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AutoCAD 2D I

Module 6

Drawing Lines Using Cartesian Coordinates

PREPARED BY

IAT Curriculum Unit

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Module 6

Auto CAD Self-paced Learning Modules

AutoCAD 2D

Drawing Lines Using Cartesian Coordinates

Learning Outcomes:

When you have completed the module, you will be able to:

1. Describe the Cartesian Coordinate System using absolute and relative coordinates.
2. Describe and use the LINE command to draw lines using the Cartesian Coordinate System with both absolute and relative coordinate.

The Cartesian Coordinate System

To draw accurately in an AutoCAD 2 Dimensional (2D) drawing, you must supply locations by entering XY coordinates. The 2D coordinates are based on the *Cartesian Coordinates System*.

The Cartesian Coordinate System consists of two numbered lines crossing perpendicular to each other at their zero values. The horizontal axis is called the X-axis, and the vertical axis is called the Y-axis as shown in Figure 4-1. This allows you to assign a value to each location on a plane. Each coordinate location consists of a pair of numbers, the first of which is the X-coordinate and the second is the Y-coordinate, written (X,Y). For example, (3,4) is a location 3 units to the right 4 units up from X0,Y0.

Cartesian coordinate can be entered into AutoCAD as either absolute or relative coordinates.

Absolute Cartesian Coordinates

Absolute Cartesian Coordinates are always referenced to the absolute origin 0,0. For example: 3,4

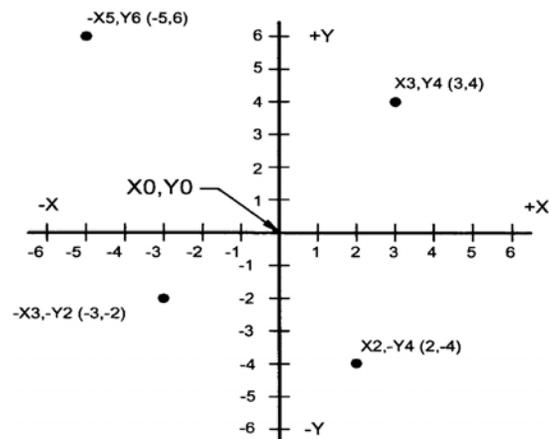


Figure 4-1

The Cartesian Coordinate System

Relative Cartesian Coordinates

Relative Cartesian Coordinates are incremental to the last input point. To indicate to AutoCAD that it is a relative coordinate you are referring to, enter an @ before the coordinate. For example @2,6.

AutoCAD User “Must Know” No. 4-1

AutoCAD has been programmed to understand the @ symbol as meaning “The Last Point”. AutoCAD always remembers the last point entered by the user so when the @ is used, for example: @2,4, that means to AutoCAD “from the last point entered go 2 units in the X direction and 4 units in the Y direction”. The @ is used in many different ways as you will see as you work your way through the modules.

AutoCAD Command: LINE

The New command is used to draw lines.

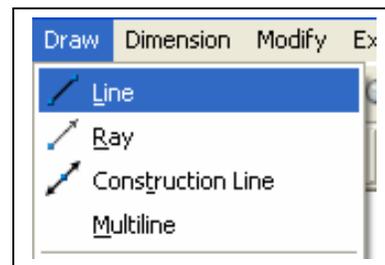
Command Line Syntax:

Command: **LINE** or Command: **L**



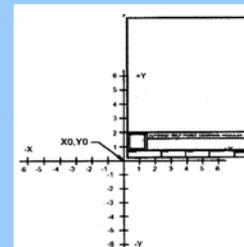
2004-2006

Line



AutoCAD User Tip 4-1

When possible, always draw in the positive quadrant. In almost all cases, X0,Y0 should be the bottom left hand corner of your trimmed drawing.



AutoCAD User Tip 4-2

When you start a drawing the first XY location is always specified using an absolute coordinate. After that, relative coordinates are used. It would be difficult to calculate all coordinates as absolute.

