

6. Graphs of Trigonometric Functions

Exercise 6.1

1 A. Question

Sketch the graphs of the following functions :

$$f(x) = 2 \sin x, 0 \leq x \leq \pi$$

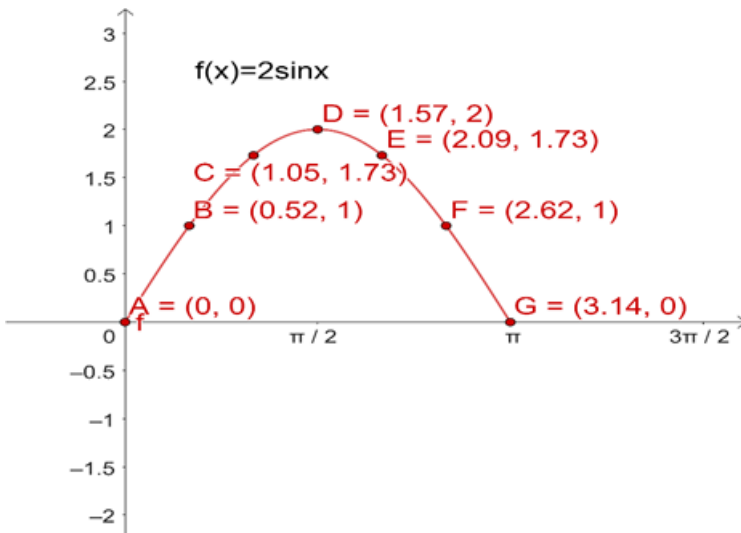
Answer

We know that $g(x) = \sin x$ is a periodic function with period π .

$\therefore f(x) = 2 \sin x$ is a periodic function with period π . So, we will draw the graph of $f(x) = 2 \sin x$ in the interval $[0, \pi]$. The values of $f(x) = 2 \sin x$ at various points in $[0, \pi]$ are listed in the following table:

X	0 (A)	$\pi/6$ (B)	$\pi/3$ (C)	$\pi/2$ (D)	$2\pi/3$ (E)	$5\pi/6$ (F)	π (G)
$F(x) = 2 \sin x$	0	1	$\sqrt{3} = 1.73$	2	$\sqrt{3} = 1.73$	1	0

By plotting the above points, we obtain the required curve.



1 B. Question

Sketch the graphs of the following functions :

$$g(x) = 3 \sin \left(x - \frac{\pi}{4} \right), 0 \leq x \leq \frac{5\pi}{4}$$

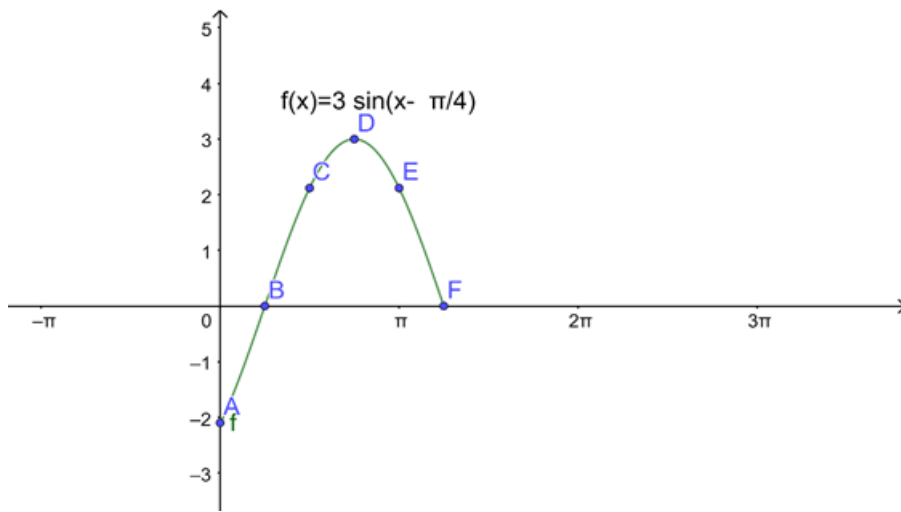
Answer

We know that if $f(x)$ is a periodic function with period T , then $f(ax + b)$ is periodic with period $T/|a|$.

