

13-6 Notes, Periodic Functions
(Period, Amplitude, Axis/Midline)

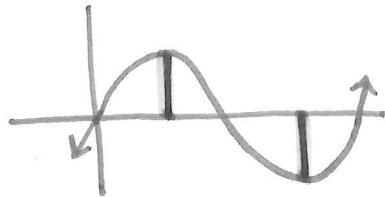
A periodic function is a function that repeats itself in regular intervals or patterns (length of one pattern or cycle) → period

The axis/midline is the line the cuts a periodic function in half horizontally.

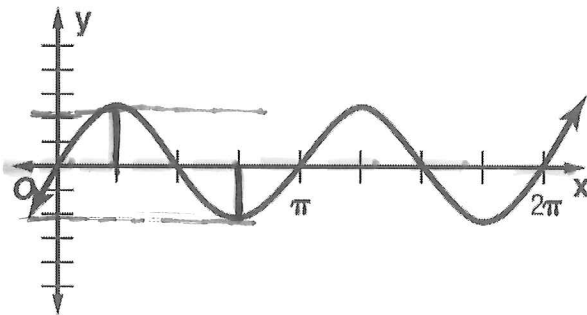


The amplitude is the midpoint from the highest point (maximum) to the lowest point (minimum) of the function. It is the distance from the axis line to the maximum or minimum.

*height/distance from max/min to midline



Example 1: Find the period, amplitude, axis/midline of each function.

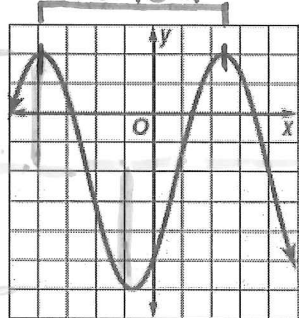


period: 1π

Amp: 2

Axis/Mid: $y=0$

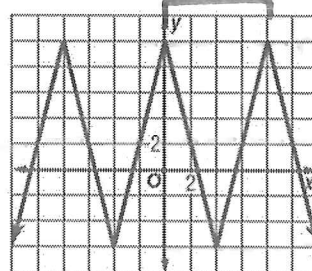
Period: 0.5 units



Axis/Mid:
 $y = -2$

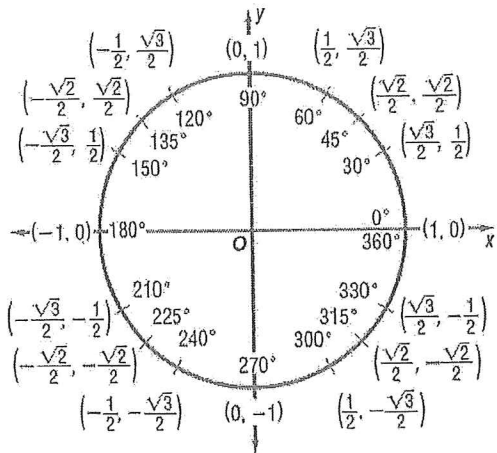
Amp: 4

Period: 8

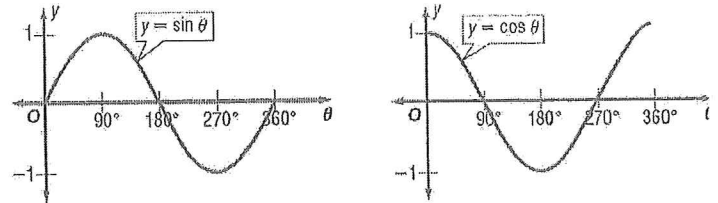


Axis/Mid:
 $y = 2$

Amp: 8



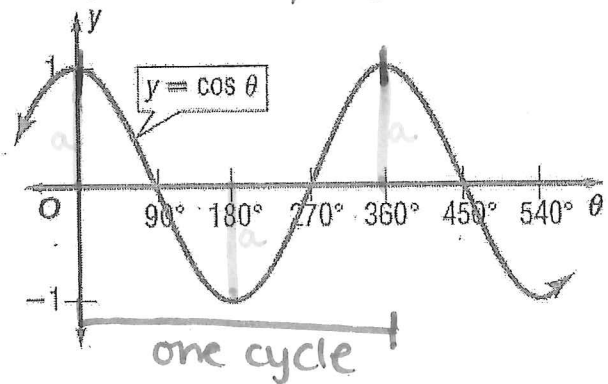
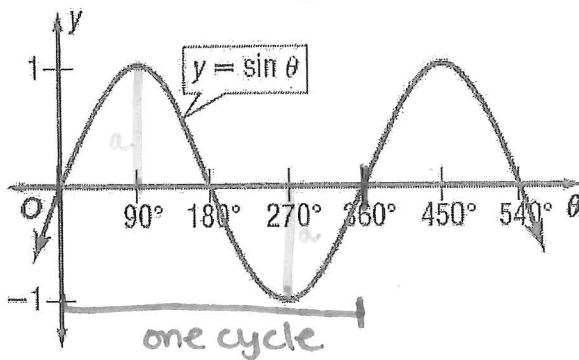
This same information is presented on the graphs of the sine and cosine functions below, where the horizontal axis shows the values of θ and the vertical axis shows the values of $\sin \theta$ or $\cos \theta$.



Key Concept : Periodic Functions

For every 360° degrees or 2π radians, the sine and cosine functions repeat their values. We say the sine and cosine functions are periodic, each having a period of 360° degrees or 2π radians.

REMINDER: $\tan \theta$ has a period of 180° or π



Remember:

Both sine and cosine have a maximum value of 1 and a minimum value of -1

Key Concept: Amplitude

The amplitude of the graph of a periodic function is the absolute value of half the difference between its maximum value and its minimum value.

OR

The amplitude is the distance from the midline to the maximum or midline to the minimum.

$$y = |a| \sin \theta$$

$$y = |a| \cos \theta$$

$$y = a \tan \theta$$

↓
not an amplitude