AutoCAD User Tip 4-3

When you are entering decimal numbers and your number ends in a zero, for example 4.0, just enter the number up to the zero. In this case 4. If the number you are entering is 3.6700, then enter 3.67.

Using the LINE Command

Command: **LINE**

Specify first point: **1.75,4**

(Always start with an absolute coordinate. It must be an X then Y with a comma between them.)

Specify next point or [Undo]: **@5,0**

(Then change to relative coordinate. Note the @ first then X and Y.)

Specify next point or [Undo]: **@0,2**

Specify next point or [Close/Undo]: **@-2.5,0**

(Note the negative coordinate since we are going in the negative X direction.)

Specify next point or [Close/Undo]: **@0,1.5**

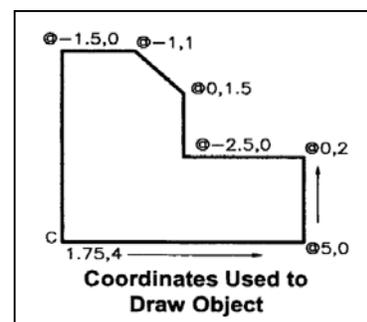
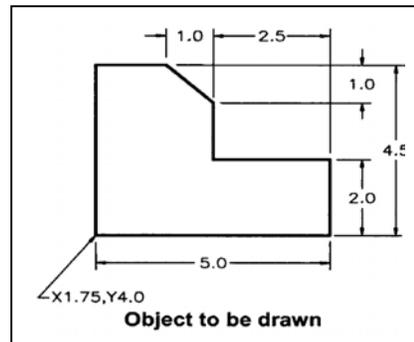
Specify next point or [Close/Undo]: **@-1,1**

Specify next point or [Close/Undo]: **@-1.5,0**

Specify next point or [Close/Undo]: **@C**

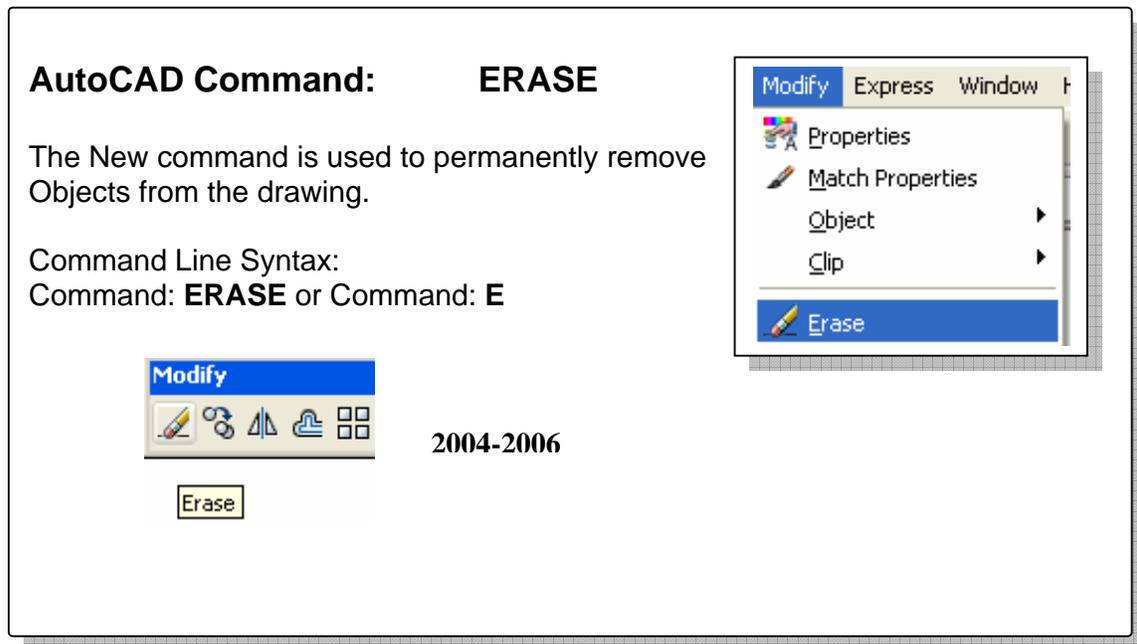
(You can use a C to close the last line and return to the first point.)