$\therefore g(x) = 3 \sin \left(x - \frac{\pi}{4} \right)$ is a periodic function with period π . So, we will draw the graph of $g(x) = 3 \sin \left(x - \frac{\pi}{4} \right)$ in the interval $[0, 5\pi/4]$. The values of $g(x) = 3 \sin \left(x - \frac{\pi}{4} \right)$ at various points in $[0, 5\pi/4]$ are listed in the following table:

X	0 (A)	$\pi/4$ (B)	$\pi/2$ (C)	$3\pi/4$ (D)	π (E)	$5\pi/4$ (F)
$g(x) = 3 \sin \left(x - \frac{\pi}{4} \right)$	$-3/\sqrt{2} = -2.1$	0	$\frac{3}{\sqrt{2}} = 2.12$	3	$\frac{3}{\sqrt{2}} = 2.12$	0

By plotting the above points, we obtain the required curve.



1 C. Question

Sketch the graphs of the following functions :

$$h(x) = 2 \sin 3x, 0 \leq x \leq 2\pi/3$$

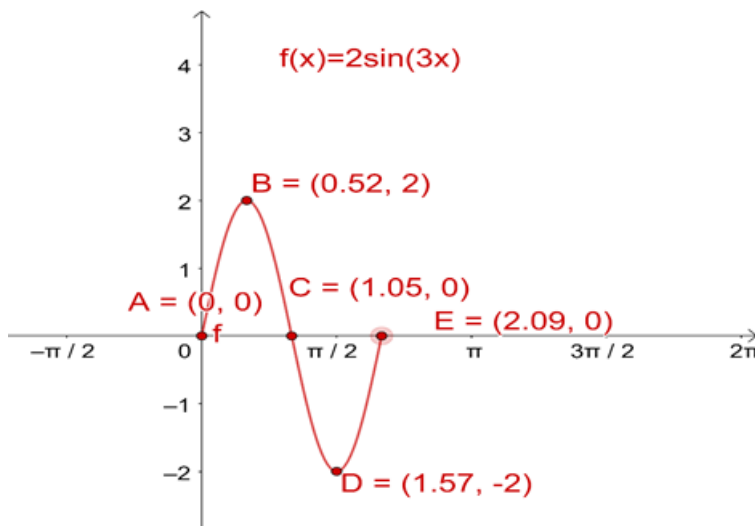
Answer

We know that $g(x) = \sin x$ is a periodic function with period 2π .

$\therefore h(x) = 2 \sin 3x$ is a periodic function with period $2\pi/3$. So, we will draw the graph of $h(x) = 2 \sin 3x$ in the interval $[0, 2\pi/3]$. The values of $h(x) = 2 \sin 3x$ at various points in $[0, 2\pi/3]$ are listed in the following table:

X	0(A)	$\pi/6$ (B)	$\pi/3$ (C)	$\pi/2$ (D)	$2\pi/3$ (E)
$H(x) = 2 \sin 3x$	0	2	0	-2	0

By plotting the above points, we obtain the required curve.



1 D. Question

Sketch the graphs of the following functions :

$$\phi(x) = 2 \sin\left(2x - \frac{\pi}{3}\right), 0 \leq x \leq \frac{7\pi}{5}$$

Answer

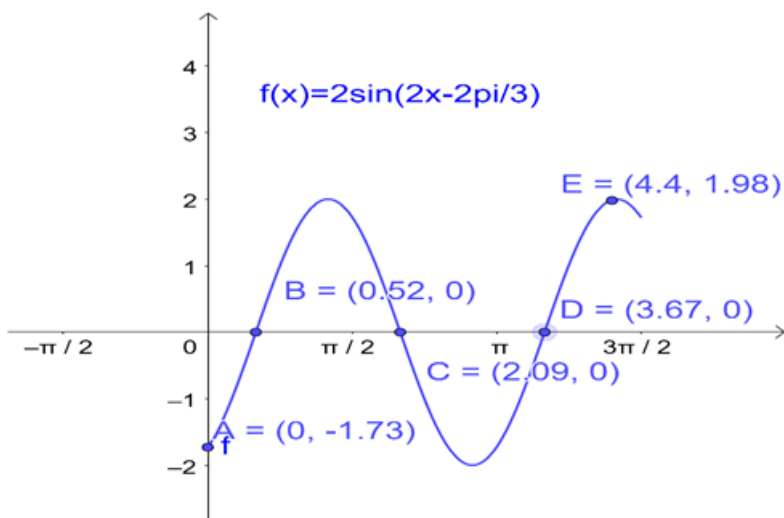
We know that if $f(x)$ is a periodic function with period T , then $f(ax + b)$ is periodic with period $T/|a|$.

