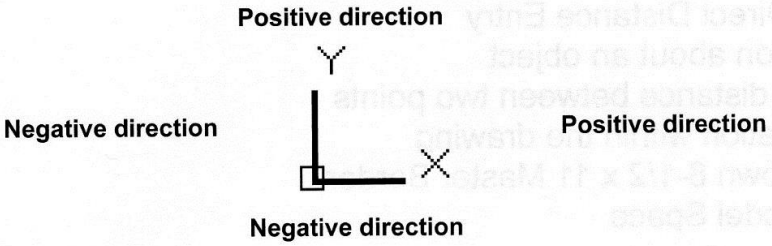
COORDINATE INPUT

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.)*

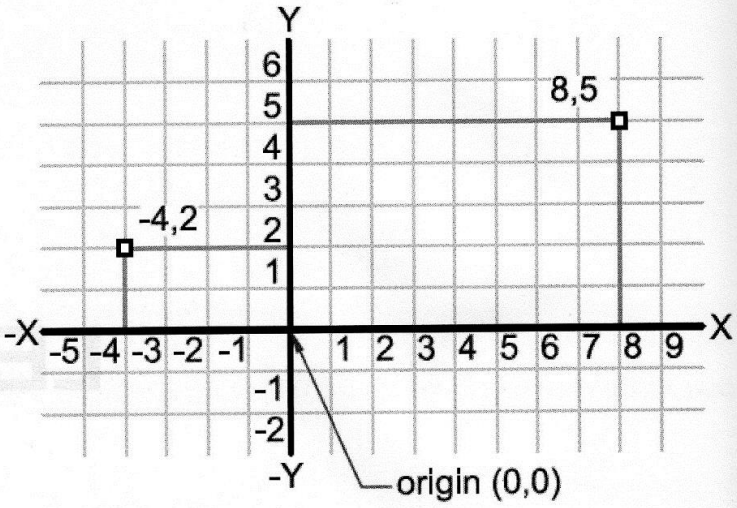


Look at the User Coordinate System (UCS) icon in the lower left corner of your screen.
The X and Y are pointing in the positive direction.

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)

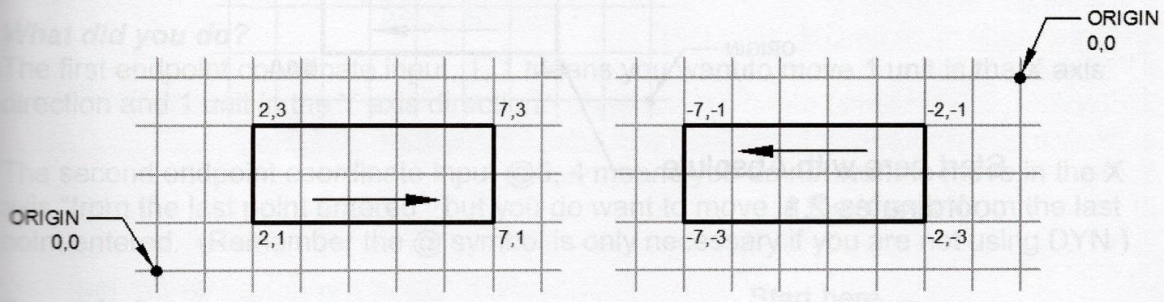
Absolute coordinates come ***from the ORIGIN*** and are typed as follows: **8, 5**

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.



Positive direction Negative direction

Very important:

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

The Dynamic Input button 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)

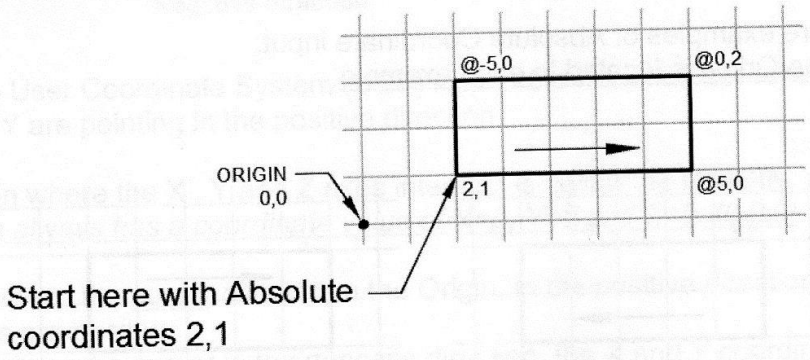
The first number represents the **X-axis** (horizontal) and the second number represents the **Y-axis** (vertical) just like the absolute coordinates.

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.

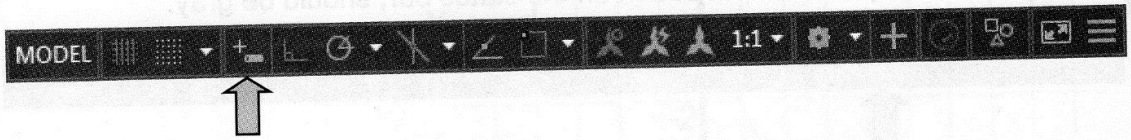
The following is an example of Relative Coordinate input.



