Drawing settings and preparing the drawing screen and worksheet

When starting any new drawing, there are four basic rules that advised to follow:

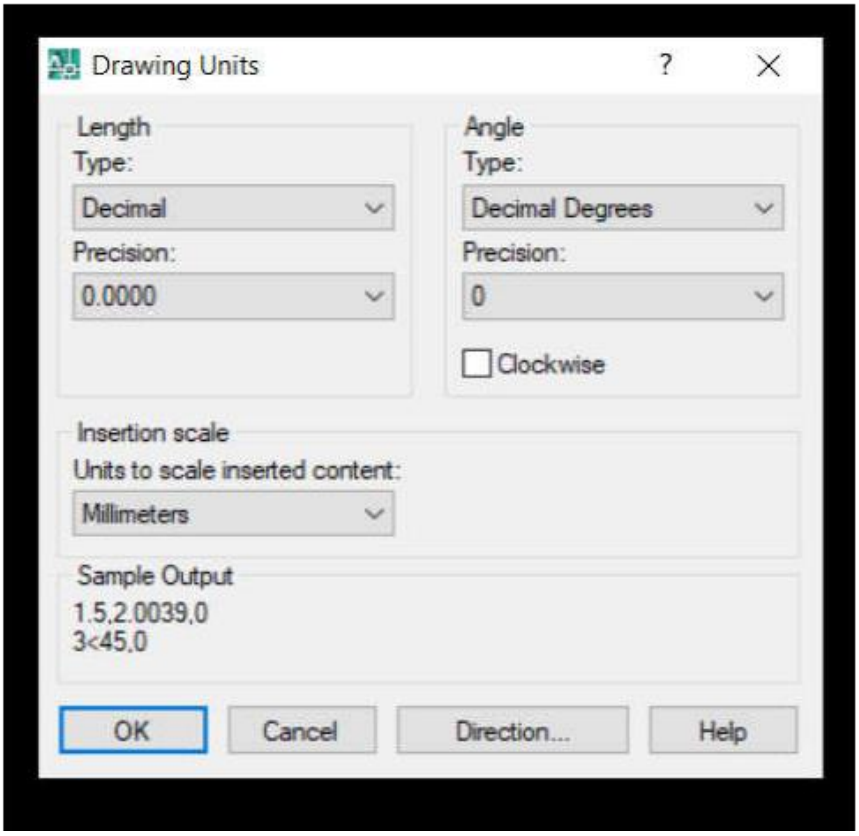
1- The units: - it means to specify the type of measurement unit used.
2- The limits: - it means to determine the boundaries of the drawing.
3- Zoom all: - It means to show the boundaries of the drawing.
4- Draw.

Units:

The concept of units of measurement here is how the elements are measured, and what these measurements will look like. It must take into account the difference between this concept and the concept of measurement systems, the metric system or the English system. Determining the measurement system done in advance when opening a new drawing.

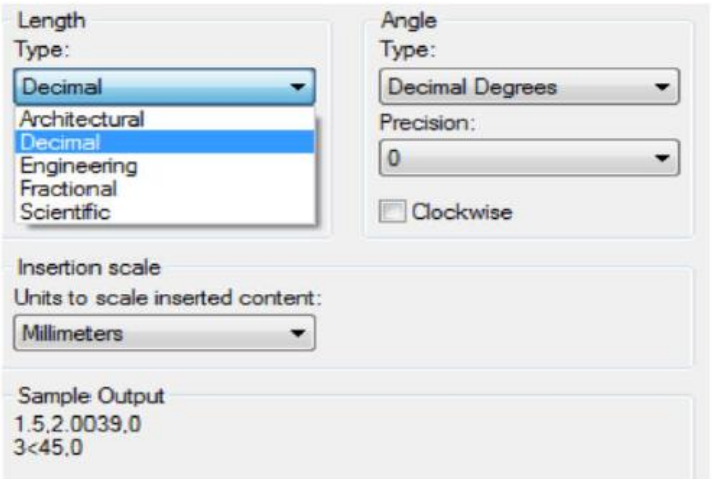
Drawing, a straight line in the program achieve by determining the length of this line and that this length is drawn in a specific unit, such a straight line of length 5 units and can be equal to any type of unit in fact, such as feet, meters, kilometers, or miles. The type of units are chosen according to the type of drawing, for example, in the horizontal projection of a room, inch or centimeter is used or a centimeter, but when you draw a city, the units of kilometers and miles are appropriate.

AutoCAD provides five types of different units, and you can choose the type that you want for your drawing from **Format** menu and select **units** after that the dialog window appears **(drawing units)**. Note that the window is divided into two parts. The section located on the left side is the length window and related to the special settings for the length measurement. While, the section located on the right side of the window related with the special settings for the angles measuring.



If you click on the small arrow in the Type address box, you will see five types of

The units as shown in the figure below.



Choose the type of units you want from the heading **TYPE .**Then go to the **Insertion scale** heading where this part is to specify the type of units for the graphics that you want to enter into the current drawing. Then determine **Precision** that means the number of digits after the decimal point.

From the angle section, choose the type of units for the angle measurement .The drop-down list of the Type box has five types, which are the well-known types:

Decimal degrees: Decimal system, angle parts are shown as a decimal fraction.

Deg /Min/sec: The sexagesimal system is degrees, minutes and seconds.

Grads: Metric system.

Radians: The circular system, where the angle is written as 360=2 л degrees.

Direction: When we draw in terms of a specific angle, the program takes it in counterclockwise direction and the angle of zero is with the positive axis of the X, if we want to change, the direction of drawing of the angle towards Clockwise, the Clockwise option should be activate.

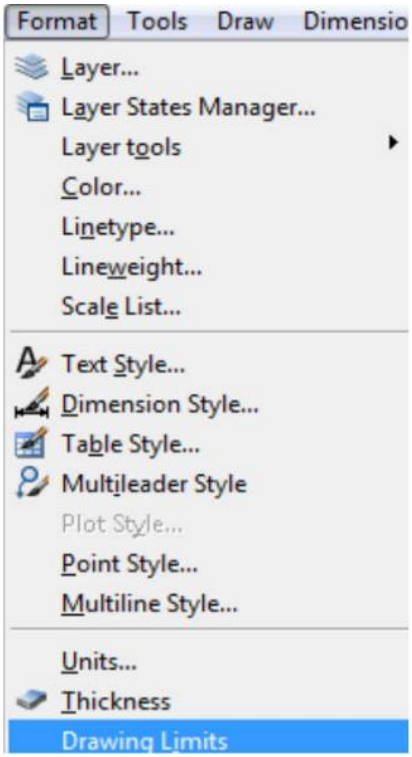
Set the drawing limits

In Auto-cad, the drawing is done by a full scale without taking into account the limits of your drawing within a screen a drawing with infinite borders, providing

you with the possibility to draw the earth and even the solar system. However, with this huge area of drawing limits, what would a drawing that represents a horizontal projection of a house whose dimensions are 30m x 20m look like? You will not see it unless you enlarge it. This is why setting limits for your drawing becomes useful and makes it easier for you, drawing limits means creating imaginary limits on the drawing screen.

Proportion to the dimensions of your drawing that you will create, so if we assume that you want to draw a house with dimensions of 40 x 30 m. You will specify the coordinates of the drawing limits as a rectangle. The coordinates of the first point is (0, 0), which is the lower left corner point, and the coordinate of the second point is (30, 40), which is the upper right corner. If you want to increase a margin to write a title for the drawing, the coordinates of the second point change to become (34, 44) with an increase of four units as a margin for drawing. In any case, these limits will not affect your ability on the drawing with large limits and you will still be able to draw outside these limits only these limits will affect the size of grid if it activated. In addition, on the zoom in and out if there is no draw outside the limits.

To do this, go to the Format menu and choose Drawing



When the command execute, the message appears on the command line, asking to select the lower left corner for limits, press **Enter** to accept the AutoCAD default option.

AutoCAD asks to specify the upper right corner of the drawing limits. Enter the coordinates of the upper right corner point, let it be (34, 44). Enter the X coordinates first, then the comma, after that the Y coordinates, finally press Enter.

From the View menu, select Zoom, and from the side menu, select all.

You will not see any change on the screen because the new borders are invisible borders. in case you want to see New borders , Activate the Grid button from the status bar at the bottom of the drawing screen, and this tool is used to help capture points to speed up the drawing process and will be explained later with other tools.

