

## **LEARNING OBJECTIVES**

*After completing this lesson, you will be able to:*

1. Understand the Origin
2. Draw objects accurately using Coordinate Input
3. Input Absolute and Relative coordinates
4. Input using Direct Distance Entry
5. List information about an object
6. Measure the distance between two points
7. Identify a location within the drawing
8. Create your own 8-1/2 x 11 Master Border
9. Print from Model Space

# **LESSON 9**

# COORDINATE INPUT

In the previous lessons you have been using the cursor to place objects. In this lesson you will learn how to place objects in specific locations by entering coordinates. This process is called **Coordinate Input**.

***This is not difficult, so do not start to worry.***

Autocad uses the **Cartesian Coordinate System**.

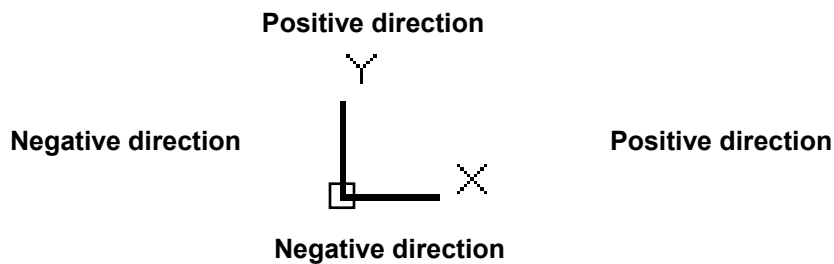
The Cartesian Coordinate System has 3 axes, X, Y and Z.

The **X** is the Horizontal axis. (*Right and Left*)

The **Y** is the Vertical axis. (*Up and Down*)

The **Z** is Perpendicular to the X and Y plane.

(The **Z** axis, which will be discussed in the Advanced workbook.)



Look at the User Coordinate System (UCS) icon in the lower left corner of your screen. The X and Y are pointing in the positive direction.

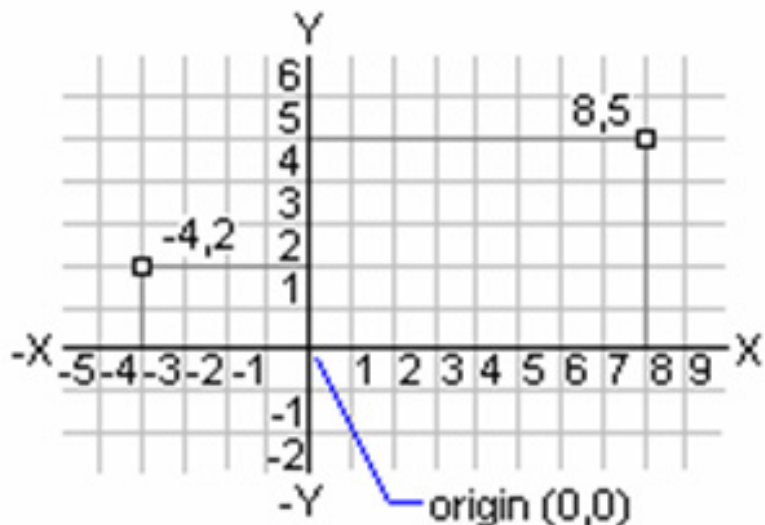
The location where the X , Y and Z axes intersect is called the **ORIGIN**.

The **Origin** always has a coordinate value of  $X=0$ ,  $Y=0$  and  $Z=0$  (0,0,0)

When you move the cursor away from the Origin, in the positive direction , the X and Y coordinates are positive.

When you move the cursor in the opposite direction, the X and Y coordinates are negative.

Using this system, every point on the screen can be specified using positive or negative X and Y coordinates.



# ABSOLUTE COORDINATES

There are 3 types of Coordinate input, **Absolute**, **Relative** and **Polar**.

(Relative is discussed on the next page and Polar will be discussed in Lesson 11)

## ABSOLUTE COORDINATES

When inputting absolute coordinates the input format is: **X, Y** (that is: X comma Y)

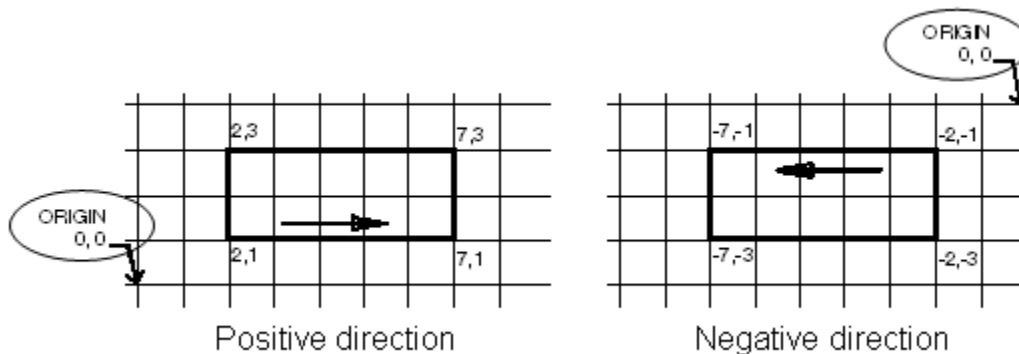
Absolute coordinates come **from the ORIGIN** and are typed as follows: **8, 5**

The first number (8) represents the **X-axis** (horizontal) distance from the Origin and the second number (5) represents the **Y-axis** (vertical) distance from the Origin. The two numbers must be separated by a **comma**.

An absolute coordinate of **4, 2** will be **4** units to the right (horizontal) and **2** units up (vertical) from the current location of the Origin.

An absolute coordinate of **-4, -2** will be **4** units to the left (horizontal) and **2** units down (vertical) from the current location of the Origin.

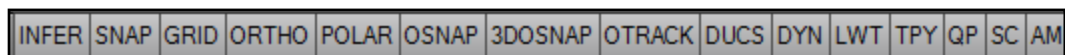
The following are examples of Absolute Coordinate input.  
Notice where the Origin is located in each example.



