LESSON 11

LEARNING OBJECTIVES

After completing this lesson, you will be able to:

1. Understand the Polar Degree Clock.
2. Draw Lines to a specific length and angle.
3. Draw objects using Polar coordinate input.
4. Use Dynamic Input.
5. Use Polar Tracking and Polar Snap.

Polar Coordinate Input

In Lesson 9, you learned to control the length and direction of horizontal and vertical lines using Relative Input and Direct Distance Entry. Now you will learn how to control the length and **angle** of a line using **Polar coordinate** input.

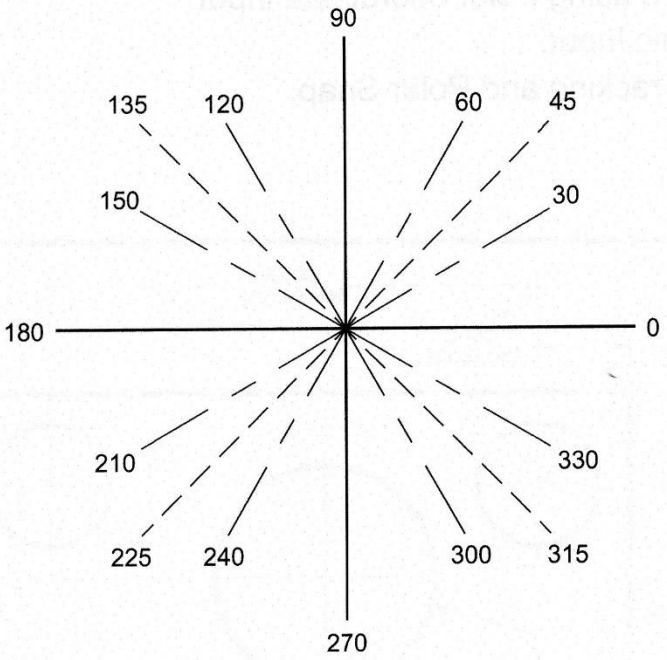
Understanding the "Polar Degree Clock"

Previously when drawing horizontal and vertical lines, you controlled the direction using a **Positive** or **Negative** input. ***Polar coordinate input is different***. The angle of the line will determine the direction.

Example: If you wanted to draw a line at a 45 degree angle toward the upper right corner, you would use the angle 45. But if you wanted to draw a line at a 45 degree angle toward the lower left corner, you would use the angle 225.

You may also use Polar coordinate input for horizontal and vertical lines using the angles 0, 90, 180, and 270. No negative input is required.

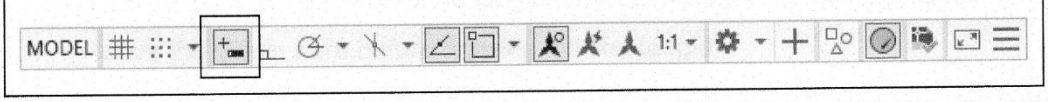
Polar Degree Clock



Drawing with Polar Coordinate Input

When entering Polar coordinates, the first number represents the **distance** and the second number represents the **angle**. The two numbers are separated by the **less than (<)** symbol. The input format is: **distance < angle**.

Note: If you are using Dynamic Input, refer to the next page.



