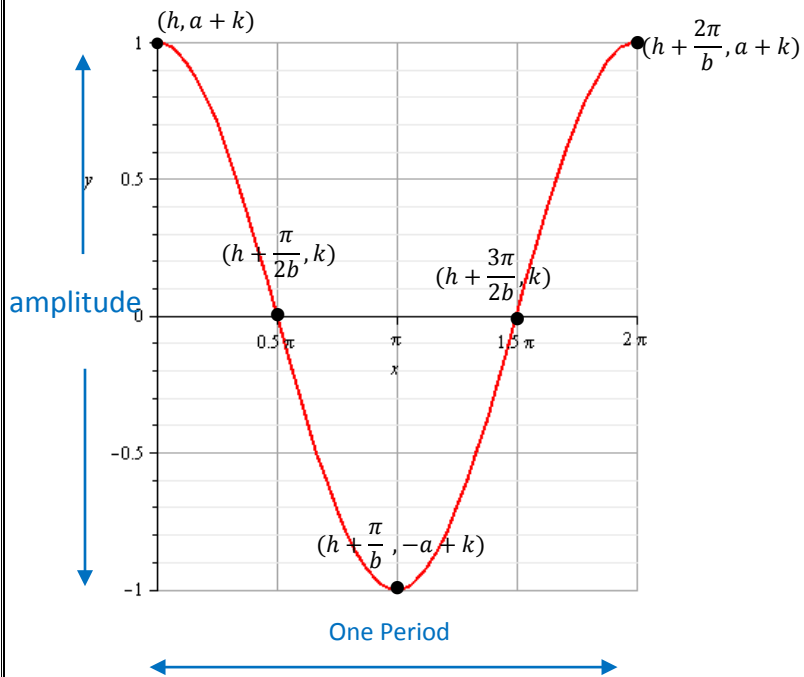


# COSINE GRAPH



General Form:  $y = a \cos b(x - h) + k$

Amplitude:  $|a|$

Period:  $\frac{2\pi}{b}$

Horizontal phase shift:  $h$

Vertical shift:  $k$

**Step 1:** Algebraically, arrange the given equation into the general form.  $y = a \cos b(x - h) + k$

**Step 2:** By inspection, identify the amplitude, phase shifts and find the period using  $k$ .

**Step 3:** Plot the following five points:

Point 1:  $(h, a + k)$       Point 2:  $(h + \frac{2\pi}{b}, k)$       Point 3:  $(h + \frac{\pi}{b}, -a + k)$

Point 4:  $(h + \frac{3\pi}{2b}, k)$       Point 5:  $(h + \frac{2\pi}{b}, a + k)$

**EXAMPLE :** Given  $y = 5 \cos(3x + \frac{3\pi}{2}) + 1$ , graph the cosine function.

Step 1: By factoring out a 3, we can rewrite equation in the general form as  $y = 5 \cos 3(x - (-\frac{\pi}{2})) + 1$

Step 2: By inspection:  $a = 5$ ;  $h = -\frac{\pi}{2}$ ;  $k = 1$ ;  $b = 3$ ;  $Period = \frac{2\pi}{k} = \frac{2\pi}{3}$

Step 3: Plot Pt1:  $(-\frac{\pi}{2}, 6)$  Pt2:  $(-\frac{\pi}{3}, 1)$  Pt3:  $(-\frac{\pi}{6}, -4)$  Pt4:  $(0, 1)$  Pt5:  $(\frac{\pi}{6}, 6)$