### Very important:

While working on Lessons 9 and 10 it is best to **turn off** Dynamic Input.

**DYN**, on the status bar, should be gray.



Refer to Lesson 11 for more information on Dynamic Input.

# RELATIVE COORDINATES

## RELATIVE COORDINATES

Relative coordinates come **from the last point entered**. (Not from the Origin)

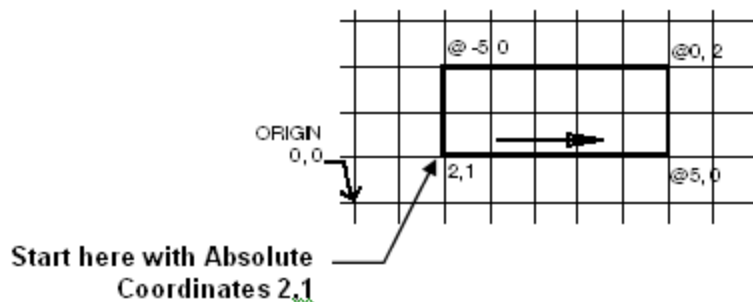
The first number represents the **X-axis** (horizontal) and the second number represents the **Y-axis** (vertical) just like the absolute coordinates.

To distinguish the relative coordinates from absolute coordinates the two numbers must be preceded by an @ symbol in addition to being separated by a **comma**.

A Relative coordinate of **@5, 2** will go to the **right 5 units** and **up 2 units** from the last point entered.

A Relative coordinate of **@-5, -2** will go to the **left 5 units** and **down 2 units** from the last point entered.

The following is an example of Relative Coordinate input.



### Very important:

While working on Lessons 9 and 10 it is best to **turn off** Dynamic Input.

**DYN**, on the status bar, should be gray.

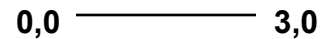


Refer to Lesson 11 for more information on Dynamic Input.

# EXAMPLES OF COORDINATE INPUT

## Scenario 1.

If you want to draw a line with the first endpoint “at the Origin” and the second endpoint 3 units in the positive X direction.



1. Select the Line command.
2. You are prompted for the first endpoint: **Type 0, 0 <enter>**
3. You are then prompted for the second endpoint: **Type 3, 0 <enter>**

### **What did you do?**

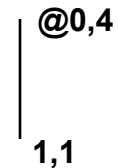
The first endpoint coordinate input, 0,0 means that you do not want to move away from the Origin. You want to start “ON” the Origin.

The second endpoint coordinate input, 3, 0 means that you want to move 3 units in the positive X axis. The “0” means you do not want to move in the Y axis. So the line will be exactly horizontal.

## Scenario 2.

You want to start a line 1 unit to the right of the origin and 2 units above and the line will be 4 units in length, perfectly vertical.

1. Select the Line command.
2. You are prompted for the first endpoint: **Type 1, 1 <enter>**
3. You are prompted for the second endpoint: **Type @0, 4 <enter>**



### **What did you do?**

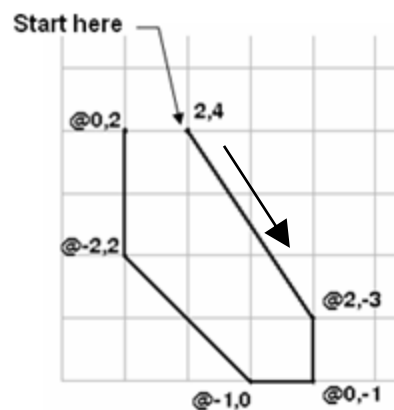
The first endpoint coordinate input, 1, 1 means you want to move 1 unit in the X axis direction and 1 unit in the Y axis direction.

The second endpoint coordinate input @0, 4 means you do not want to move in the X axis “from the last point entered” but you do want to move in the Y axis “from the last point entered. (Remember the @ symbol is only necessary if you are not using DYN )

## Scenario 3.

Now try drawing 5 connecting line segments. (Watch for the negatives)

1. Select the Line command.
2. First endpoint: 2, 4 <enter>
3. Second endpoint: @ 2, -3 <enter>
4. Second endpoint: @ 0, -1 <enter>
5. Second endpoint: @ -1, 0 <enter>
6. Second endpoint: @ -2, 2 <enter>
7. Second endpoint: @ 0, 2 <enter> <enter>



**Note:** If you enter an incorrect coordinate, just select the undo arrow and the last segment will disappear and you will have another chance at entering the correct coordinate.

# DIRECT DISTANCE ENTRY (DDE)

**DIRECT DISTANCE ENTRY** is a combination of keyboard entry and cursor movement. **DDE** is used to specify distances in the horizontal or vertical axes from the last point entered. **DDE is a *Relative Input***. Since it is used for Horizontal and Vertical movements, **Ortho** must be **ON**.

*(Note: to specify distances on an angle, refer to Polar Input in Lesson 11)*

Using DDE is simple. Just move the cursor and type the distance. Negative and positive is understood automatically by moving the cursor up (positive), down (negative), right (positive) or left (negative) from the last point entered. No minus or @ sign necessary.

Moving the cursor to the right and typing 5 <enter> tells AutoCAD that the 5 is positive and Horizontal.

