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1.8 - LAYERS, DIMENSIONING AND TEXT - OH MY!

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Topics covered in this Lesson:

Layer, Text, Dimensioning, Scale

Now that you've learned a lot of the drawing and modifying commands, it's time to go to the next level. This lesson will introduce you to text, dimensioning and the concept of layers. What you will do is take one of your previous assignments, save it to a new name and then add text and dimensions to it. These are the commands you'll be learning.

Command	Keystroke	Icon	Menu	Result
Layer	Layer / LA		<u>F</u> ormat > <u>L</u> ayer	Starts the Layer and Linetype property dialog box
Text	Text	No Icon	<u>D</u> raw > Single Line <u>T</u> ext	Creates a single line of text
Dimension	Dim	Many	<u>D</u> imension > (<i>pick one</i>)	Dimensions previously drawn objects
Scale	Scale / SC		<u>M</u> odify > <u>S</u> cale	Proportionately resizes (or scales) objects

Begin by opening up [Assignment #5](#) from your CAD folder.

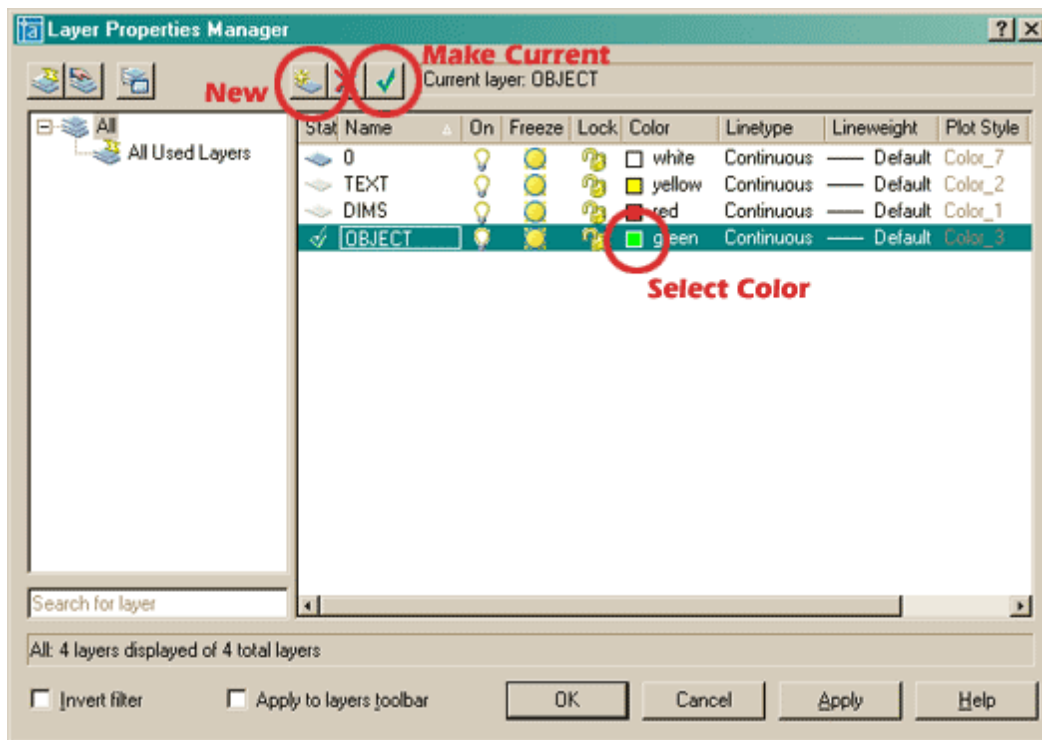
Using the **SAVE AS**  option, immediately save it under the name Assign6.dwg

Click [HERE](#) for the GIF version of the file.

Click [HERE](#) for the DWG version.

The first thing you want to do is create three **layers**. Layers are used to organize drawings. Imagine a large project for a high-rise tower. The designers would create layers for the electrical, plumbing, landscape and more. It is necessary to control the drawing and turn some layers off and view only the ones you want. This is one reason why layers are needed. But if you were to use AutoCAD professionally, every drawing you dealt with would have layers.

You will be creating a layer for the dimensions, one for the lines (objects that were drawn) and another for the text. Start the **LAYER** command (**LA**). This will bring up the Layer Properties Manager (shown below). We'll cover the things that are used most often in this lesson.



Looking at the Dialog Box, you will see a lot of information. Notice the button beside **Make Current** on it. Below it is the name of the current layer you are drawing on. The main window gives you information about each particular layer. At this point, you want to be concerned with the 'Name', 'On' (light bulb) and 'Color' (colored square) columns as well as the 'New' button.

