

Sine of the Times

Functions
Sine
Graphing

Standards: Problem Solving, Communication, Reasoning, Algebra, and Functions.

Materials: CFX-9850G or CFX-9850Ga PLUS

Calculator Menus: RUN and GRAPH

The graphing calculator can be used to “discover” the impact of changes in functions. Use the GRAPH menu to enter these equations and answer the following questions. If there are any equations already in the GRAPH menu, either delete or de-select them.

Enter $\sin X$ in Y1 and graph.

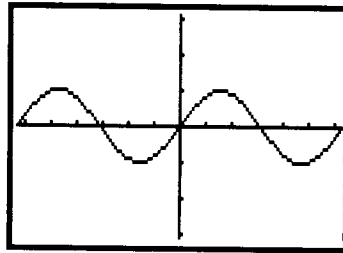


Figure 1

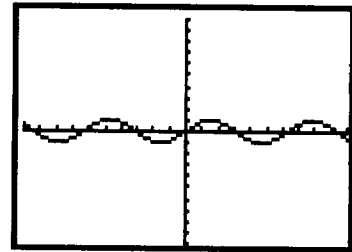


Figure 2

Typically the CFX-9850G will be in either the INIT or STD setting which will yield a screen similar to Figure 1 or Figure 2 respectively. If your graph does not resemble Figure 1 or Figure 2, check to make sure the calculator is set for Radians and not degrees.

Reset the limits of the graph window so the X values go from -2π to $+2\pi$ and the Y values go from -1 to $+1$ and regraph. Your graph should resemble Figure 3.

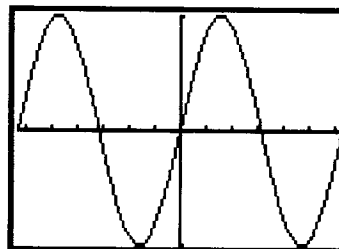


Figure 3

Make Y2: $\sin(2x)$. Change the color of the equation/graph to orange. Compare the blue equation (Y1) and the orange equation (Y2).

How are they alike? **A.**

How are they different? **B.**

Deleting an Equation in the GRAPH Menu

Highlight the equation
Press F2 (DEL)
F1 (YES)

De-selecting an Equation in the GRAPH Menu

Highlight the equation
Press F1 (SEL)
The = sign will turn blue when de-selected.

Selecting Graph Type

In the GRAPH Menu
Press: F3 (TYPE)
Make selection

Changing from Degrees to Radians

Press Shift key
Menu key
Down Arrow to Angle
F2 (Rad)
Exit key

Sine of the Times

Resizing the Graph Window

Press Shift key
F3 (V-WIN)
Highlight Xmin,
Xmax, Ymin, or
Ymax.
Enter desired value
EXE key
Repeat steps to
alter min or max
values for X or Y.

? represents a high level question

Changing the Color of an Equation and Graph in the GRAPH Menu

Highlight the equation.
Press F4 (COLR)
Select desired color:
F1 (Blue),
F2 (Orng), or
F3 (Grn)
Exit key

Shifting from the Equation Screen to the Graph Screen

Graph the equation.
Press SHIFT key,
F6 (G↔T).
F6 (G↔T).
Repeat process to toggle
between screens.

Compare the blue graph with the orange graph and state your conclusions. **C.**

Make Y3: $\sin(3x)$. Change the equation/graph to green. Compare the green equation with the orange and blue ones.

How are they alike? **D.**

How are they different? **E.**

Compare the green graph with the others and state your conclusions. **F.**

Make Y4: $\sin(4X)$. Predict how the graph of Y4 will compare with the other 3. **G.**

Generalize what will happen as the coefficient of X in $\sin(BX)$ increases. **H.**

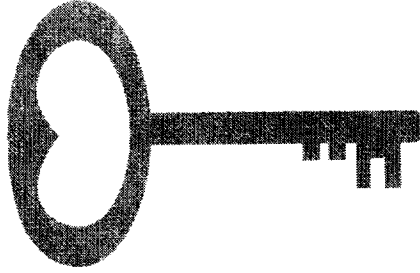
What will happen if $\sin(62X)$ is graphed? **I.**

Graph $\sin(62X)$. Is this what you expected? Why or why/not. **J.**

What is the lesson in graphing $\sin(62X)$? **K.**

Your anticipation about $\sin(62x)$ was probably correct, but technology is limited as it attempts to graph certain functions. Find another example that does not behave as anticipated because of technology.

Solution Key



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- A.** Both have a Y. Both have an X. Both sine. Max and min are same.
- B.** Y1 has X. Y2 has 2X. **C.** The orange one goes up and down more.
- D.** Each has a Y. Each has an X. Each sine. Max and min are same.
- E.** Y1 has X. Y2 has 2X. Y3 has 3X. **F.** Green one goes up and down even more.
- G.** It will go up and down even faster.
- H.** As B increases, the graph goes up and down faster. Cycle shorter. Period decreases.
- I.** Paint the screen. **J.** No.
- K.** Have to think. Cannot blindly trust technology.