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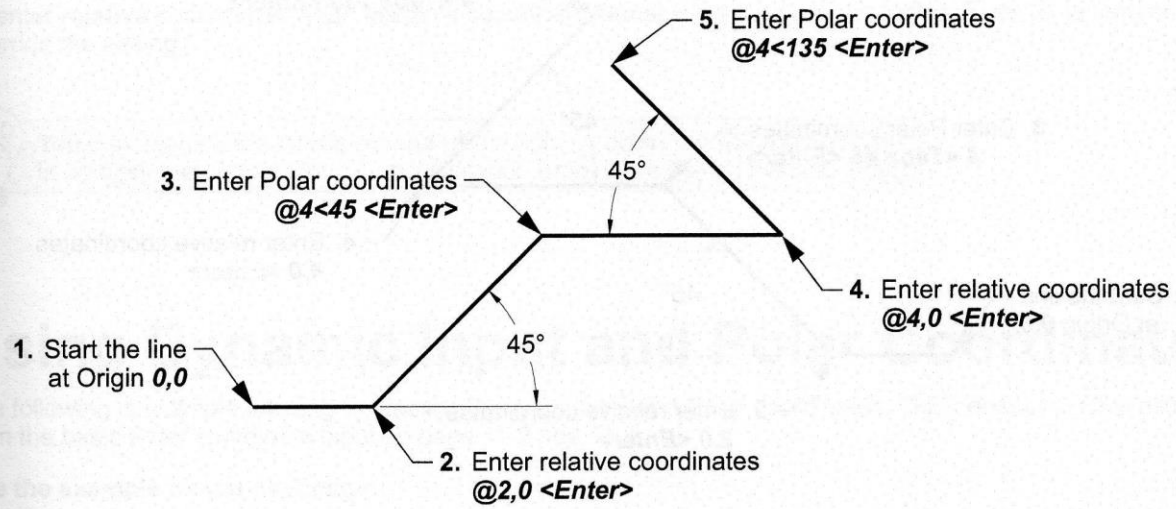
A Polar coordinate of **@6<45** will be a distance of **6 units** and an angle of **45 degrees** from the last point entered.

Here is an example of Polar coordinate input for four line segments.

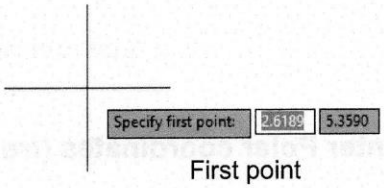


Dynamic Input

To help you keep your focus in the "drawing area", AutoCAD has provided a command interface called **Dynamic Input**. You may input information within the Dynamic Input tooltip box instead of on the Command Line.

When AutoCAD prompts you for the **first point**, the Dynamic Input tooltip displays the **absolute: X, Y** distance from the Origin.

- Enter the **X** dimension, press the ***<Tab>*** key, enter the **Y** dimension, and then press ***<Enter>***.

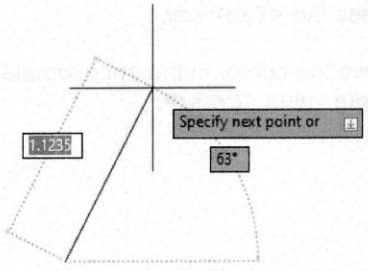


First point

When AutoCAD prompts you for the **second** and all **next points**, the Dynamic Input tooltip displays the **relative: distance and angle** from the last point entered.

Enter the **distance**, press the ***<Tab>*** key, move the cursor in the approximate desired angle, enter the **angle**, and then press ***<Enter>***.

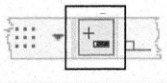
(**Note:** The **@** is not necessary.)



Second and all next points

How to turn Dynamic Input on or off

Select the **Dynamic Input** button on the Status Bar or use the ***<F12>*** key.