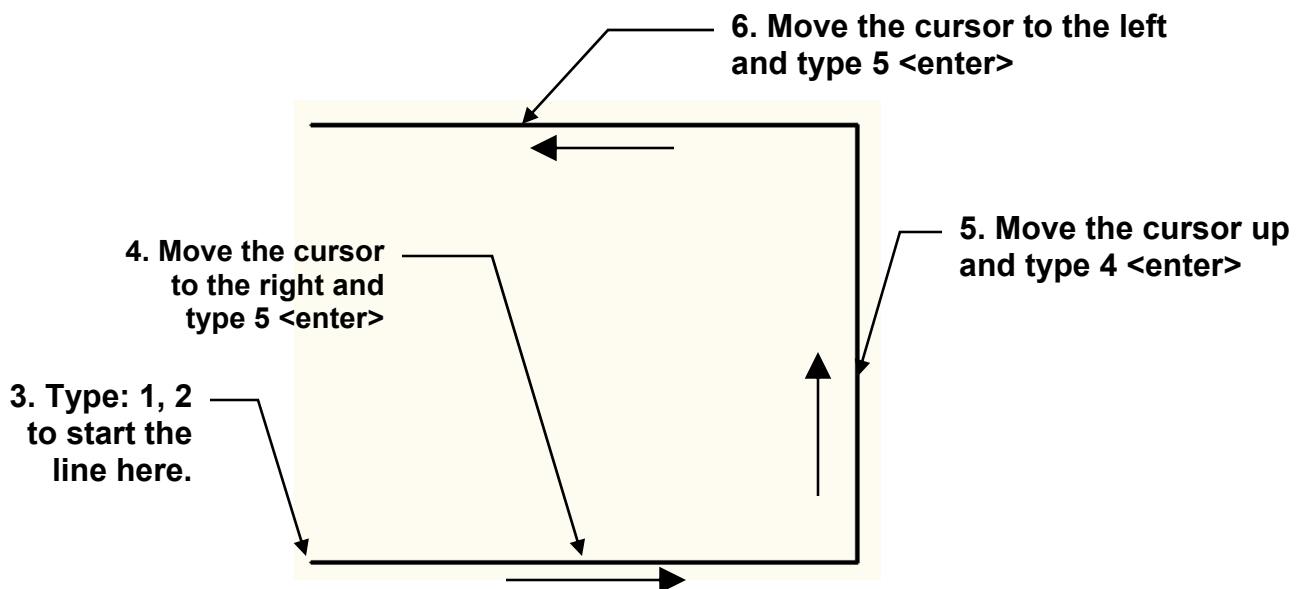
Moving the cursor to the left and typing 5 <enter> tells AutoCAD that the 5 is negative and Horizontal.

Moving the cursor up and typing 5 <enter> tells AutoCAD that the 5 is positive and Vertical.

Moving the cursor down and typing 5 <enter> tells AutoCAD that the 5 is negative and Vertical.

## EXAMPLE:

1. Ortho must be ON. Grid OFF
2. Select the Line command.
3. Type: 1, 2 <enter> to enter the first endpoint using Absolute coordinates.
4. Now move your cursor to the right and type: 5 <enter>
5. Now move your cursor up and type: 4 <enter>
6. Now move your cursor to the left and type: 5 <enter> <enter> to stop



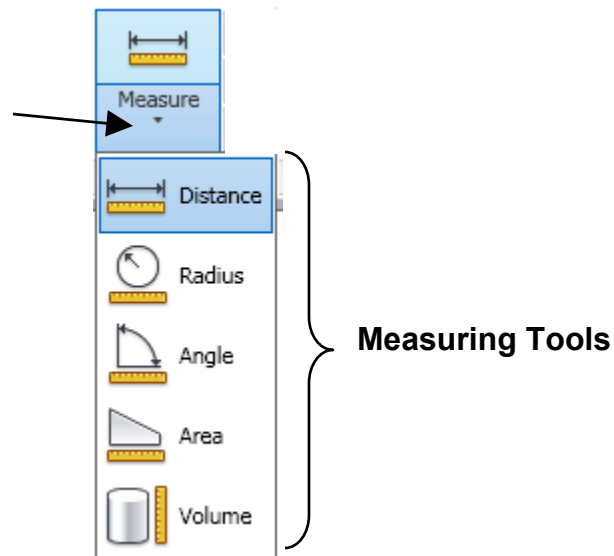
# MEASURE TOOLS and ID Point

The following tools are very useful to confirm the location or size of objects.

The Measure tools enables you to measure the distance, radius, angle area, or volume of a selected object. The default option is Distance.

1..You may access these tools as follows:

**Ribbon = Home tab / Utilities Panel / Measure ▼**



2. Select one of the tools and follow the instructions on the command line.

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## ID Point

The ID Point command will list the X and Y coordinates of the point that you select. The coordinates listed will be from the Origin.

1. Select the ID Point command by typing: **ID <enter>**
2. Select a location point, such as the endpoint of a line.  
The X, Y and Z location coordinates for the endpoint will be displayed.

### Example:

1. Command: **id<enter>**
2. Snap to the endpoint
3. Coordinates, from the Origin, are displayed.

**2. Snap to endpoint**



Specify point: X = 6.8293    Y = 6.6926    Z = 0.0000

# EXERCISE 9A

In this exercise you will create a master template named “**Border A**” to be used for the exercises in Lessons 9 through 25. Follow the easy steps below. Do not skip any.

## STEP 1: (Select the Settings)

1. Start a **NEW** file using  
**2013-Workbook Helper.dwt**
2. Set **Units** (Refer to page 4-14)  
Units = Decimal  
Precision = 0.000
3. Set **Drawing Limits** (Refer to page 4-10)  
Lower Left Corner = 0,0  
Upper Rt. Corner = 11, 8.5
4. Show the new limits using: (Refer to page 4-8)  
**Zoom / All**
5. **Important:** Change Lineweight settings to **Inches** and **adjust Display scale**.  
Refer to bottom of page 3-12
6. Set **Grids** and **Snap** (Refer to page 3-7, 4-12 and 4-13)  
Snap = .125 (**this is important, it will make it easier to draw the lines**)  
Grids = 1.00

