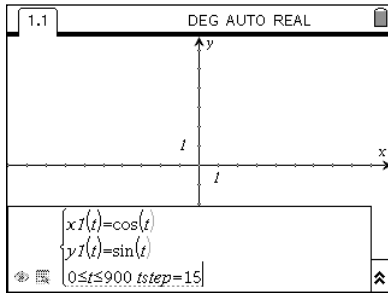


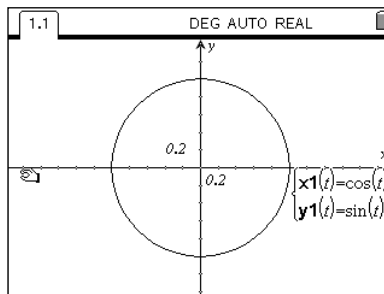
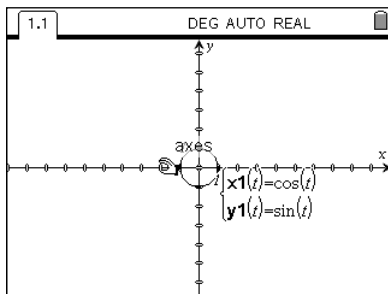
Note 13A: Unit Circle

Complete the following steps to graph the unit circle using parametric equations.

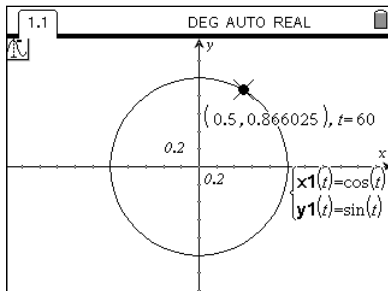
- Make sure your handheld is in Degree mode. If you need help with Degree mode, see **Note 12A**.
- In the Graphs & Geometry application, press **(menu)** and choose Graph Type | Parametric.
- In the entry line, type $\cos(t)$ for $x(t)$. Press **(tab)** and type $\sin(t)$ for $y(t)$. Move to the final line and change the numerical values to $0 \leq t \leq 900$ and $tstep = 15$.
- Press **(enter)** to display the graph. Press **(ctrl)** **(G)** to hide the entry line.



- Move the cursor to a tick mark on an axis, press **(ctrl)** **(mouse cursor)**, use the NavPad to change the scale of the axes and zoom in on the unit circle. Press **(esc)** to let go of the tick mark.

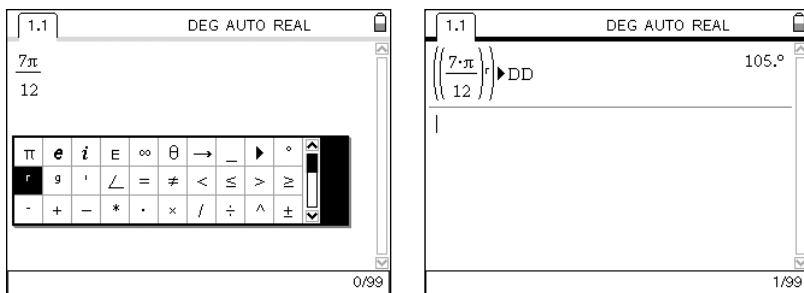


- To find the coordinates of points on the unit circle, press **(menu)** and choose Trace | Graph Trace.



For another example, follow these steps to convert $\frac{7\pi}{12}$ radians to degrees:

- Set the calculator to Degree mode.
- Enter $\frac{7\pi}{12}$ and press $\text{ctrl} \left[\frac{\text{deg}}{\text{rad}} \right]$ and choose r. Then press $\left[\frac{\text{deg}}{\text{rad}} \right] \text{1} \text{D}$, choose $\blacktriangleright\text{DD}$, and press $\left[\text{enter} \right]$ twice.
- So $\frac{7\pi}{12}$ radians is equivalent to 105° .