Very important:

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

The Dynamic Input button 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.

0,0 ——— **3,0**

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 1 unit above and the line will be 4 units in length, perfectly vertical.

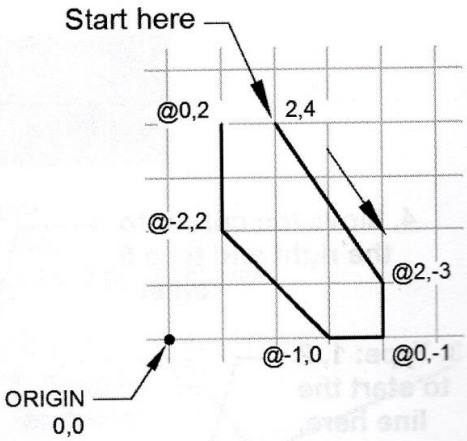
@0,4
|
1,1

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 hold down the **Shift key** and press **U** then **<enter>**, 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, **Orthomode** must be **ON**.

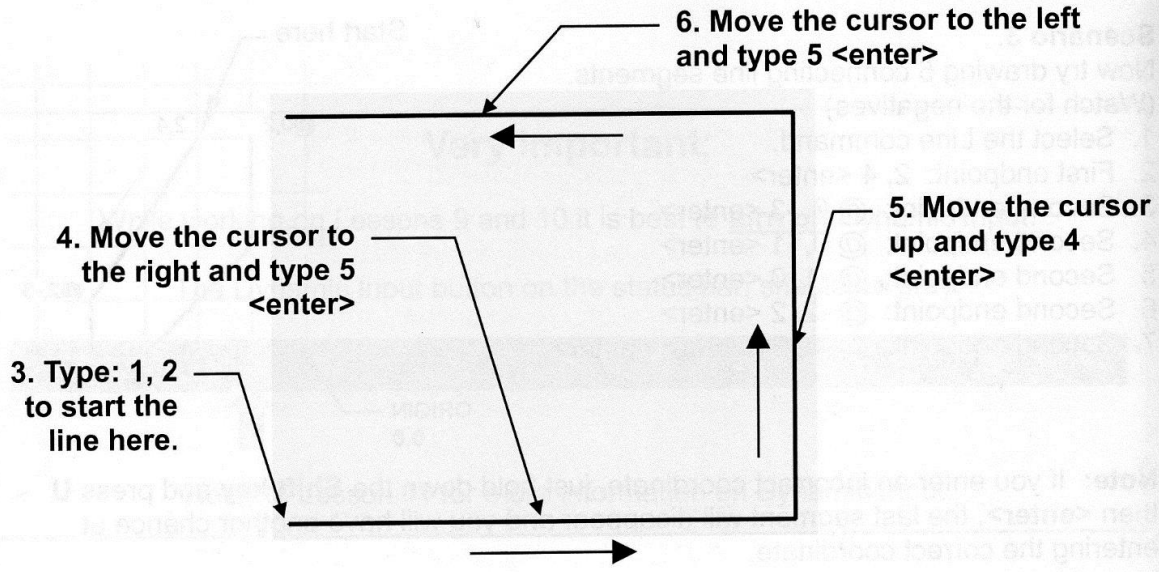
(Note: to specify distances on an angle, refer to Polar Input in Lesson 11)

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. Orthomode 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



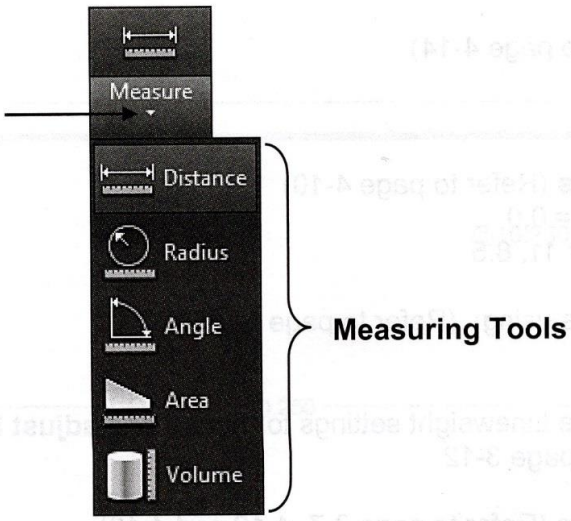
MEASURE TOOLS and ID Point

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 ▾

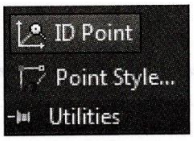


2. Select one of the tools and follow the instructions on the command line.

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.

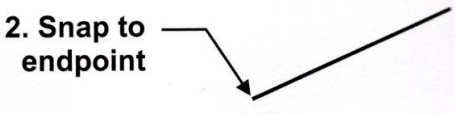
Ribbon = Home tab / Utilities Panel / ▾
Or
Keyboard = ID <enter>



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



```
Command: '_id Specify point:  X = 5.474     Y = 0.791     Z = 0.000
```