Standard paper sizes in mm

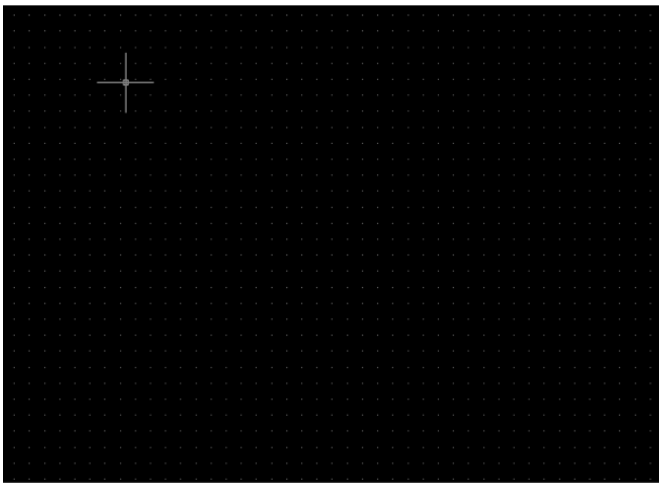
Height	Width	Symbol
210	297	A4
297	420	A3
420	594	A2
594	841	A1
841	1189	A0

Helpful tools in Auto CAD

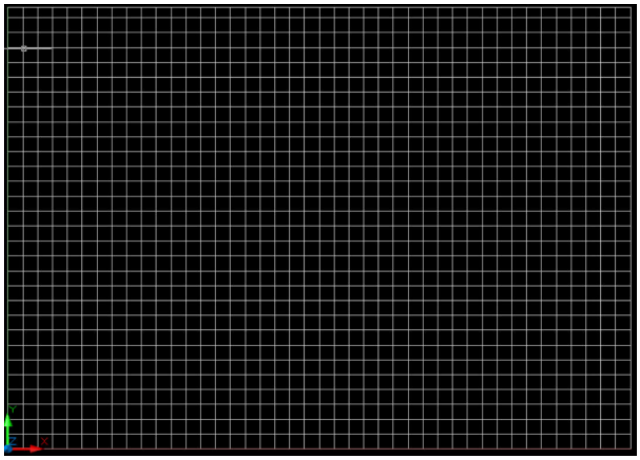
The AutoCAD program contains a set of tools that help the user to draw accurately and quickly, such as using a network of orthogonal points and making the cursor jumps specific distances that are set According to the request or forcing the lines to be drawn perpendicular to the axes...etc., and these tools are located at the bottom of the drawing screen on the information bar or what is called the status bar .

Grid: After its activation, this tool draws a network of orthogonal points that help to determine the boundaries of the drawing and know the distances by looking at it, the same as a graph paper. In addition, you can set up point spacing, angle, and point alignment as you like and it apply to a specific area. the network does not appear in the process of printing the drawing .

The network can be linear, that is, composed of perpendicular lines or a point network and it depends on the preview mode of the drawing. The linear grid is possible in all preview modes, except for the preview of two-dimensional.



Dot grid



Linear grid

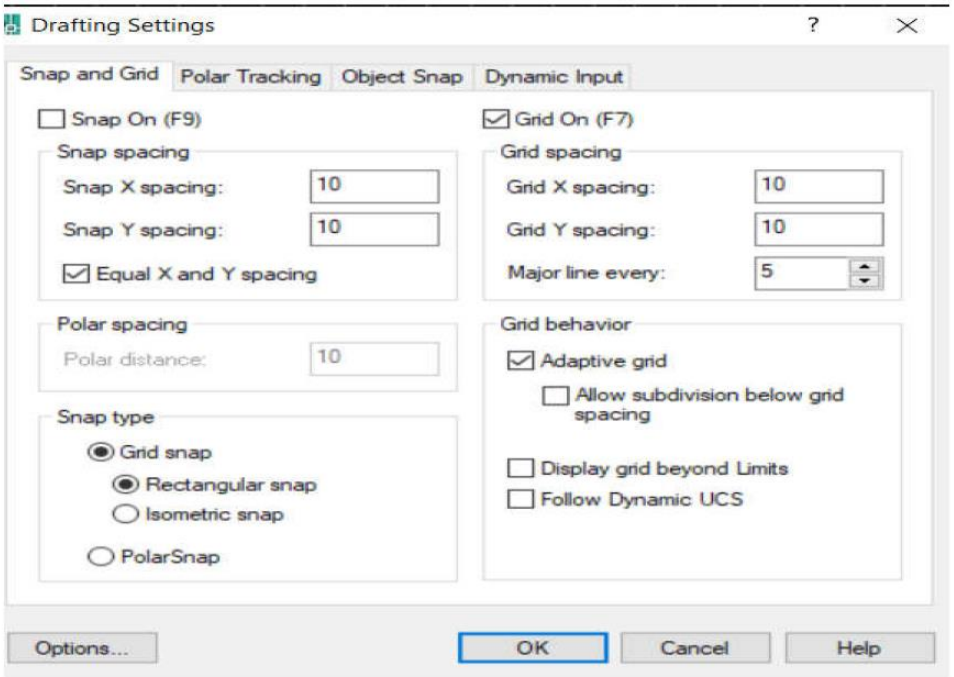
The type of preview select from the drop-down list **Visual style < View**
Where drop down submenu with types of reviews will appear or write down **Vscurrent** in the command bar.