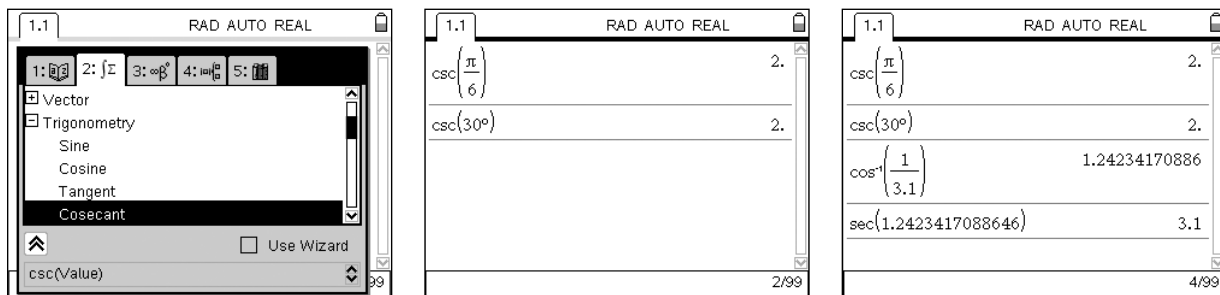


Note 13C: Secant, Cosecant, and Cotangent

All of the trigonometric functions and the inverse trigonometric functions can be found in the trigonometry section of the catalog. To access these functions, press $\left[\frac{\text{deg}}{\text{rad}} \right] \text{2}$, choose Trigonometry, and then choose the appropriate trigonometric or inverse trigonometric function.

Alternatively, you can type in the trigonometric function. For example, to find the cosecant of 30 degrees, type $\text{csc}(30$ and press $\text{ctrl} \left[\frac{1}{\text{ }} \right] \left[\text{enter} \right] \left[\text{enter} \right]$.

You cannot type in the inverse trigonometric functions, but you can find the inverse cosecant, inverse secant, and inverse cotangent by using the inverse of a reciprocal trigonometric function with the reciprocal of the input. For example, to find $\text{sec}^{-1}(3.1)$, press $\text{ctrl} \left[\frac{\text{cos}^{-1}}{\text{cos}} \right]$, type $1 / 3.1$, and press $\left[\text{enter} \right]$.



Note 13D: Collecting Sound Frequency Data

The microphone sensor is not currently compatible with the TI-Nspire. Change the TI-Nspire faceplate to the TI-84 Plus faceplate.

You need a CBL2 and the EasyData application to collect sound frequency data. Plug the microphone probe into channel CH 1 of the CBL2, and connect the calculator to the CBL2. Press **[APPS]** and select EasyData. If the program does not recognize the microphone, follow these steps:

- Press Setup (**[WINDOW]**) and select Other Sensors.
- Select CH1 and press Next (**[ZOOM]**). Then choose Microphone and press Next.

Ring the tuning fork and press Start (**[ZOOM]**) to begin collecting data. The CBL2 collects data for only 0.02 second, so it will stop again almost immediately. The calculator will display a graph. If the graph does not look like a sinusoidal curve, press Main (**[TRACE]**) and then Start (**[ZOOM]**) to try again. Press OK (**[GRAPH]**) to overwrite the data. If you continue to have trouble collecting good data, adjust the microphone's position.

When you have good data, press Main (**[TRACE]**) and then Quit (**[GRAPH]**). The calculator will tell you that time data are stored in list L1 and sound frequency data are stored in list L2. Press OK (**[GRAPH]**).

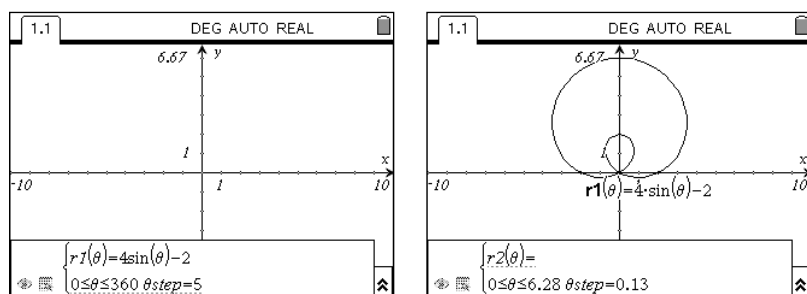
The microphone sensor cannot be used with the TI-Nspire CAS at this time. Go to <http://education.ti.com> for more information.

