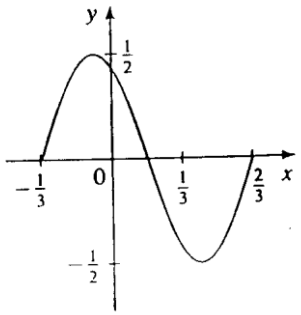
Trigonometric Graphs



The graph above can be expressed as a *y = A sin (B x + C)* or *y = A cos (B x + C)*.

The amplitude will be $A = \frac{1}{2}$**. The period will be** $P = \frac{2}{3} - \left(-\frac{1}{3}\right) = 1$**.**

Since $B = \frac{2\pi}{P}$**,** $B = 2\pi$ **. Since graph can be seen as a sine shifted** $\frac{1}{3}$ **to the left,**

$y = \frac{1}{2} \sin 2\pi \left(x + \frac{1}{3}\right) = \frac{1}{2} \sin \left(2\pi x + \frac{2\pi}{3}\right)$**.**

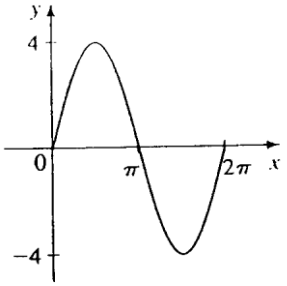
To find the shift of the cosine function, first we find the midpoint between the zeros $-\frac{1}{3}$ **and** $\frac{2}{3}$ **by finding the average of the two *x*-intercepts,**

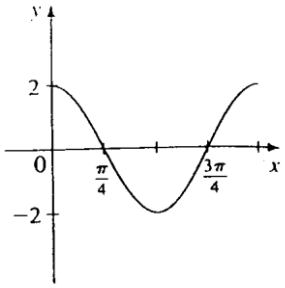
or $\frac{-1/3 + 2/3}{2} = \frac{1}{6}$**. That will be the first positive zero of the function. To find the maximum value of the function, we find the midpoint between the two zeros** $-\frac{1}{3}$ **and** $\frac{1}{6}$**, or** $\frac{-1/3 + 1/6}{2} = \frac{1}{12}$**. This will give the other function**

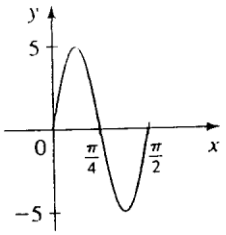
$y = \frac{1}{2} \cos 2\pi \left(x + \frac{1}{12}\right) = \frac{1}{2} \cos\left(2\pi x + \frac{\pi}{6}\right)$**.**

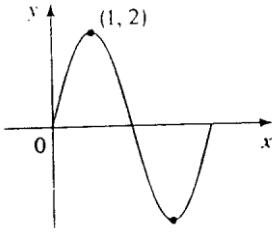
Exercises:

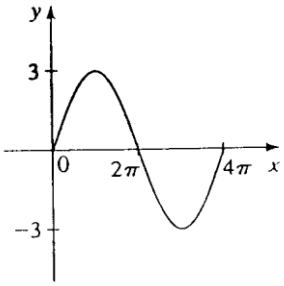
For each graph determine two functions. One in the form y = A sin (B *x* + C) and the other one in the form y = A cos (B *x* + C). You can check your answers with your calculator.

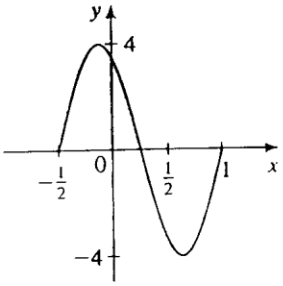


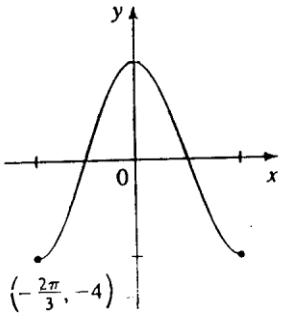


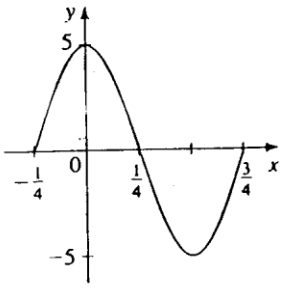

y
5
0
$\frac{\pi}{4}$
$\frac{\pi}{2}$
x
−5

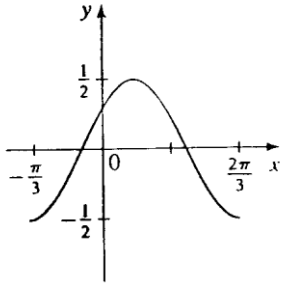

y
(1, 2)
0
x


y
3
0
2π
4π
x
−3


y
4
$-\frac{1}{2}$
0
$\frac{1}{2}$
1
x
−4


y
0
x
$\left(-\frac{2\pi}{3}, -4\right)$


y
5
$-\frac{1}{4}$
0
$\frac{1}{4}$
$\frac{3}{4}$
x
−5


y
$\frac{1}{2}$
$-\frac{\pi}{3}$
0
$\frac{2\pi}{3}$
x
$-\frac{1}{2}$