Now you have the dialog box on your screen, click the **'New'** button. This will create a new layer and give you an opportunity to name it. Name this layer **TEXT**. Click on the small box towards the right and select **yellow** for the color. Create another layer and call this one **DIM** (for dimensions), and make its color **red**. Finally, create a third layer and call it **OBJECT** and make its color **green**. You have just created three new layers in your drawing. Highlight the TEXT layer and then press the 'Make Current' button. This makes the TEXT layer current and anything you draw will be placed on that layer. Your Dialog box should look like the one above. If it does, press **OK** to close the dialog box.

More about Layers

In the Layer Properties Manager, you will notice that each layer can have a number of specific properties.

Status	Name	On	Freeze	Lock	Color	Linetype	Lineweight	Plot	Plot Description
	Defpoints					Continuous	Default	Color_7	
	0					Continuous	Default	Color_7	
	OBJECTS					Continuous	Default	Color_3	
	DIMENSIONS					Continuous	Default	Color_1	

- Status: Displays the current state of the layer. In this example, the green check means that Objects is the current layer.
- Name: The name of the layer. Give layers understandable names.
- On: If a layer is 'On' it means that it is visible (but objects can still be erased when the 'Select > All' option is used).
- Freeze: A layer is not visible and cannot be deleted.
- Lock: Layer is visible, but cannot be modified.
- Color: A specific color for everything on that layer.
- Linetype: A specific linetype (hidden, center, etc) for the layer.
- Lineweight: The visible width of the objects on that layer.
- Plot: A defined color for the plotter to use on that layer.
- Plot (yes, two columns use the same name: Switch on or off if that layer is plotted.
- Description: A user-defined description for the layer.

ADDING TEXT

TEXT is your current drawing layer now, so what you will be doing is creating some text now. Type in **TEXT** on the command line. Look at the command line.

Command: `text`
Justify/Style/<Start point>:

The first thing AutoCAD wants is a starting point for the text. Type: `0,0` to place it at the bottom left corner of your drawing. Notice that there are other options you could make, but ignore them for now.


Height <0.2000>:

Next, AutoCAD wants to know how tall you want your letters to be. For this assignment, you want them to be 1/4" tall. Type in `.25` at the Height prompt.

Rotation angle <0>:

One more thing before you start typing in text, tell AutoCAD if you want to have your text rotated. Not this time, so press <ENTER> to accept the default of 0 degrees.

Text: `(YOUR NAME - ASSIGNMENT #6)`

Finally you can type in what you want to put on the drawing. At the prompt, type your **NAME** and **ASSIGNMENT #6**  then press <ENTER>.

You will see that AutoCAD has placed your name in the bottom left corner at 1/4" high and in yellow on the 'Text' layer.

You don't really want your name jammed into the corner like that so move it up and over 1/8" (*Remember your **MOVE** command and relative points: `@.125,.125`*)

Now it's time to start dimensioning your drawing. Bring up the Layer dialog box and make **DIM** your current layer.

This is one time when I recommend to use the icons. Dimensioning is A LOT easier this way. If you don't see your dimensioning toolbar on the screen, right click on one of your toolbar icons and check the Dimension checkbox. You'll see the toolbar appear. Close the Toolbars dialog box.

There are several different types of dimensions, here are the ones you'll be using in this lesson (Each of the dimensioning icons gives you a quick clue as to which type of dimension it will create.) The image below shows you the standard dimensioning icons. This list below shows you which dimension types you will use in this lesson (Place your mouse on the toolbar icons to see what they represent).



Here are the ones you'll be using in this lesson.

Linear dimensions are used for dimensioning either horizontal or vertical distances.

Aligned dimensions will measure the actual length of an angled line.

Radius dimensions will give you the radius of either arcs or circles.

Diameter dimensions are used on circles.

Angular dimensions will measure the angle between two lines that you pick.

Baseline dimensions are a special type that will automatically stack dimensions along one plane as you pick points.

The type of dimension you pick will depend entirely upon what information you want to convey to the person reading the drawing. Look at the sample drawing and pick out the different types of dimensions and where they are used.

We'll start with the most common (and easiest): **Linear Dimensions**. You'll use this type to add dimensions to the rectangle in the bottom left of your drawing. Pick on the icon and then look at the command line.

Command: _dimlinear

Specify first extension line origin or <select object>:

It asks for either the origin of the first dimension line (a starting point) or you can press <ENTER> to select a particular line. Turn your **OSNAPS** on to endpoint only. Pick the top left corner of the rectangle. AutoCAD then asks for the second extension line origin. Pick the top right corner. You'll then see the dimension appear and AutoCAD asks for the *Dimension line location*. Pick somewhere just above the line where you think it fits well.