Note 13E: Polar Coordinates**Graphing Polar Coordinates**

Polar equations can be graphed using radians or degrees. To learn how to change to Degree mode, see **Note 12A**. You can graph a polar equation using these steps:

- In the Graphs & Geometry application, press **[menu]** and choose Graph Type | Polar.
- In the entry line, type an equation in the form $r = f(\theta)$.
- Move to the final line and change the numerical values of the inequality to the appropriate values.

Press **[ctrl]** **[G]** to toggle between hiding and displaying the entry line. Change the viewing window if necessary. See **Note 4D** for help on setting windows.

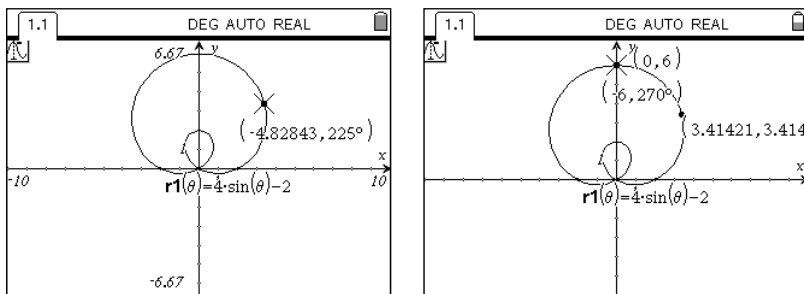


(continued)

Tracing Polar Coordinates

To trace on a polar graph, press MENU and choose Trace | Graph Trace. Press \blacktriangleright or \blacktriangleleft to increase or decrease the angle measure, θ . Alternatively, you can type the angle measure and press ENTER . The coordinates are displayed in the form (r, θ) . Press POINT to create a point at the current coordinates. This point will be labeled with rectangular coordinates instead of polar coordinates. Press MENU and choose Trace | Trace Settings to adjust the trace step.

To move to a different graph, press \blacktriangleup or \blacktriangledown . Press ESC to put away the trace tool.



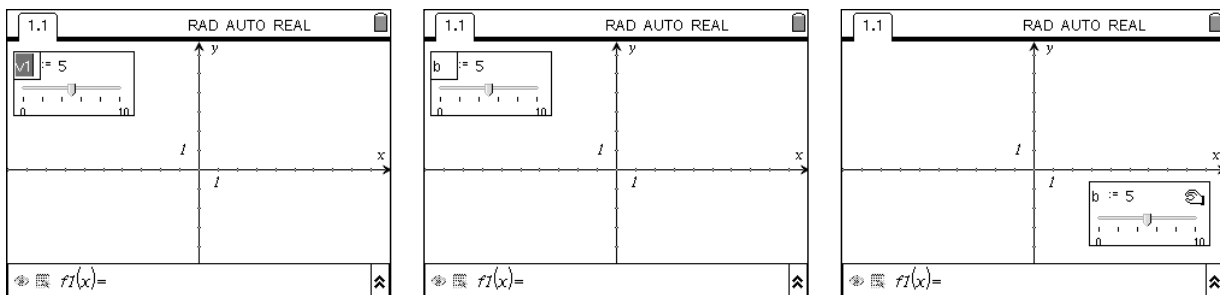
Note 13F: Sliders

Sliders allow you to control the values of coefficients in equations. Note that in Graphs & Geometry, you can grab the graph of a function, dynamically alter it, and observe the changes that occur in its equation. Sliders allow you to dynamically change the values of coefficients in an equation and observe the resulting changes in the graph of the equation. You can insert sliders into Graphs & Geometry pages and Data & Statistics pages.