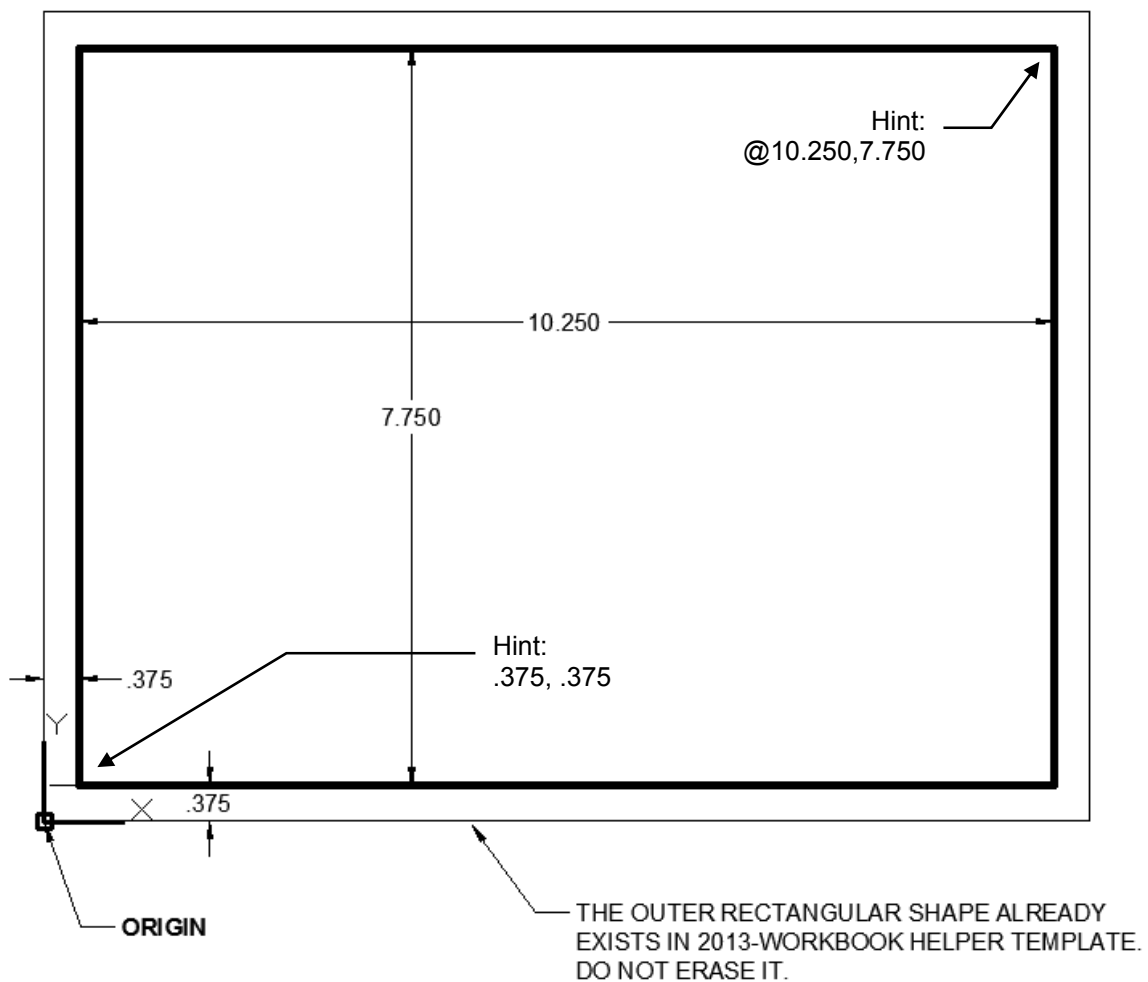
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# EXERCISE 9A....continued