AutoCAD then shows you the length that it found to be the length of the line you just dimensioned. The following lines show what you should have seen on your command line:

Specify second extension line origin: <SELECT TOP RIGHT CORNER>

Specify dimension line location or

[Mtext/Text/Angle/Horizontal/Vertical/Rotated]: <PICK ABOVE THE LINE>

Dimension text = 3.000

Now dimension the line on the left side using the same method.

Now you want to dimension the radius of the fillet on the object above the first box. Pick the icon for **radius dimension**. AutoCAD asks you to select an arc or circle. Pick the arc on the top left corner. Again AutoCAD

then wants you to pick the dimension line location. Pick anywhere outside the arc where the dimension fits well.

Looking at the top left object on the sample sheet, notice that there are a few ways to dimension the corners. Start on the bottom left. Pick the **Linear Dimension** icon. Instead of picking the two endpoints, press <ENTER> and AutoCAD will ask you to select the object you want to dimension. Pick on the angled line in the bottom left corner. As you move your cursor around, you'll see that you could place it either to the left or below the line. Choose one or the other and place your dimension. Repeat these steps to add the other dimension.

At the top left, you want to add an **Aligned dimension**. Pick the icon for this. As with the linear dimensions, you can either pick the endpoints or press <ENTER> to choose an object. When you're asked to place the dimension, you'll see that you can only move parallel to the line that you picked. Place the dimension line somewhere outside the object.

Now you're going to dimension the angle on the bottom right corner of the top box. Pick the **Angular dimension** icon. Pick the bottom line and then the angled line in the bottom right corner. Place the dimension so that it looks like the one in the sample.

Now it's time to dimension the circle. Pick the icon for the **Diameter dimension**. AutoCAD then wants you to select the arc or circle. Pick anywhere on the circle. Then you have to place the dimension line somewhere. Pick a good spot for it.

Dimension the 1" line in the circle as shown using a linear dimension.

Dimension the top left box of the array as shown using **Linear dimensions**.

Dimension the space (0.75) between the two rows by picking the endpoints of the lines.

Dimension the space (0.75) between the columns as shown.

Now for the tricky part. You want to add baseline dimensions to the column distance dimension you just created. Pick the icon for the baseline dimensions. Look at the command line:

You may be asked to select the base dimension. If so, pick on the 0.75 dimension for the column. Then you're asked to **Specify a second extension line origin**. Pick where **P1** shows you on the sample drawing. AutoCAD then will get you to keep repeating this process until you press <ENTER> to end the command. Pick near **P2** to continue, then press <ENTER>. This is what your command line should have looked like:

```
Command: _dimbaseline
Select base dimension:
Specify a second extension line origin or (Undo/<Select>): <pick P1>
Dimension text = 1.50
Specify a second extension line origin or (Undo/<Select>): <pick P2>
Dimension text = 2.00
Specify a second extension line origin or (Undo/<Select>): <ENTER>
```


Your drawing should now look similar to the sample drawing. Check to see if you missed any dimensions.

Now you have dimensioned the drawing, save it and [print](#) it.

Next you want to copy everything over 12" to the right. Start the **COPY** command, and when asked to select objects, type **ALL** <ENTER>. Then copy it all 12" to the right.

What you want to do next is scale the copy of everything to double its existing size. Start the **SCALE** command. When asked to select objects, draw a window around the **new** set of objects and press <ENTER>. When asked for a base point, pick the bottom left corner of the border. Enter **2** for the scale factor. Your command line should look like this:

Command: sc
SCALE
Select objects: Other corner: 38 found
Select objects:<ENTER>
Base point:<PICK THE BOTTOM LEFT CORNER>
<Scale factor>/Reference: 2 <ENTER>

Perform a Zoom Extents (type **Z** <ENTER> **E** <ENTER>) at the command line. Now that everything is twice as large, Zoom in on your dimensions and you'll see that they have automatically adjusted to the new sizes! This is called *associative dimensioning*. 

There are many different parameters you can change to get just the right look for your dimensions and text (use the **DDIM** command). This is will not be covered in this course.

For practice, you can try dimensioning some of your other assignments.

Even if your drawing is 100% accurate, it is still only as good as the dimensions. Some common mistakes when dimensioning are:

- Not using your Osnaps. If you don't get the exact endpoint of a line, then your dimension is wrong.
- Snapping to the wrong point. In detailed drawings, this can be easy to do if you aren't paying attention.
- Incomplete dimensions. If you miss one or two dimensions, you can delay the project while these numbers are located, new drawings made, delivered, etc..
- Confusing dimensions. Make sure that your dimensions don't overlap, or aren't too close, or otherwise unclear.



[View the video for Assignment 6 .](#)

For dimensioning practice, dimension the extra lessons from the previous lessons. Also put objects and dimensions on separate layers.

[Extra_001.gif](#) [Extra_002.gif](#) [Extra_003.gif](#) [Extra_004.gif](#) [Extra_005.gif](#)
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