Command:



AutoCAD User Tip 4-4

If you are entering a positive number in AutoCAD, just enter on it's own. Positive is the AutoCAD default. If the number is negative, you must enter the – sign before the number. For example, if the number is 4.0, enter 4. If the number is -4.0, enter -4.



Erasing Objects

For now, you will be shown the simplest method to erase objects from your drawing. As you work your way through the modules, you will be taught more sophisticated methods. Enter the ERASE command using one of the menus or on the keyboard.



Figure 4-2
The Pickbox

Command: **ERASE**
Select Object:

When you see the Select Objects prompt, your graphic cursor displays as the pickbox only. See Figure 4-2. Move the cursor onto the object you want to erase and click the left mouse button. The object will highlight. You can select as many objects as you want. When you are finished selecting object, execute the command.

Using the LINE Command - Continued

Command: **LINE**

Specify first point: **7,5**

Specify next point or [Undo]: **@0,2**

Specify next point or [Undo]: **@-2,0**

Specify next point or [Close/Undo]: **@.75,1**

(You can draw a line at an angle by entering both the X and Y coordinates.)

Specify next point or [Close/Undo]: **@-3.5,0**

Specify next point or [Close/Undo]: **@-.75,-1**

Specify next point or [Close/Undo]: **@U**

(When you make an input error, enter a U to go back one step. More than one U can be entered to step back further. Ensure you press the ENTER or SPACE after each one.)

Command:

Specify next point or [Close/Undo]: **@.75,-1**

Specify next point or [Close/Undo]: **@-2,0**

Specify next point or [Close/Undo]: **@0,-2**

Specify next point or [Close/Undo]: **@1,0**

Specify next point or [Close/Undo]: **@0,.5**

Specify next point or [Close/Undo]: **@4,0**

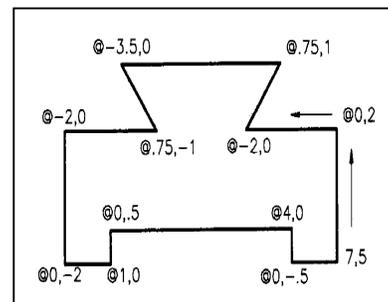
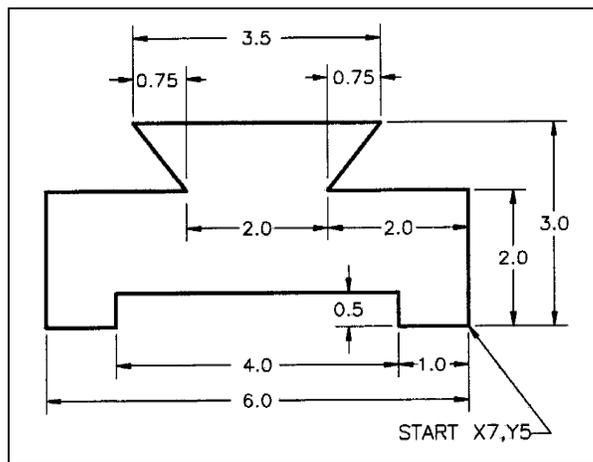
Specify next point or [Close/Undo]: **@0,-.5**

Specify next point or [Close/Undo]: **@7,5**

(The object was closed by entering the absolute coordinate.)