Grid setting:

1-from the Tools drop-down list **Tools < Drafting** setting The Utilities dialog window appears.

2-By clicking on the tool icon **grid** Right mouse button, then select setting The same dialog window appears

3- By writing the command **Dsettings** On the command bar, you get the same result.



Snap: Through this tool, you can force the mouse cursor to move a certain distance, that is, to jump a certain distance around points that we select from the settings window. When you activate this tool, you will notice that the cursor movement it became heavy and its movement restricted, and this is useful in entering distances accurately and quickly. The jumping distances must match the net distances. Activate the snap by Clicking on the icon **Snap** in the utility bar and to disable it press once again on the icon, the tool becomes inactive (Snap **of).** You can also activate or disable the tool by pressing the key **F9** from the keyboard.

Ortho: When you activate this tool, you force the mouse cursor to move horizontally and vertically when drawing or modifying objects, and when drawing a line and after determine the starting point, you can watch the line as it moves only with the directions of the axes X, Y.

To activate the perpendicularity feature (Ortho), click on the ortho tool in the utilities toolbar, and by clicking on it once again become inactive.

Polar tracking: By activating this tool, you make the pointer follow the path of a polar angle that you specify it from the settings window Put a √ sign in the polar tracking on box to activate the polar tracking feature.

Object Snap: This tool is considered one of the most important auxiliary tools for drawing in AutoCAD, and it helps in determining the distinct points for the object accurately, such as the beginning of a line, the middle of a line, or the center of a circle...etc. Its importance reaches an extent that without it, we cannot perform some operations, such as obtaining the area of a shape, the length of a line, the coordinates of a point where obtaining the mentioned information requires identifying the item very accurately. As this tool helps you to draw a specific element starting with a distinct point on a drawn object.

Dynamic input: The task of this tool is to show command bar dialogs, entries and information in a small box next to the cursor, which makes you focus

more on the drawing area instead of moving between the cursor and the command line

To activate and deactivate this tool, click on the tool icon with the left mouse button on the toolbar commands, or by pressing a key F12 from the keyboard.

Dimensions

Drawing any straight line requires a minimum of two points to be located on it to be drawn through the program at the PLANE level. There are several ways in which these known points are identified and set this straight line is known as the dimensions

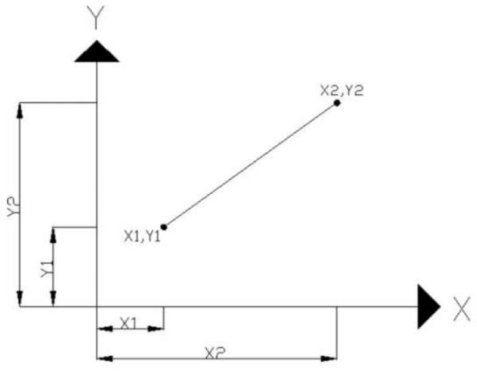
There are three types of dimensions (Coordinates)