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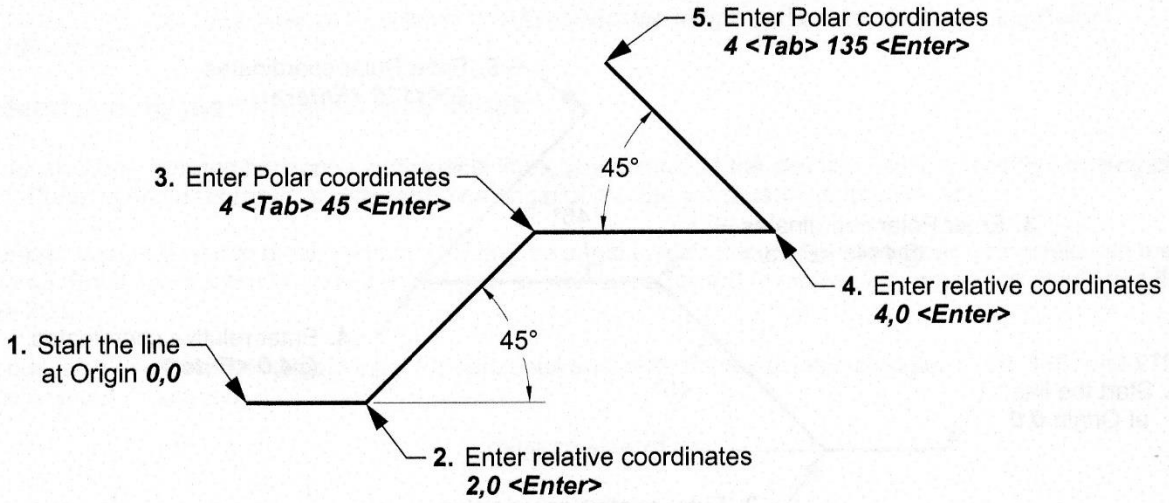
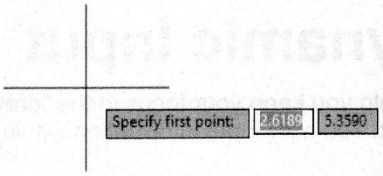
Here is an example of Dynamic Input for four line segments.



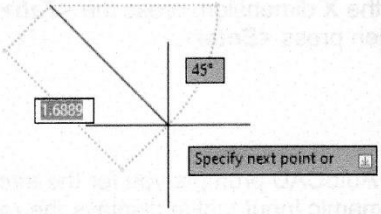
To enter Cartesian coordinates (X and Y)

1. Enter an **"X"** coordinate value and a **comma**.
2. Enter a **"Y"** coordinate value ***<Enter>***.

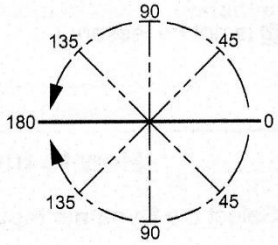


To enter Polar coordinates (from the last point entered)

1. Enter the **distance** value from the last point entered.
2. Press the ***<Tab>*** key.
3. Move the cursor in the approximate direction and enter the **angle** value ***<Enter>***.



Note: Move the cursor in the approximate direction and enter an angle value of **0-180 only**. Dynamic Input does not use 360 degrees. (Refer to the example on the next page.)



How to specify absolute or relative coordinates while using Dynamic Input

To enter **absolute** coordinates when relative coordinate format is displayed in the tooltip: Enter **#** to temporarily override the setting.

To enter **relative** coordinates when absolute coordinate format is displayed in the tooltip: Enter **@** to temporarily override the setting.

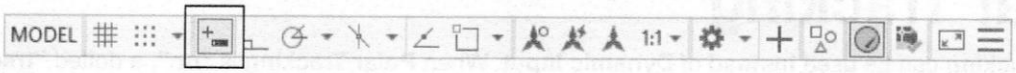
CAD TIP! You may toggle OrthoMode **on** and **off** by holding down the ***<Shift>*** key. This is an easy method for using Direct Distance Entry while using Dynamic Input.

Using Dynamic Input and Polar Coordinates

The following is a simple drawing to practice Dynamic Input and Polar coordinates. Think about how this differs from the basic Polar coordinate input on page 11-2 and 11-3.

See the example on the next page.

1. Set the Status Bar as follows:
   Dynamic Input = **on** All others = **off**



2. Select the **Line** command.
3. Start the line near the lower left corner of the drawing area.

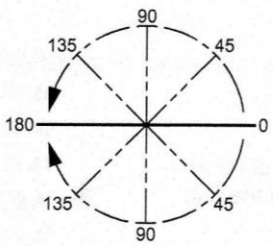
Line A
4. Move the cursor to the right.
5. Type ***2 [50.8] <Tab> 0 <Enter>*** (**Note:** Sizes in **[....]** are for metric users.)

