

Recognizing Definitions:

A. There are 4 definitions you need to be familiar with: amplitude, horizontal displacement, vertical displacement, and wavelength (sometimes called period).

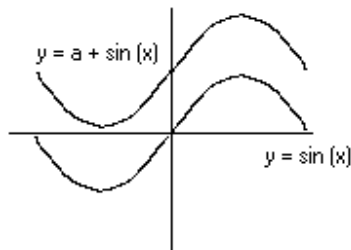
1. In general we can have an equation that is of the form:

$$y = a + b \sin c(x-d)$$

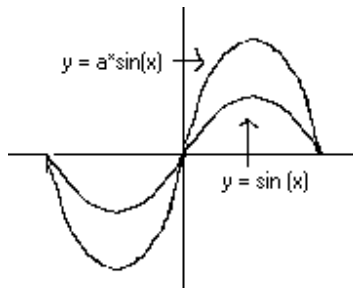
Note: The function does not have to be a sine function. For ease of writing, this page will show only those graphs for $\sin x$.

2. Each value: a , b , c , and d , play a special part in manipulating the graph of the function y .

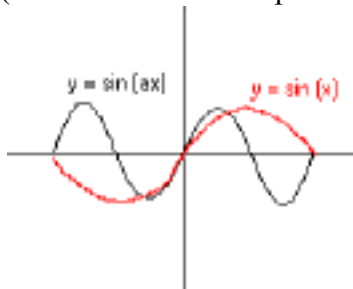
3. ' a ' is the vertical displacement:



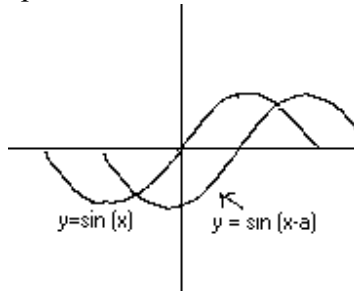
4. ' b ' is the amplitude:



5. ' c ' is the wavelength (sometimes called the period):



6. 'd' is the horizontal displacement:



B. Examples

Ex [1] On the graph of $y = 4 - 3 \sin 2x$, the amplitude is?

- The answer is 3. Notice, that for the amplitude, the answer will always be positive, even when there is a negative sign in front. This is the same for the wavelength. All other values can be negative.

Ex [2] On the graph of $y = 2 - 5 \sin 2(x+4)$, the horizontal displacement is?

- In this example we have to be careful. If you notice, the sign is positive. If you look in the equation above, the sign should be negative which means our answer is going to be negative.
- The answer is -4. Notice, it does not matter even though there is a 2 in front of the $()$. As long as the expression is $(x-b)$ and not $(ax - b)$ the answer is simply b. If it is $(ax - b)$ the horizontal displacement is b/a .