1- ABSOLUTE COORDINAT

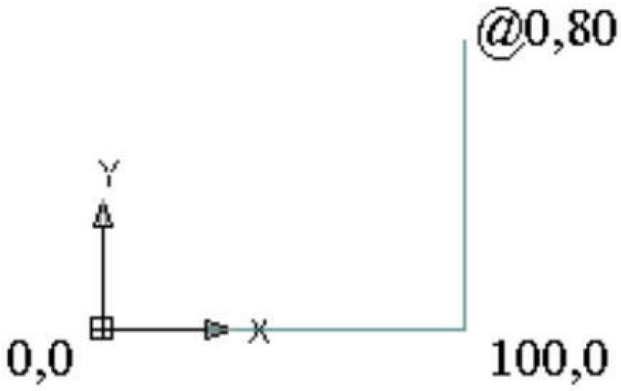
2- RELATIVE COORDINAT

3- POLAR COORDINAT

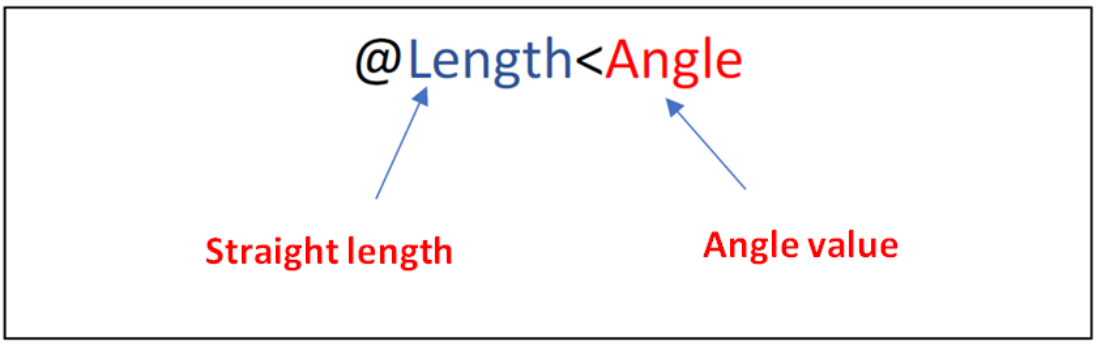
ABSOLUTE COORDINAT: It is an accurate way to enter coordinates in the form (X,Y) then press **ENTER** this way used in the event that we know the coordinates It is often used in survey work.

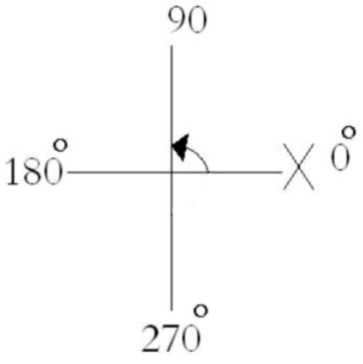


RELATIVE COORDINAT: It is taken in relation to the last point that was determined and written on the figure **@X,Y** then **ENTER** , the @ symbol Auto-CAD reports that the distance starts from the last point that was determined.



POLAR COORDINAT: These coordinates are written relative to the last point that was determined, as in the previous method, and the length of A straight line and an angle are preceded by the @ symbol and write**(@length of the straight line < angle**) then **ENTER** The angle is calculated starting from the x-axis and counterclockwise .





Example: Draw a square of side length 100 units using the command **Line** in the ways that have been explained. With the assumption The coordinates of the starting point are (150,150).

Solution:

Absolute Coordinates method

1- On the drawing toolbar, click the line drawing tool **Line** Or type **L** on the command bar or from the **Draw** drop-down list, choose **Line**.

2- When an AutoCAD message appears **SPECIFY FIRST POINT** Enter the coordinates of the first point by typing (150,150) then **ENTER** to confirm the entry. First we enter the X axis and then the y axis separated by a comma on the keyboard to the side located on the lower right at the letter W . Note that the utility is disabled **DYN** on the status bar.

3- When the Auto cad message appears **SPECIFY NEXT POINT OR UNDO** Enter the coordinates of the second point (150,250) then **ENTER.**

4- AutoCAD message will appear **SPECIFY NEXT POINT OR UNDO** after every time You choose a point at which you did not inform the Auto cad that your drawing was finished, and since we did not finish the drawing, you will we enter the coordinates of the third point, which is (250,250), then **ENTER.**

5- Input the coordinates of the fourth point, which is (250,150), then **ENTER.**

6- Input the coordinates of the first point to close the drawing, which is (150,150), then **ENTER**.

7- To exit and finish, click **ENTER**.

Relative coordinates method

1- Choose the command Line in one of the ways previously described.

2-When an AutoCAD message appears **SPECIFY FIRST POINT** Enter the coordinates of the first point By writing (150,150) then **ENTER** to confirm the entry.