Line B
6. Move the cursor up and to the right.
7. Type ***3 [76.2] <Tab> 45 <Enter>***.

Line C
8. Move the cursor up.
9. Type ***2 [50.8] <Tab> 90 <Enter>***.

Line D
10. Move the cursor down and to the left.
11. Type ***4 [101.6] <Tab> 135 <Enter>***. (**Note**: 180 – 45 = **135**)

If you move the cursor around, you will notice that the angle value display never exceeds 180 degrees.



Line E
12. Move the cursor to the left.
13. Type ***1.293 [32.84] <Tab> 180 <Enter>***.

Line F
14. Move the cursor down.
15. Type ***1.293 [32.84] <Tab> 90 <Enter>***.
16. Press ***<Enter>*** to stop.

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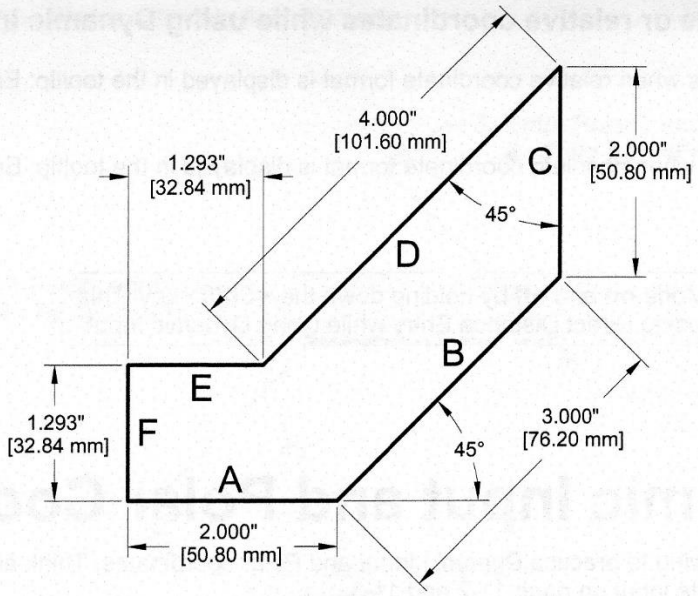
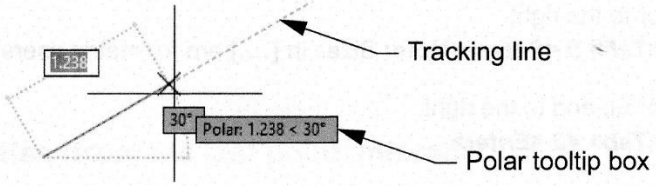


Note: For more on Dynamic Input, see Appendix B.

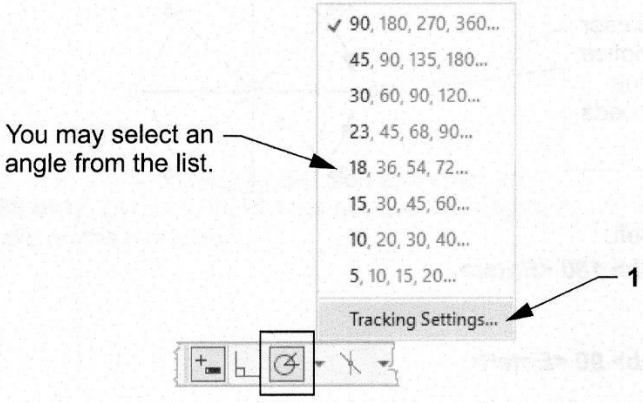
Polar Tracking

Polar Tracking can be used **instead** of **Dynamic Input**. When **Polar Tracking** is **"on"**, a dotted **"tracking"** line and a **"tooltip"** box appear. The tracking line **"snaps"** to a **preset angle increment** when the cursor approaches one of the preset angles. The word **"Polar"**, followed by the **"distance"** and **"angle"** from the last point appears in the box. (A step-by-step example is described on the next page.)



