

1. Sinusoidal functions

Domain – possible x values

Range – possible y values

Shifts

- $a > 1 \rightarrow$ skinnier
- $0 < a < 1 \rightarrow$ fatter
- $a < 0 \rightarrow$ reflected in y-axis
- $+ c \rightarrow$ shift up c
- $- c \rightarrow$ shift down c
- $(x+c) \rightarrow$ shift left c
- $(x-c) \rightarrow$ shift right c

General form of a sinusoidal function

$$y = d + A \sin(n(x - \delta))$$

where A is the amplitude

$p = \frac{2\pi}{n}$ is the period

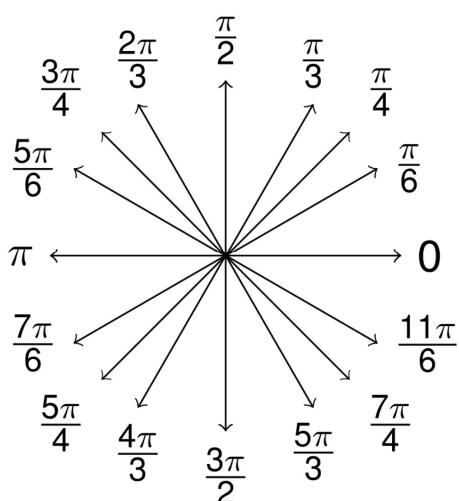
d is the mean value/vertical shift

δ indicated the starting value/horizontal shift

Note: $\cos x = \sin(x + \frac{\pi}{2})$

Radians

$$180^\circ = \pi \text{ radians}$$



Periodicity

A periodic function satisfies

$$f(x + p) \equiv f(x)$$

where p = period

If 2 sinusoidal functions have the same period then their sum is also sinusoidal

$$a \sin x + b \cos x \equiv r \sin(x + \alpha)$$

where $r \geq 0$ and r and α are constants

$$\sin(a + b) = \sin a \cos b + \cos a \sin b$$