3- Input the coordinates of the second point, which is the length of the path traveled by the first point until you reach the second point with respect to the x and y coordinates preceded by the symbol @ in our case ,will be entered 0,100.

4- Input the coordinates of the third point relative to the second point, which is @100,0 .

5-Input the coordinates of the fourth point relative to the third point, which is @0,-100 and note that The coordinates of the point with respect to the axis Y It has been entered with a negative value because its path From the second to the third point, reverse the positive direction of the axis.

6-Input the coordinates of the first point of the square to close the figure, relative to the third point, which is @-100,0 note that the coordinates of the This is point are relative to the axis X It has been entered with a negative value because its path from the fourth point to the first is opposite to the direction of the axis X .

7-To exit and finish, click **ENTER** .

Polar coordinates

1-Choose command Line in one of the ways you know.

2-When an AutoCAD message appears **SPECIFY FIRST POINT** Enter the coordinates of the first point By writing (150,150) then **ENTER** to confirm the entry.

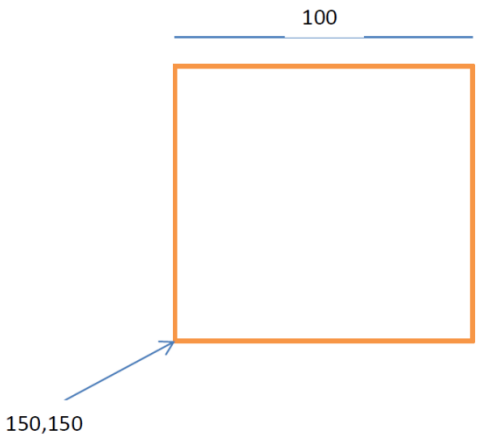
3-Input the polar coordinates of the second point, which is @100<90 then **ENTER**.

4- Input the polar coordinates of the third point, which is @100<0 then **ENTER.**

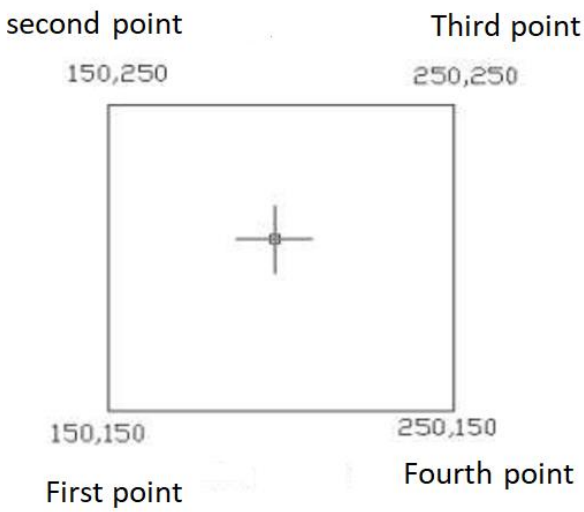
5- Input the polar coordinates of the fourth point, which is @100<270 then **ENTER.**

6- Input the polar coordinates of the first point, which is @100<180 then **ENTER.**

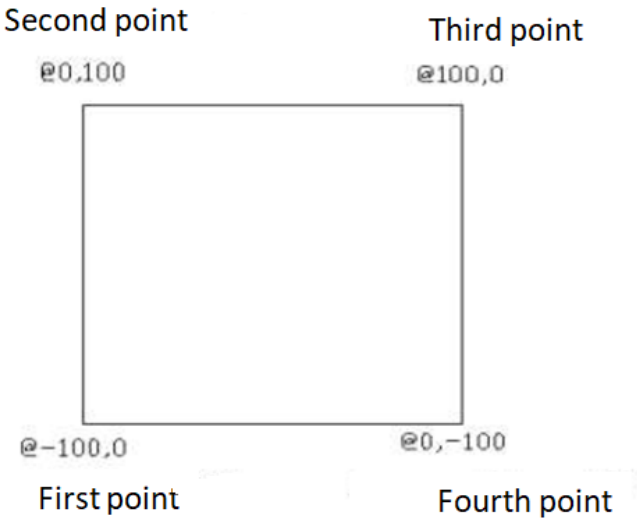
7- To exit and finish, click **ENTER** .



Absolute coordinates



Relative coordinates



Polar coordinates