## STEP 2: (Draw the Border Lines)

1. Select Layer **Borderline**
2. Draw the border below using the dimensions shown.

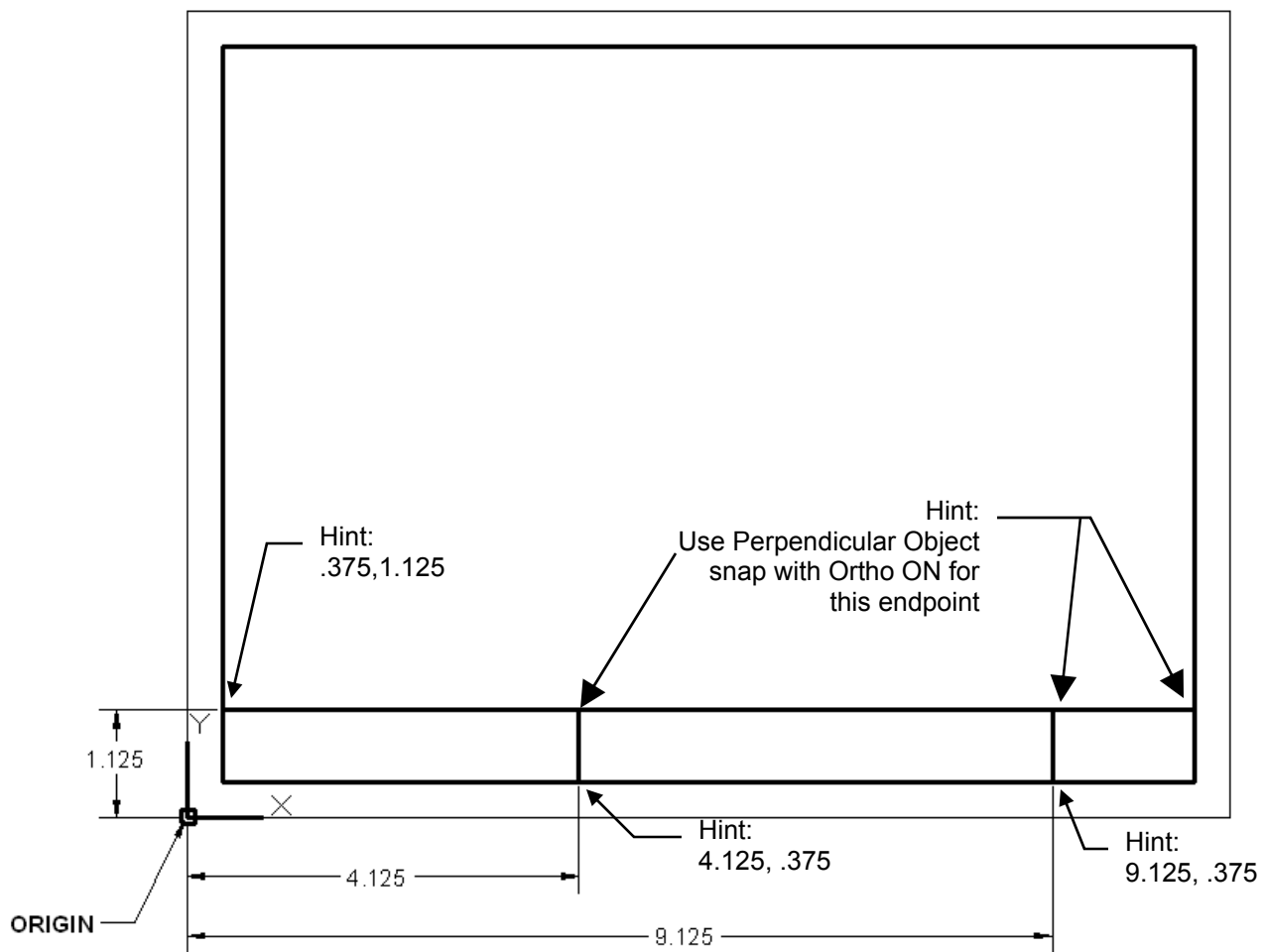


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# EXERCISE 9A continued

## STEP 3: (Draw the TITLE BLOCK Lines)

1. Select Layer **Borderline**
2. Draw the 3 **TITLE BLOCK** lines as shown below using the dimensions shown.

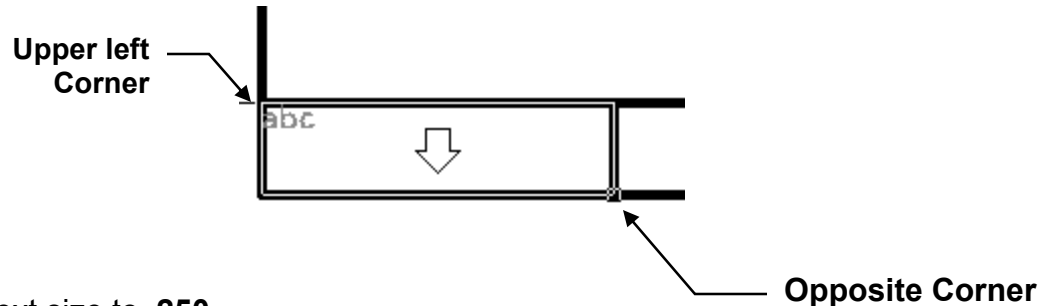


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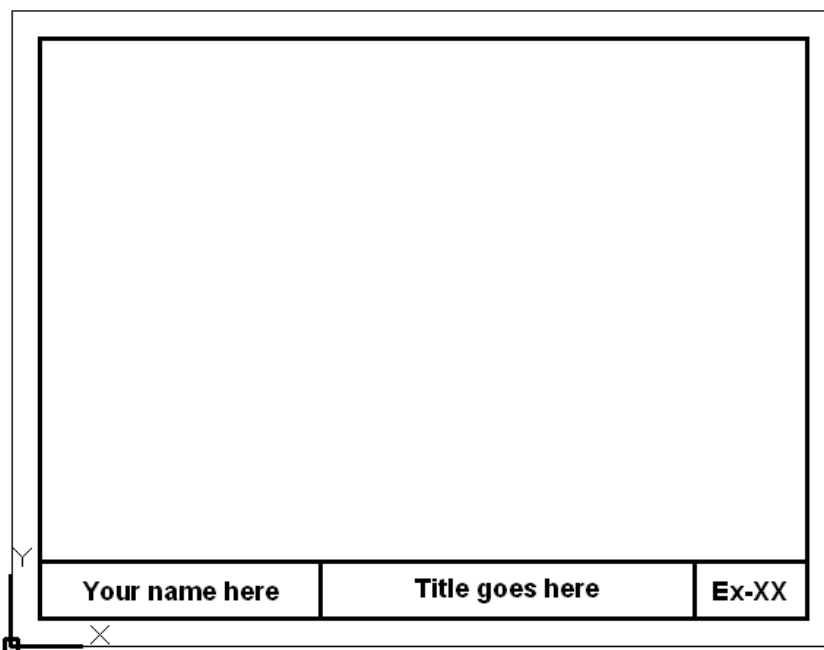
# EXERCISE 9A continued

## STEP 4: (Enter the TEXT)

1. Select Layer **Text**
2. Select **Multiline text** command.
3. Select the upper left corner and then the opposite corner.



4. Change the text size to **.250**
5. Select **Bold**
6. Select justification **Middle Center**
7. Type the text shown below.
8. Repeat the above for the remaining 2 title boxes