Specify next point or [Close/Undo]:

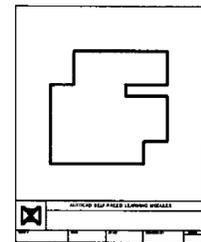
Command:



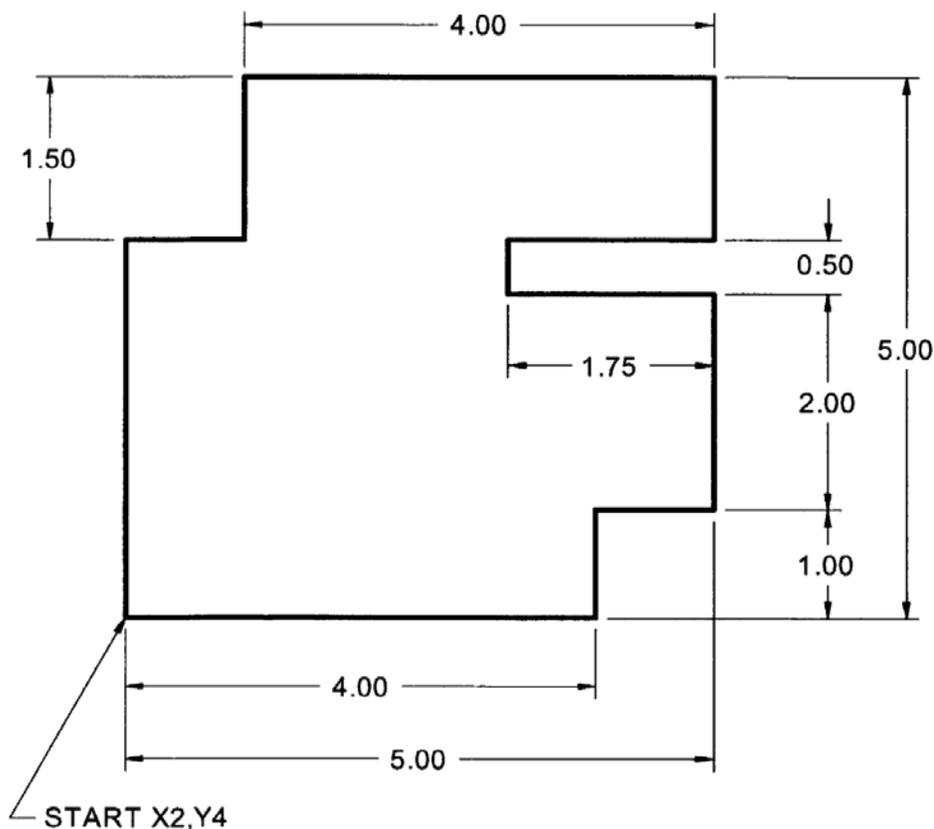
Lab Exercise 4-1			Time Allotted: 30 min.	
Drawing Specifications				
Name	Template	Units	Text Style	Font
AutoCAD 2D Lab 04-1	Module Template A	Inches	N/A	N/A
Note: Color, Linetype and Lineweight are all 'ByLayer' unless otherwise instructed.				
Layering Scheme				
Objects on Layer	Name	Color	Linetype	Lineweight
N/A				

Instruction:

1. Draw the object shown below.
2. Check your drawing with the key. If you have trouble doing this, redo Module 3.
3. If you have any errors, correct your drawing.
4. Name the drawing as shown above and save it in the folder:
CAD Courses/AutoCAD2D/Lab Exercises



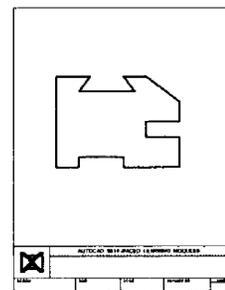
Completed Drawing



Lab Exercise 4-2			Time Allotted: 30 min.	
Drawing Specifications				
Name	Template	Units	Text Style	Font
AutoCAD 2D Lab 04-2	Module Template A4	Millimeters	N/A	N/A
Note: Color, Linetype and Lineweight are all 'ByLayer' unless otherwise instructed.				
Layering Scheme				
Objects on Layer	Name	Color	Linetype	Lineweight
N/A				

Instruction:

5. Draw the object shown below.
6. Check your drawing with the key. If you have trouble doing this, redo Module 3.
7. If you have any errors, correct your drawing.
8. Name the drawing as shown above and save it in the folder:
CAD Courses/AutoCAD2D/Lab Exercises



Completed Drawing