How to set the Increment Angle

1. Left click on the **Polar Tracking** button down arrow ▾ on the Status Bar and select **"Tracking Settings"**, or select an angle from the list.



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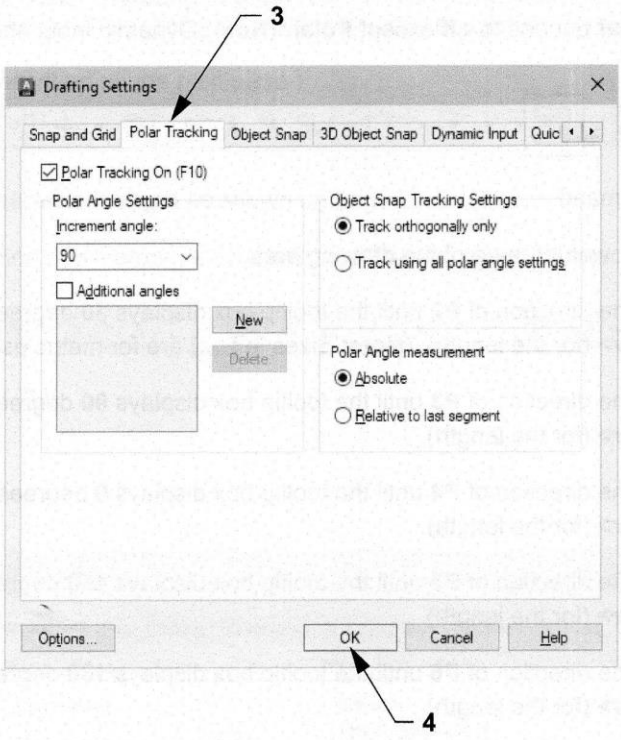
. The **Drafting Settings** dialog box will appear.

. Select the **Polar Tracking** Tab.



Polar Tracking Tab descriptions

Polar Angle Settings

Increment angle: Choose from the Increment angle list including 90, 45, 30, 22.5, 18, 15,10, and 5. It will also snap to the selected angles multiples. For example, if you choose 30, it will snap to 30, 60, 90, 120, 150, 180, 210, 240, 270, 300, 330, and, 0.

Additional angles: Check this box if you would like to use an angle other than one in the Increment angle list. For example, 12.5.

New: You may add an angle by selecting the **"New"** button. You will be able to snap to this new angle in addition to the incremental angle selected. **But you will not be able to snap to its multiple**. For example, if you selected 7, you would not be able to snap to 14.

Delete: Deletes an Additional angle. Select the Additional angle to be deleted and then the **Delete** button.

Polar Angle Measurement

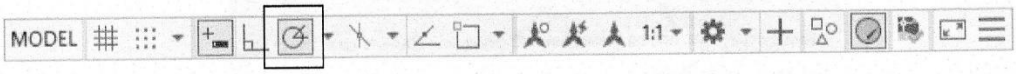
Absolute: Polar Tracking **angles** are relative to the UCS.

Relative to last segment: Polar Tracking **angles** are relative to the last segment.

. Make any necessary changes and then select the **OK** button to close the **Drafting Settings** dialog box.

Using Polar Tracking and DDE

1. Set the Polar Tracking Increment angle to **15**.
2. Turn all the Status Bar buttons to **off** except **Polar**. (**Note:** Dynamic Input should be **off**, but you may wish to leave it on.)



3. Select the **Line** command.

P1 4. Start the line in the lower left area of the drawing area.

P2 5. Move the cursor in the direction of **P2** until the tooltip box displays **30** degrees.
6. Type ***2 [50.8] <Enter>*** (for the length). (**Note:** Sizes in **[....]** are for metric users.)

