AutoCAD Coordinate Systems

AutoCAD allows you to define the placement of a point using two different coordinate systems. The Cartesian (rectangular) Coordinate System uses the “x” distance (left/right) and the “y” distance (up/down). The Polar Coordinate System uses the distance between points (length or magnitude) and the angle (direction or vector).

The system you use will depend upon the information you have. Rectangular coordinates are typically used when you know your grid positions. Polar coordinates are typically used when you know the exact angle between two points, along with the distance.

<table>
<thead>
<tr>
<th>Cartesian Coordinate System</th>
<th>Polar Coordinate System</th>
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</thead>
<tbody>
<tr>
<td>Locations are measured along the x axis (horizontal) and y axis (vertical).</td>
<td>Locations are measured as distance and angle in degrees, with 360 degrees in all.</td>
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<tr>
<td>![Cartesian Coordinate System Diagram]</td>
<td>![Polar Coordinate System Diagram]</td>
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</tbody>
</table>

**Absolute** coordinates are measured from the origin or 0,0 point.

**Relative** coordinates are measured from the last defined point.

Five methods used to specify the locations of points:

- **Interactive Method** – Click points on the screen with the cursor. This method is the least accurate unless you are using osnap or snap tools.
- **Absolute Cartesian Coordinate Method** – x,y – Type the x and y coordinates on the command line to locate a point relative to the origin (0,0).
- **Relative Cartesian Coordinate Method** – @x,y - Type the x and y coordinates on the command line to locate a point relative to the previous point.
- **Relative Polar Coordinate Method** – @distance<angle - Type the distance and angle on the command line to locate a point relative to the previous point.
- **Direct Distance Entry Method** – Move the cursor in the correct direction and type the distance on the command line (should be used with Ortho or Polar Tracking). This is the simplest method.
- **Surveyors Coordinates** – @100'<n29d59'e - "n29d59'e" is the AutoCAD notation for "North 29°59' East" and the distance precedes, making this method similar to Relative Polar Coordinates

***With AutoCAD versions 2008 and newer the state of “DYN” (Dynamic Input) determines whether Absolute or Relative coordinates are in use. Coordinate entry may take place in the drawing area versus on the command line.***
Example:

To Point B from Point A:
- Absolute Cartesian coordinates: 0,0 (A) and 4,4 (B)
- Relative Cartesian coordinates for Point B: 0,0 (A) and @4,4 (B)
- Interactive method with Snap and Grid set to 1

To Point D from Point C:
- Absolute Cartesian coordinates: -3,0 (C) and -3,4 (D)
- Relative Cartesian coordinates for Point D: -3,0 (C) and @0,4 (D)
- Interactive method with Snap and Grid set to 1
- Relative Polar Coordinates for Point D: -3,0 (C) and @4<90 (D)
- Direct Distance Entry for Point D: -3,0 (C) and 4 (D) with Ortho on and cursor above Point C

To Point F from Point E:
- Absolute Cartesian coordinates: -3,-4 (E) and 3,-2 (F)
- Relative Cartesian coordinates for Point F: -3,-4 (E) and @6,2 (F)
- Interactive method with Snap and Grid set to 1

Why wouldn’t you use Polar Coordinates for line AB and line EF?

How would the relative coordinates be different if you draw the lines the other direction?