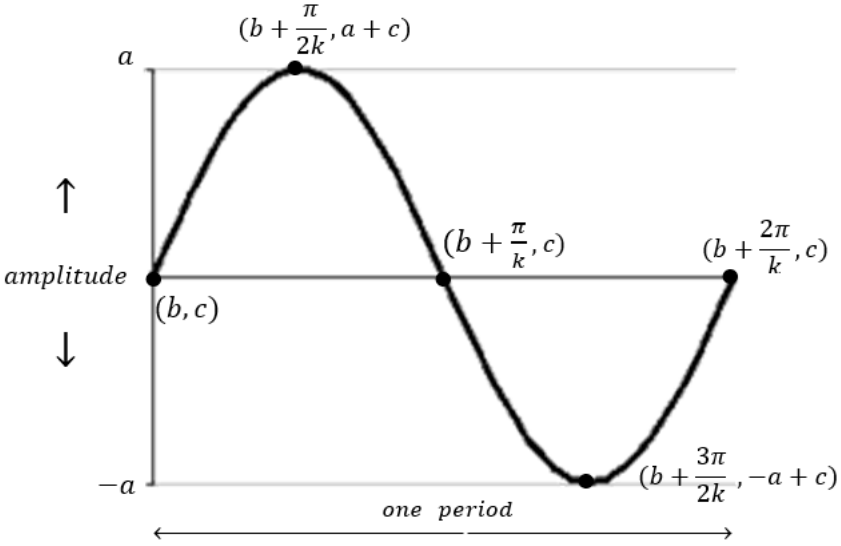


General Form: $\boldsymbol{y = a \sin k(x - b) + c}$

Amplitude: $|\boldsymbol{a}|$

Period: $\boldsymbol{\frac{2\pi}{k}}$

Horizontal phase shift: $\boldsymbol{b}$

Vertical phase shift: $\boldsymbol{c}$

Step 1: Algebraically, arrange the given equation into the general form. $\boldsymbol{y = a \sin k(x - b) + c}$

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

Step 3: Plot the following five points:

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

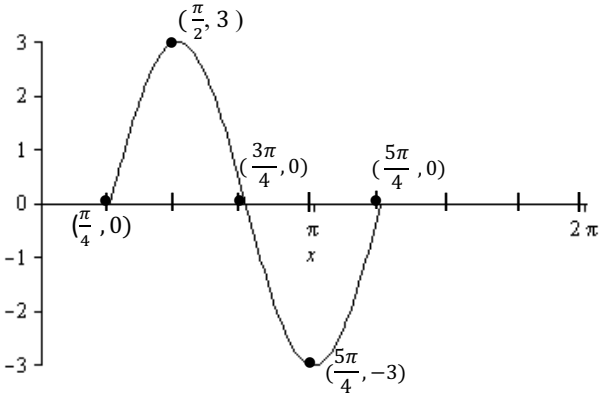
Point 4: $(b + \frac{3\pi}{2k}, -a + c)$ Point 5: $(b + \frac{2\pi}{k}, c)$

EXAMPLE : Given $y = 3\sin(2x - \frac{2\pi}{4})$, graph the sine function.

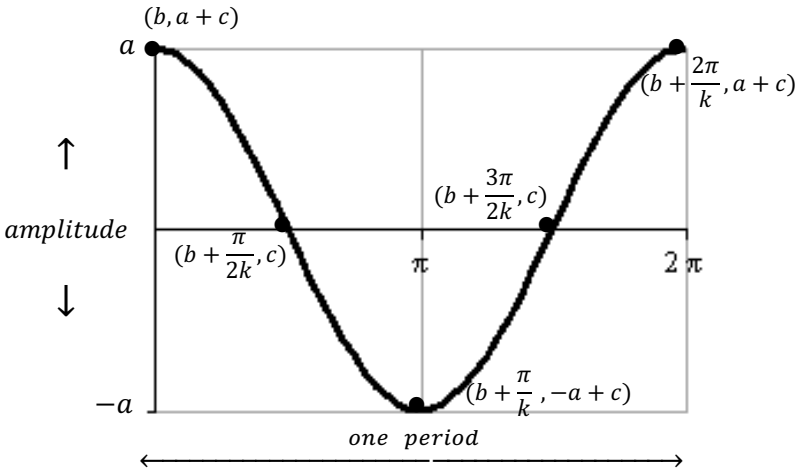
Step 1: By factoring out a 2, we get an equation in the general form: $y = 3 \sin 2(x - \frac{\pi}{4})$

Step 2: By inspection, $a = 3$; $b = \frac{\pi}{4}$; $c = 0$; $k = 2$; $Period = \frac{2\pi}{k} = \frac{2\pi}{2} = \pi$

Step 3: Plot Pt1: $(\frac{\pi}{4}, 0)$ Pt2: $(\frac{\pi}{2}, 3)$ Pt3: $(\frac{3\pi}{4}, 0)$ Pt4: $(\frac{5\pi}{4}, -3)$ Pt5: $(\frac{5\pi}{4}, 0)$



COSINE GRAPH STEM SC CALCULUS



General Form: $\boldsymbol{y = a\cos k(x-b)+c}$

Amplitude: $|\boldsymbol{a}|$

Period: $\boldsymbol{\frac{2\pi}{k}}$

Horizontal phase shift: $\boldsymbol{b}$

Vertical phase shift: $\boldsymbol{c}$

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

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

Step 3: Plot the following five points:

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

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

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, $a = 5;\ b = -\frac{\pi}{2};\ c = 1;\ k = 3;\ Period = \frac{2\pi}{k} = \frac{2\pi}{3}$

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