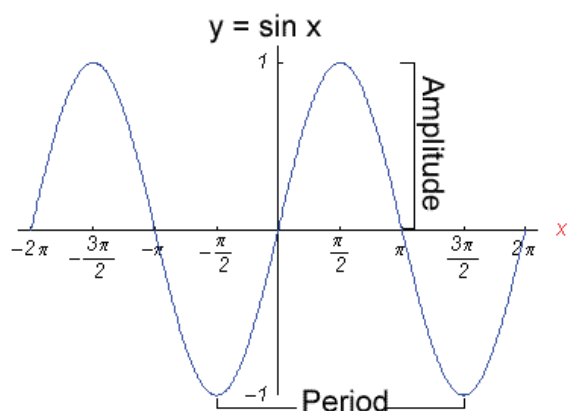


## 4.5 Graphs of Sine and Cosine Functions

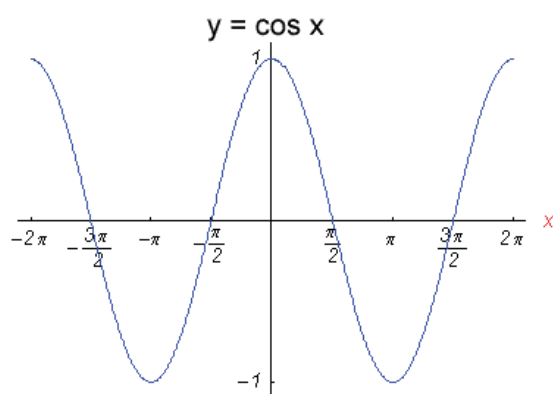
This section will introduce you to the graphs of sine and cosine.



**Period:** How long it takes the graph to repeat itself  
For sine graphs, the period is  $2\pi$ .

$$\text{Amplitude} = \frac{\text{Highest value} - \text{Lowest value}}{2}$$

For the regular sine graph the amplitude is 1.



The period for cosine graphs is  $2\pi$

The amplitude for a regular cosine graph is 1.

### General Form of a Sine or Cosine Equation:

$$y = A\sin(Bx - C) + D \text{ or } y = A\cos(Bx - C) + D$$

$$\text{Amplitude} = |A|, \quad \text{Period} = \frac{2\pi}{B}, \quad \text{Phase Shift} = \frac{\text{opp sign of } C}{B}$$

The **phase shift** is a shift of the graph to the left or to the right. The direction depends on the sign of the phase shift:

If  $\frac{C}{B} > 0$  the graph will shift to the right.

If  $\frac{C}{B} < 0$  the graph will shift to the left.

The phase shift will always be one of the five key points. In the two regular graphs of sine and cosine, the phase shift is 0, That is why 0 is the starting key point of a cycle.