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# EXERCISE 9A continued

## STEP 5: (Save the border as a Template)

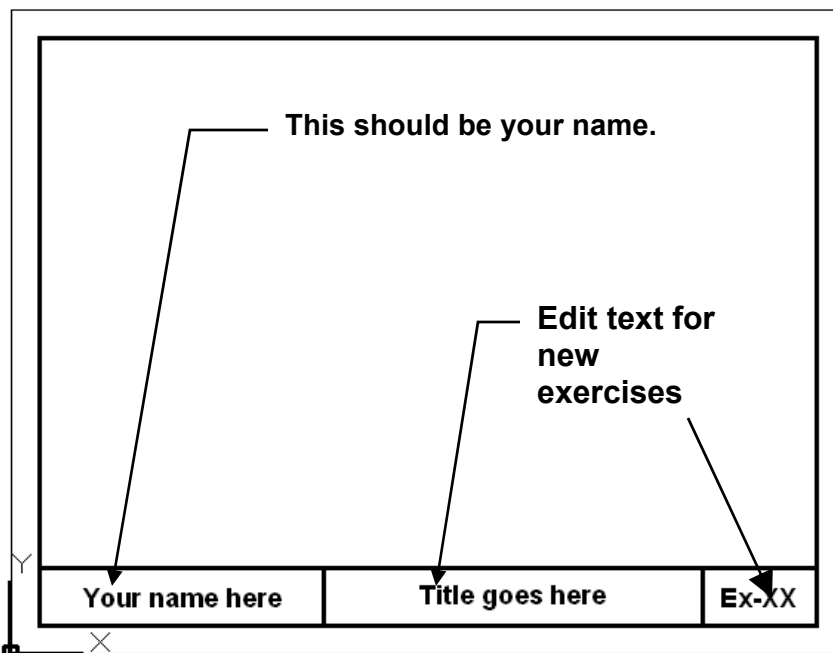
1. Select the **Application Menu** (Refer to page 2-4)
2. Select **Save As** ►
3. Select **AutoCAD Drawing Template**
4. Enter the new template name: **Border A-2013**
5. Select **Save** button
6. Enter the description:  
**Use for Lessons 9 through 25**
7. Select the **OK** button

You now have a template to use for Lessons 9 through 25.

At the beginning of each exercise you will be instructed to start a **New** drawing using **Border A-2013.dwt**

You will **edit** the **title** and the **Ex-XX** to match the exercise. Editing makes it much easier. You will not need to change the location of the text. Merely edit it.

**If you would like to Print this border follow the steps on the following pages.**



# Basic Plotting from Model Space

**Note: More Advance plotting methods will be explained in Lessons 26 and 27.**

1. **Important:** Open the drawing you want to plot, if it is not already open.
2. Select: **Zoom / All** to center the drawing within the plot area.
3. Select the Plot command using one of the following;

**Quick Access toolbar =**

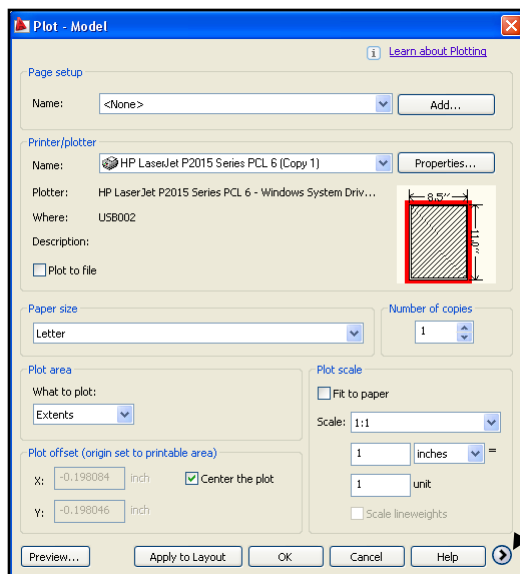


**Ribbon = Output tab / Plot Panel /**



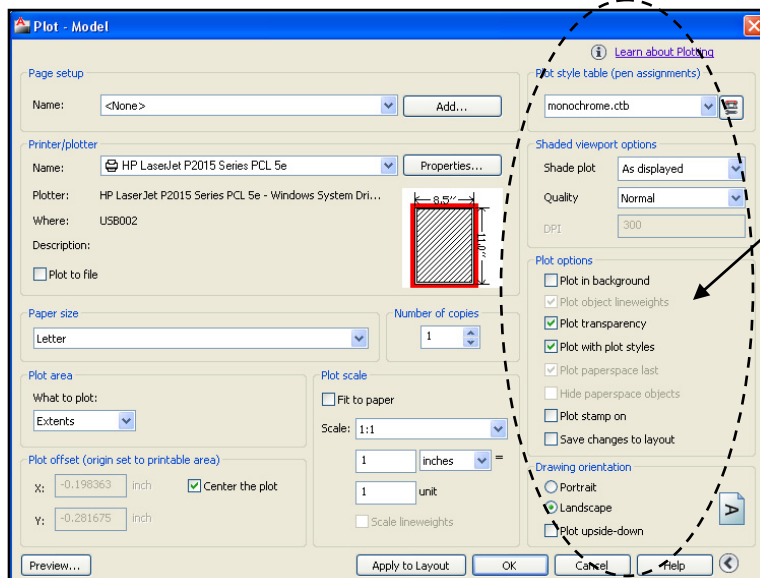
**Keyboard = Plot <enter>**

The Plot –Model dialog box will appear.