Inserting and Using a Slider

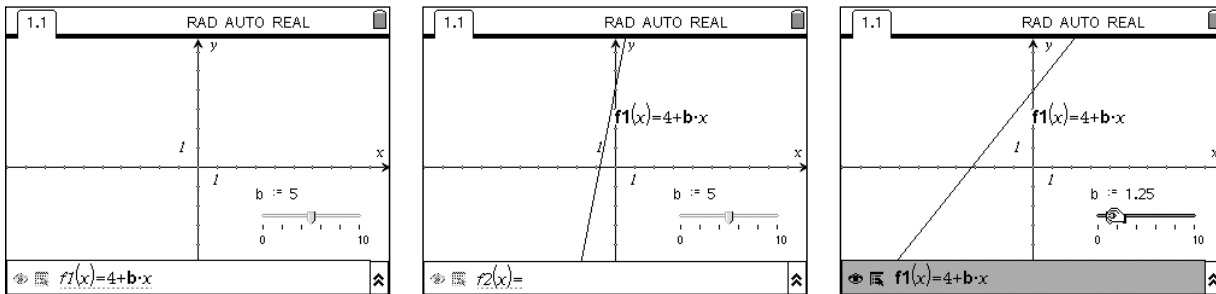
Follow these steps to insert a slider:

- Press HOME and choose Graphs & Geometry OR Data & Statistics.
- Press MENU and choose Actions | Insert Slider. A slider appears on the graphing screen. Type a name for the slider and press ENTER .
- If the slider is not in a convenient location, move the cursor to the upper-right corner of the slider and press CTRL POINT . Move the slider to the desired location and press ESC .



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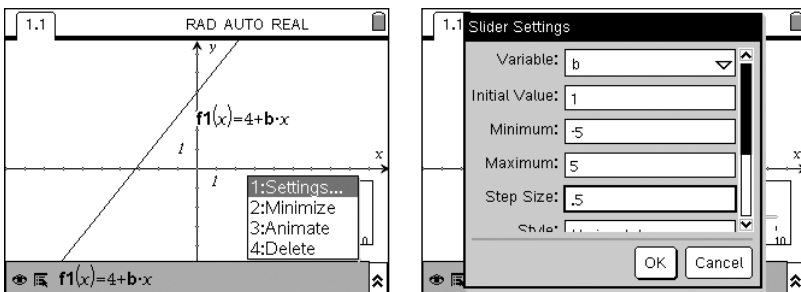
- d. Move the cursor to the entry line and press . Type a function, typing the name of the slider in place of the coefficient you want to vary. It is important to enter operation symbols in the function. For example, if b is the slider, do not type $4 + bx$. Type $4 + b \cdot x$.
- e. Press to graph the function.
- f. Press and move the cursor to the sliding tab on the slider. Press and move the tab to the desired value. Alternatively, move the cursor to the value of the slider. Press , type the desired value for the slider, and press . The graph will adjust automatically.



Changing Slider Settings






The slider is preset to values between zero and ten. To change these values, move the cursor over the slider and press . Then press and choose Settings.

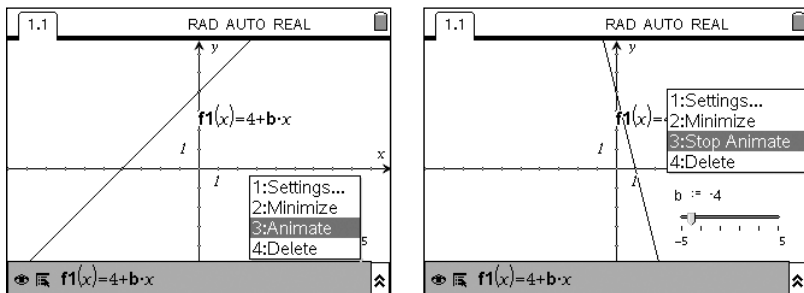
In the Slider Settings dialog box, change the values to the appropriate minimum and maximum. The value you enter in the “Step Size” box will determine the steps the handheld will use if you animate the slider. Press .








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Animating a Slider

To animate the slider, move the cursor over the slider and press . Then press   and choose Animate. The slider immediately animates and the graph changes as the slider value changes. To stop the animation, press   and choose Stop Animate.



Minimizing a Slider

To minimize the slider, move the cursor over the slider and press . Press   and choose Minimize. The slider can be controlled by the up and down arrows next to the slider value. Move the cursor to these arrows to change the value of the slider in step increments. To return the slider to its original size, press   and choose Maximize.