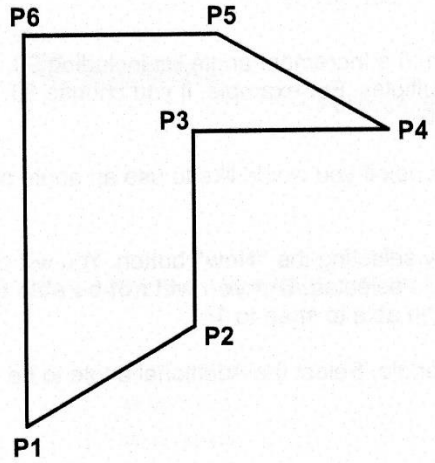
P3 7. Move the cursor in the direction of **P3** until the tooltip box displays **90** degrees.
8. Type ***2 [50.8] <Enter>*** (for the length).

P4 9. Move the cursor in the direction of **P4** until the tooltip box displays **0** degrees.
10. Type ***2 [50.8] <Enter>*** (for the length).

P5 11. Move the cursor in the direction of **P5** until the tooltip box displays **150** degrees.
12. Type ***2 [50.8] <Enter>*** (for the length).

P6 13. Move the cursor in the direction of **P6** until the tooltip box displays **180** degrees.
14. Type ***2 [50.8] <Enter>*** (for the length).

15. Then type ***C*** for Close.



CAD TIP! You may toggle Polar Tracking **on** or **off** by using one of the following methods: either left click on the **Polar** button on the Status Bar or press ***<F10>***.

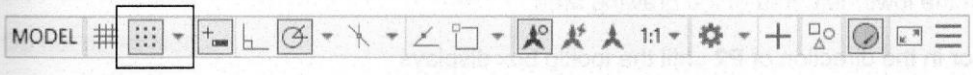
Polar Snap

Polar Snap is used with **Polar Tracking** to make the cursor snap to specific **distances** and **angles**. If you set **Polar Snap distance** to **1** and **Polar Tracking** to **angle 30**, you can draw lines 1, 2, 3, or 4 units long at an angle of 30, 60, 90, etc. without typing anything. You just move the cursor and watch the tooltips.

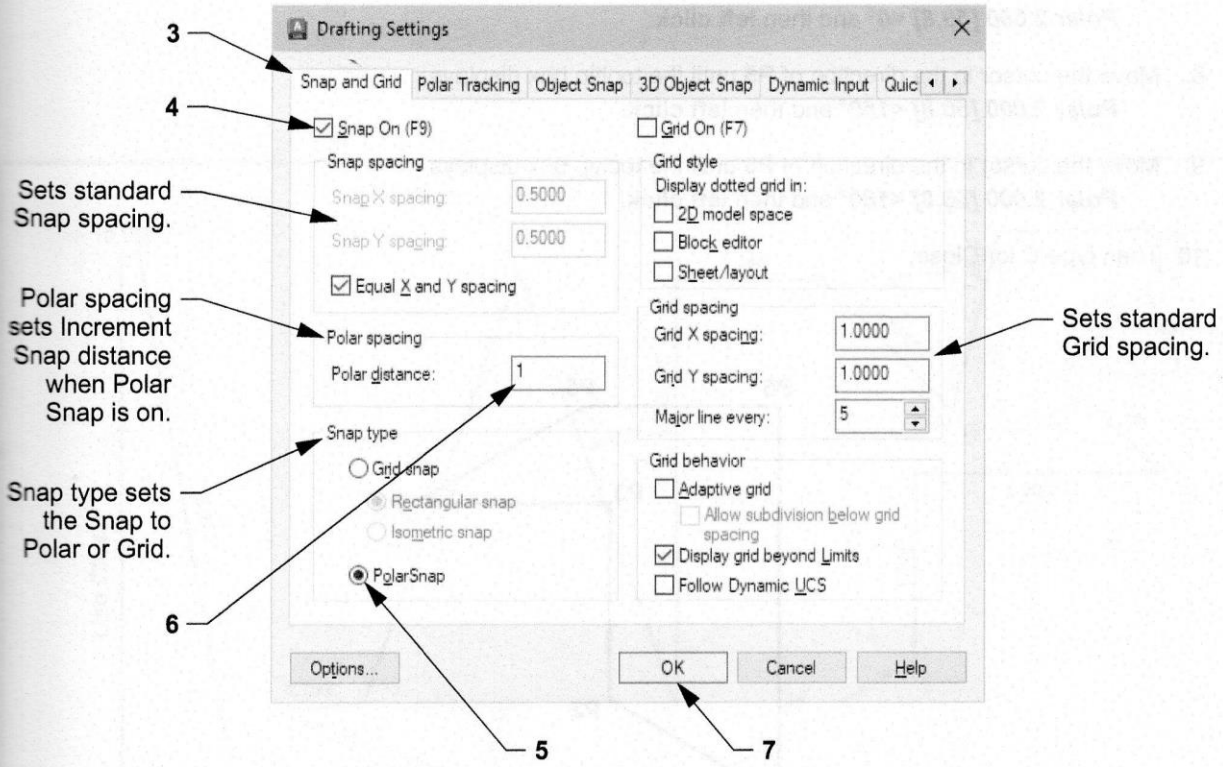
(A step-by-step example is described on the next page.)

