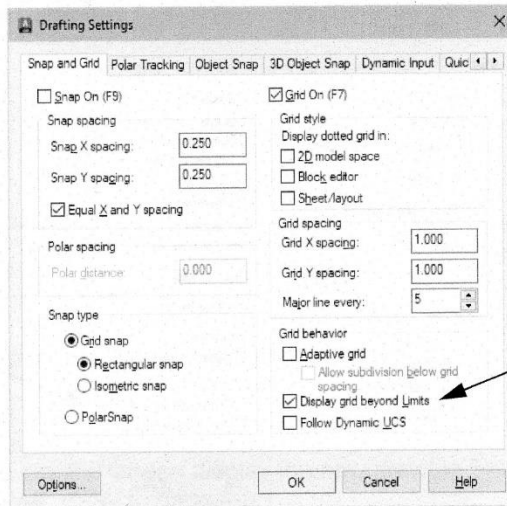


Grids displayed within Limits only.

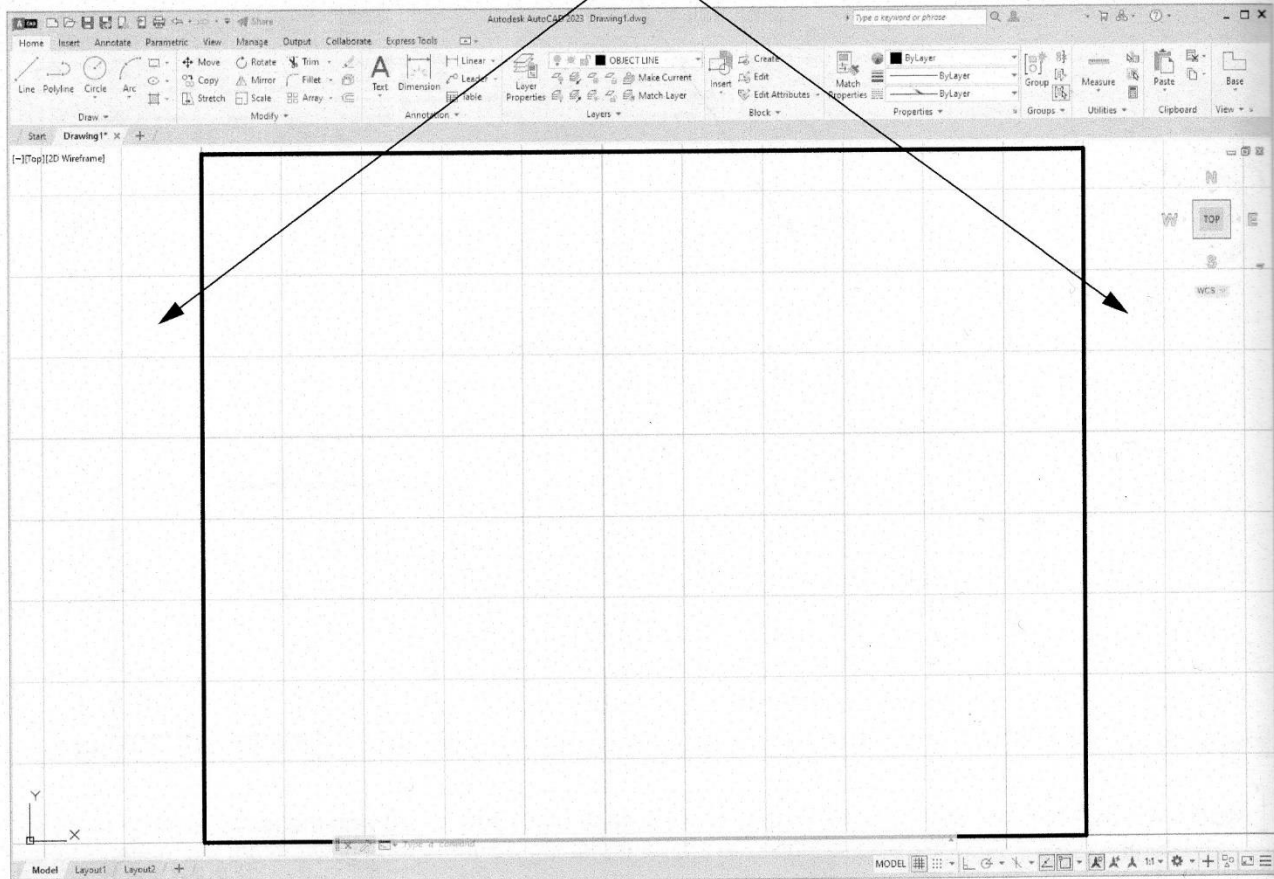


Grids beyond Limits

If the Grid behavior setting is **Display grid beyond Limits** (check mark), it is turned on and the grids will be displayed beyond the Limits that you set.



