

Exploration with Trigonometric Functions on the Graphing Calculator - (TI84C)

Part I

1. Enter the equation $y_1 = \cos(x)$ and graph the function using Zoom 7. Trig. Make an observation about the period, amplitude, y- and x- intercepts.
2. Enter the equation $y_2 = 2 \cos(x)$ in the same window. Make an observation about the similarities and differences between $y_1 = \cos(x)$ and $y_2 = 2 \cos(x)$.
3. Enter the equation $y_3 = \cos(2x)$ in the same window. Make an observation about the similarities and differences between $y_1 = \cos(x)$, $y_2 = 2 \cos(x)$, and $y_3 = \cos(2x)$.
4. Enter the equation $y_4 = 2 + \cos(x)$ in the same window. Make an observation about the similarities and differences between $y_4 = 2 + \cos(x)$, $y_1 = \cos(x)$, $y_2 = 2 \cos(x)$ and $y_3 = \cos(2x)$.
5. Write a summary statement about the effect of the value of 2 on the amplitude, period, positioning of the function, and the x- and y-intercepts for each equation when the various forms of $y = a + b \cos(cx)$ are graphed.

Part II

1. Use the same window as Part I and repeat the observations for $y = \sin(x)$ and $y = a + b \sin(cx)$.
2. Explain how the same constants effected the amplitude, period, positioning of the function, and the x- and y-intercepts when $y = a + b \sin(cx)$ was graphed.

Part III

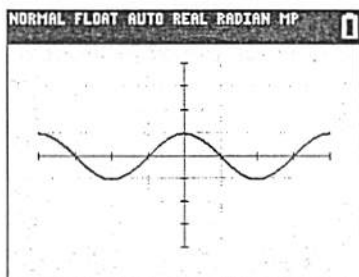
1. Make a prediction about the appearance of the following four functions.

$$y_1 = 4 \sin(x), y_2 = \sin(4x), y_3 = 4 + \sin(x) \text{ and } y_4 = 4 + 4 \sin(4x)$$

2. After you have written down your observations, graph them on the graphing calculator to check your predictions. Remember to choose an appropriate window so you can see all four functions between $(-2\pi, 2\pi)$.

Part IV.

1. Determine what cosine function is graphed in figure 1. Use trial and error to explore different translations and stretchings of the cosine function.



Graph of $y = \cos(x)$ for
 $-2\pi \leq x \leq 2\pi$

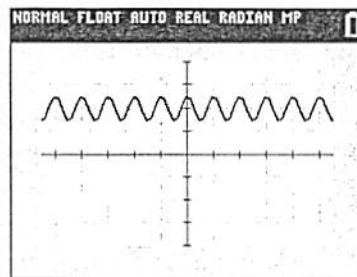


Figure 1
Graph of $y = a + b \cos(cx)$
for $-2\pi \leq x \leq 2\pi$