Setting the Polar Snap

1. Set the **Polar Tracking Increment angle** as shown on page 11-7.
2. Left click on the **Snap** button down arrow ▾ on the Status Bar and select **"Snap Settings".**



3. Select the **Snap and Grid** Tab.

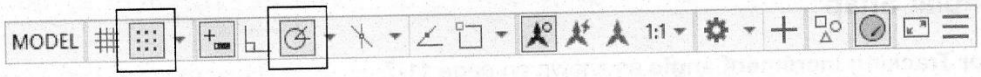


4. Select **Snap On**.
5. Select **PolarSnap**.
6. Set the **Polar distance**.
7. Select the **OK** button.

Using Polar Tracking and Polar Snap

Now let's draw the objects below again, but this time let's use "Polar Snap".

1. Set Polar Tracking Increment angle to **30** and Polar Snap to **1.000 [25.4]**
2. Turn all the Status Bar buttons to **off** except **Snap** and **Polar**.



3. Select the **Line** command.

P1 4. Start the line in the lower left area of the drawing area.

P2 5. Move the cursor in the direction of **P2** until the tooltip box displays ***Polar 2.000 [50.8] <30°*** and then **left click**.

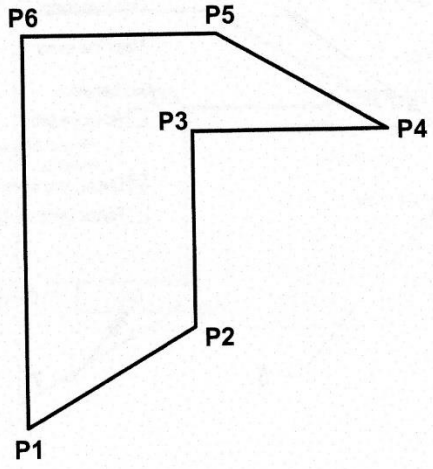
P3 6. Move the cursor in the direction of **P3** until the tooltip box displays ***Polar 2.000 [50.8] <90°*** and then **left click**.

P4 7. Move the cursor in the direction of **P4** until the tooltip box displays ***Polar 2.000 [50.8] <0°*** and then **left click**.

P5 8. Move the cursor in the direction of **P5** until the tooltip box displays ***Polar 2.000 [50.8] <150°*** and then **left click**.

P6 9. Move the cursor in the direction of **P6** until the tooltip box displays ***Polar 2.000 [50.8] <180°*** and then **left click**.

10. Then type ***C*** for Close.



CAD TIP! You may **override** Polar settings at any time by typing: Polar coordinates (***@Length<Angle***) on the Command Line. For example, ***@2<30***