Grids displayed beyond Limits.



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".

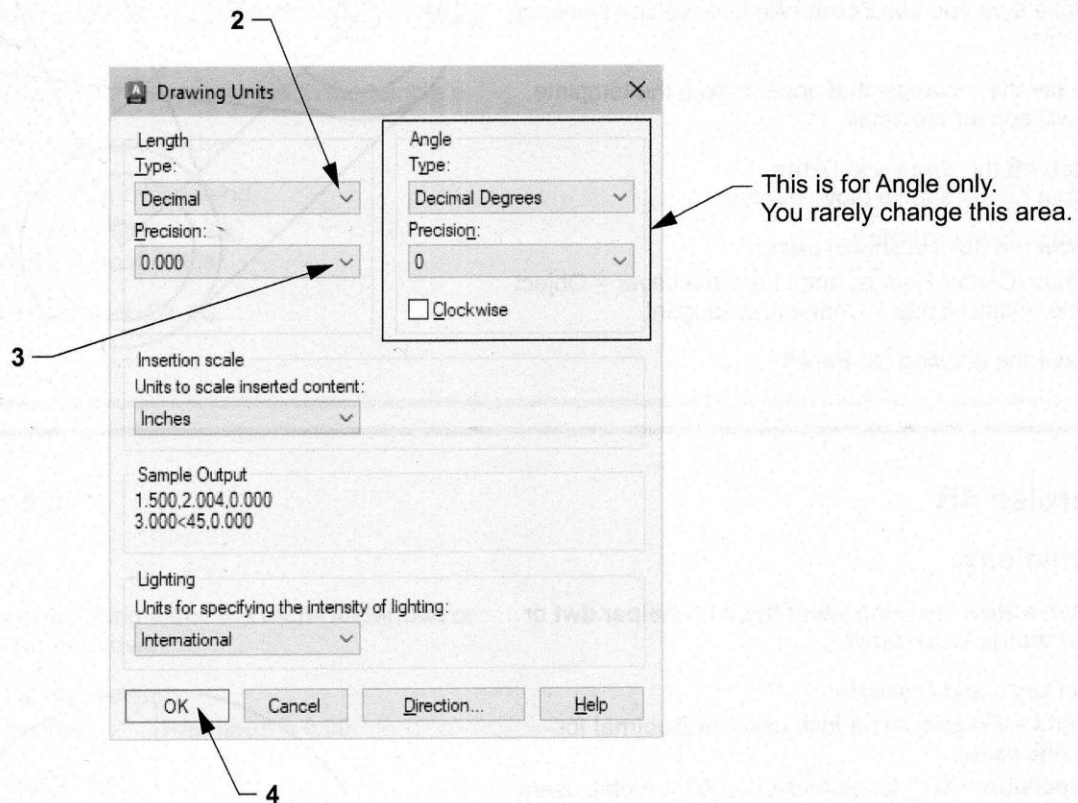
How to Set the Units and Precision

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: **Decimal** 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?