

Translations of Sinusoidal FunctionsVertical Shifts:

$$y = \sin x + c$$

$$y = \cos x + c$$

This is the same as vertical shifts with other functions.

* If $c > 0$, shift the y-values up c – units.

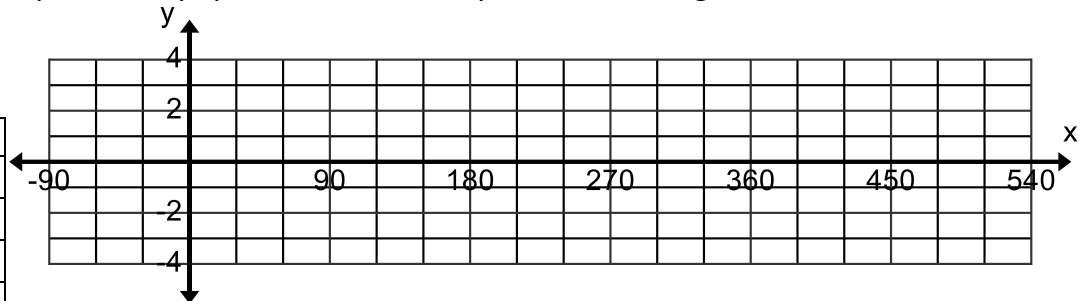
* If $c < 0$, shift the y-values down c – units.

The “sinusoidal axis” is at $y = c$

Example 1: Sketch the graph of $y = \sin x$ and $y = \sin x + 2$ (use the 5 key points)

NOTE: If it does not say how many cycles to sketch then you must fill the grid.

x	$\sin x$	$\sin x + 2$
0°		
90°		
180°		
270°		
360°		



Amplitude:

Period:

Sinusoidal Axis:

Phase Shift:

Domain:

Range:

Horizontal Shifts (also known as PHASE SHIFTS)

$$y = \sin(x - d)$$

$$y = \cos(x - d)$$

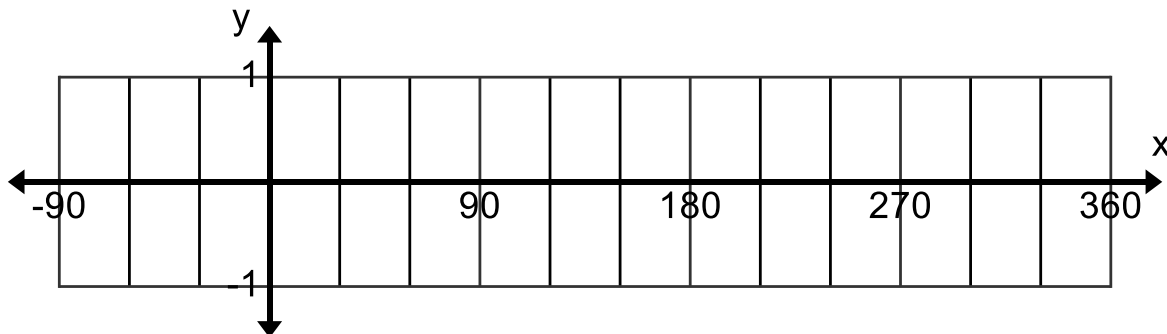
This is the same as horizontal shifts with other functions.

* If $d < 0$, i.e., the bracket looks like $(x + \text{number})$, shift the graph left d units.

* If $d > 0$, i.e., the bracket looks like $(x - \text{number})$, shift the graph right d units.

Example 2: Sketch one cycle of $y = \cos x$ and $y = \cos(x + 30^\circ)$ on the grid below.

$y = \cos x$	$(0^\circ, \quad)$	$(90^\circ, \quad)$	$(180^\circ, \quad)$	$(270^\circ, \quad)$	$(360^\circ, \quad)$
$y = \cos(x + 30^\circ)$					



Amplitude:

Period:

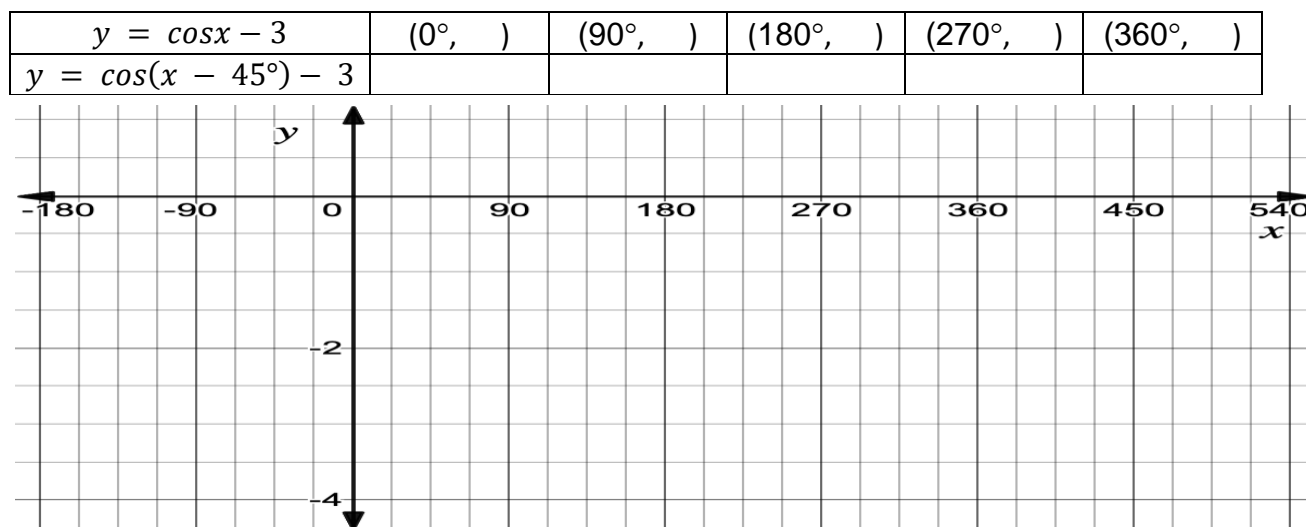
Phase Shift:

Sinusoidal Axis:

Domain:

Range:

Example 3: Sketch two cycles of $y = \cos x - 3$ and $y = \cos(x - 45^\circ) - 3$ on the grid below.



Amplitude:

Period:

Phase Shift:

Sinusoidal Axis:

Domain:

Range:

Example 4: If the amplitude is 6, the sinusoidal axis is $y = -3$, period is 600° and the phase shift is 60° to the right, determine the equation of the sine function.

Example 5: Given the equation $y = \frac{1}{5} \sin\left(\frac{3}{2}(x + 120^\circ)\right) + 7$, identify:

Amplitude:

Period:

Phase Shift:

Sinusoidal Axis:

Max value:

Min value:

Domain:

Range: