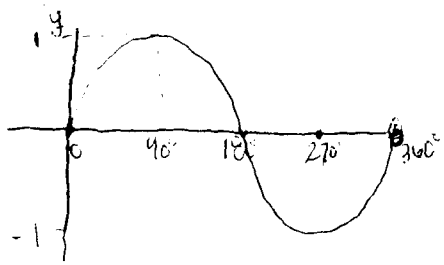
Let's Wave Hello to the Graphs of the Sine Function and the Cosine Function!

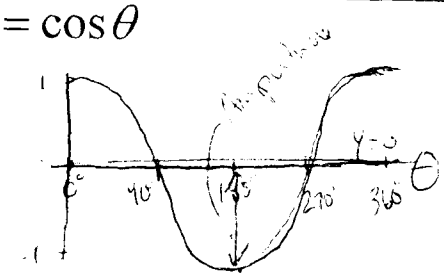
$y = \sin\theta$



θ	y
0	0
90	1
180	0
270	-1
360	0

Amplitude = 1
Central Axis: y = 0
Period Length = 360°
Phase Shift: none

$y = \cos\theta$



θ	y
0	1
90	0
180	-1
270	0
360	1

Amplitude = 1
Central Axis: y = 0
Period Length = 360°
Phase Shift: none

Important Terminology for Sine Waves and Cosine Waves

Amplitude – the distance from the central axis to the crest/trough of the wave
Period Length – the length of one complete wave or cycle (measured in degrees)
Phase Shift – the movement left or right away from the standard position of the wave
Vertical Shift – the movement of the central axis up or down

THIS LESSON LOOKS AT varying amplitudes, phase shifts and vertical shifts.

Example 1

State the amplitude, the period length, the phase shift and the equation of the central axis for the function: $y = 3\sin\theta + 5$

stretch ∴ Amp = 3

up 5 ∴ central axis y = 5

$(\theta, y) \rightarrow (\theta, 3y + 5)$

θ	y
0	0
90	1
180	0
270	-1
360	0

→

θ	y
0	5
90	8
180	5
270	2
360	5

Example 2

State the amplitude, the period length, the phase shift and the equation of the central axis for the function: $y = -\cos(\theta - 30°) + 2$

reflection over the θ axis

phase shift right 30°

up 2 ∴ central axis y = 2

$(\theta, y) \rightarrow (\theta + 30, -y + 2)$

Example 3

State the amplitude, the period length, the phase shift and the equation of the central axis for the function: $y = 2\sin(\theta + 45°) - 1$

stretch ∴ Amp = 2

phase shift left 45°

down 1 ∴ central axis y = -1

$(\theta, y) \rightarrow (\theta - 45, 2y - 1)$

Graph the following:

1. $y = -2\sin(\theta + 120^0) + 1$

Amplitude –

Eq'n of Central Axis-

Period Length-

Phase Shift-

2. $y = \cos(\theta - 30^0) - 4$

Amplitude –

Eq'n of Central Axis-

Period Length-

Phase Shift-

3. $y = 5\cos(\theta + 45^0) - 2$

Amplitude –

Eq'n of Central Axis-

Period Length-

Phase Shift-