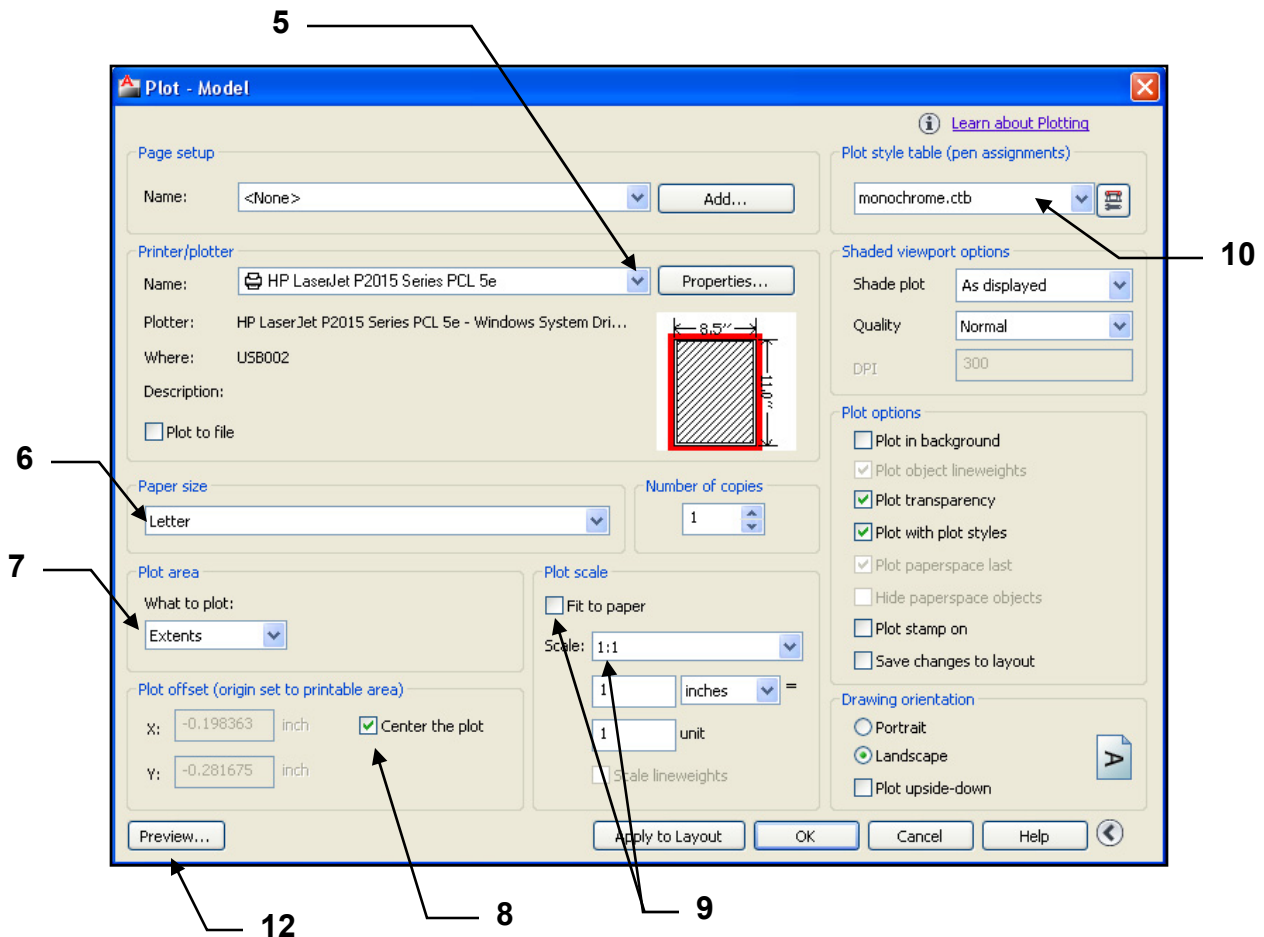
4. **More Options** button.

4. Select the **“More Options”** button to expand the dialog box.



The dialog box expands To show more options.

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5. Select your printer from the drop down list or “Default windows system printer.pc3”  
 Note: If your printer is not shown in the list you should configure your printer within AutoCAD. This is not difficult. Refer to Appendix-A for step by step instructions.

6. Select the Paper size :**Letter**.

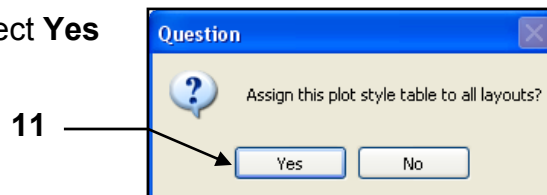
7. Select the Plot Area **Extents**

8. Select the Plot Offset **Center the Plot**

9. Uncheck the **Fit to paper** box and select Plot Scale **1 : 1**

10. Select the Plot Style table **Monochrome.ctb** (for all black)  
**Acad.ctb** (for color)

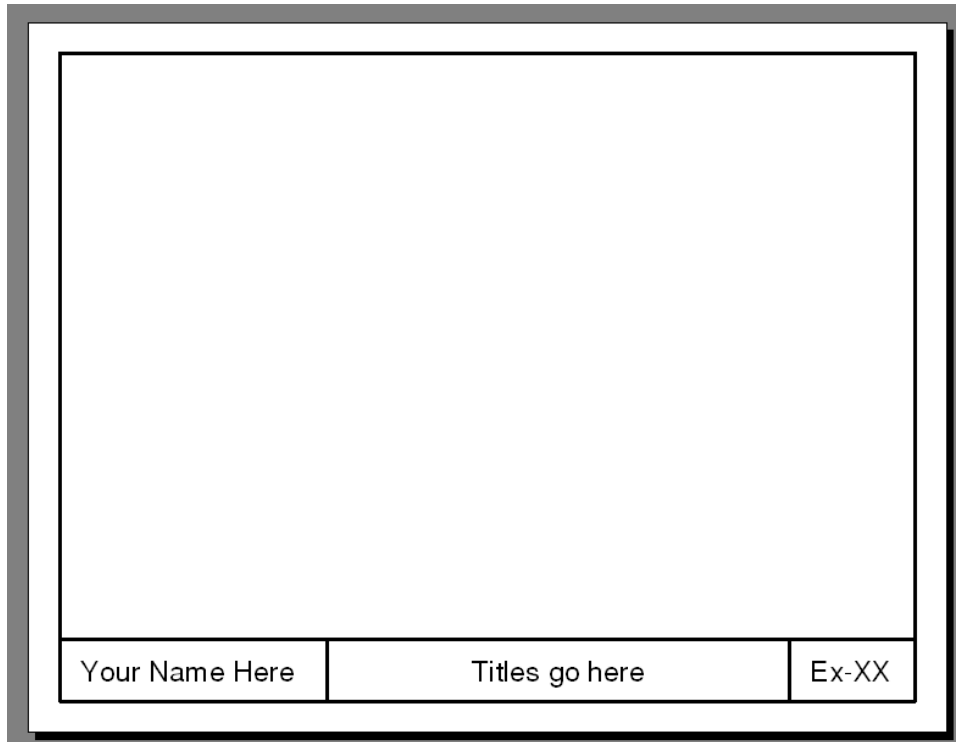
11. If the following box appears, select **Yes**



12. Select the **Preview** button.

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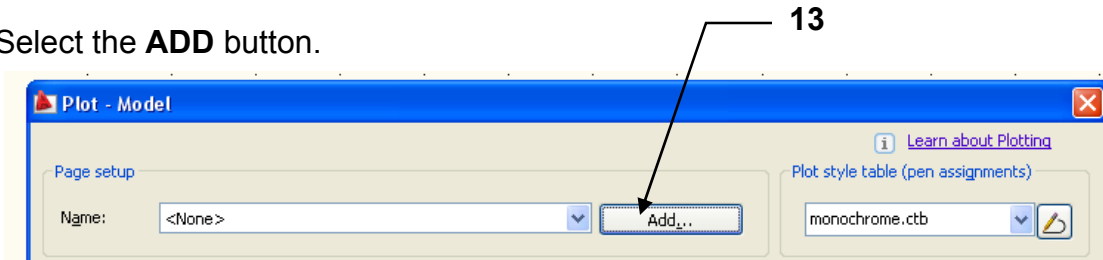
**Note:** If you are using a 30 day free trial or student version software, your display may appear with text around the perimeter.



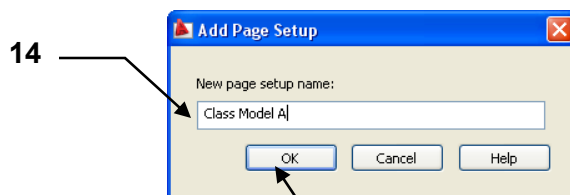
Does your display appear as shown above?  
If yes, press <enter> and proceed to 13.  
If not, recheck 1 through 11.

You have just created a **Page Setup**. All of the settings you have selected can now be saved. You will be able to recall these settings for future plots using this page setup. To save the **Page Setup** you need to **ADD** it to the model tab within this drawing.

13. Select the **ADD** button.



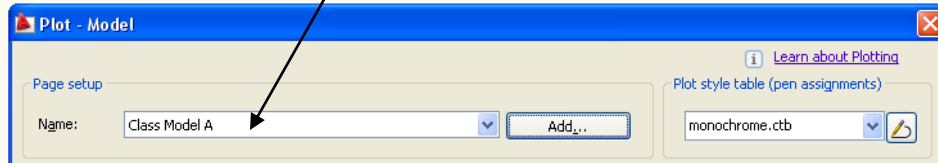
14. Type the new Page Setup name **Class Model A**



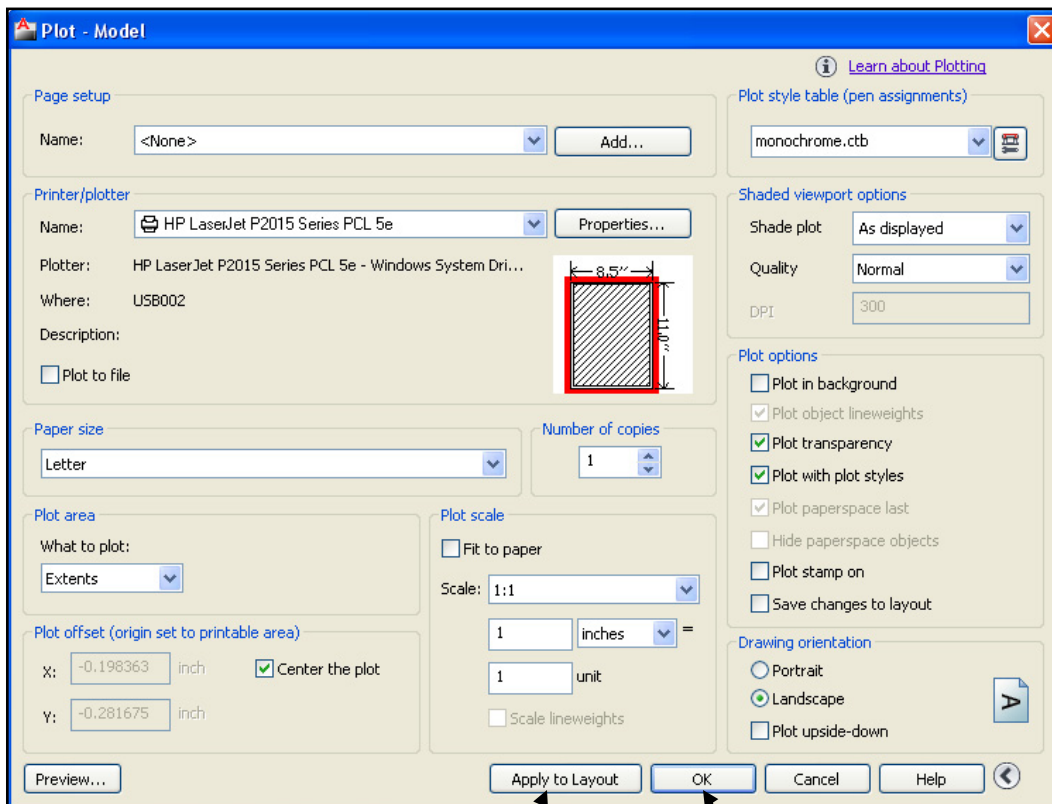
15. Select the **OK** button.

Continued on the next page...

New Page Setup name appears



16. Select the **Apply to Layout** button.



16

17

17. Select the **OK** button to send the drawing to the printer or select Cancel if you do not want to print the drawing at this time. The Page Setup will still be saved.

18. Save the entire drawing again as a template using **Save as AutoCAD drawing template: Border A-2013**. (Refer to page 9-12)  
The Page Setup will be saved to the drawing and available to select in the future. You will not have to select all the individual settings again unless you choose to change them.

***Now go tape your print out to the refrigerator door.  
This is quite an accomplishment.***



# EXERCISE 9B

INSTRUCTIONS:

# EXERCISE 9C