$\therefore \phi(x) = 2 \sin(2x - \frac{\pi}{3})$ is a periodic function with period π . So, we will draw the graph of $\phi(x) = 2 \sin(2x - \frac{\pi}{3})$ in the interval $[0, 7\pi/5]$. The values of $\phi(x) = 2 \sin(2x - \frac{\pi}{3})$ at various points in $[0,$

$7\pi/5]$ are listed in the following table:

X	0	$\pi/6$	$2\pi/3$	$7\pi/6$	$7\pi/5$
$\phi(x)$ $= 2 \sin\left(2x - \frac{\pi}{3}\right)$	$-\sqrt{3} = -1.73$	0	0	0	1.98

By plotting the above points, we obtain the required curve.



1 E. Question

Sketch the graphs of the following functions :

$$\psi(x) = 4 \sin 3\left(x - \frac{\pi}{4}\right), 0 \leq x \leq 2\pi$$

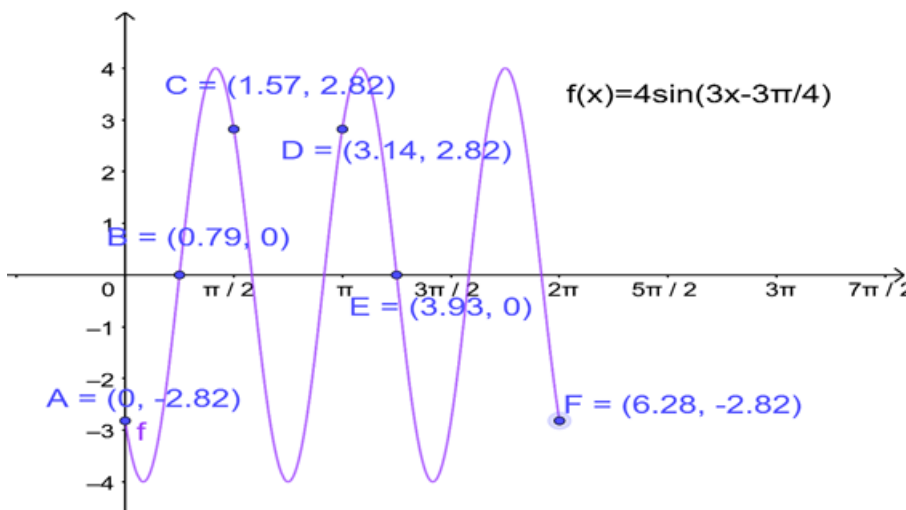
Answer

We know that if $f(x)$ is a periodic function with period T , then $f(ax + b)$ is periodic with period $T/|a|$.

$\therefore \psi(x) = 4 \sin 3\left(x - \frac{\pi}{4}\right)$ is a periodic function with period 2π . So, we will draw the graph of $\psi(x) = 4 \sin 3\left(x - \frac{\pi}{4}\right)$ in the interval $[0, 2\pi]$. The values of $\psi(x) = 4 \sin 3\left(x - \frac{\pi}{4}\right)$ at various points in $[0, 2\pi]$ are listed in the following table:

X	0	$\pi/4$	$\pi/2$	π	$5\pi/4$	2π
$\psi(x)$ $= 4 \sin 3\left(x - \frac{\pi}{4}\right)$	$-2\sqrt{2} = -2.82$	0	$2\sqrt{2} = 2.82$	$2\sqrt{2} = 2.82$	0	$-2\sqrt{2} = -2.82$

By plotting the above points, we obtain the required curve.



1 F. Question

Sketch the graphs of the following functions :

$$\theta(x) = \sin\left(\frac{x}{2} - \frac{\pi}{4}\right), 0 \leq x \leq 4\pi$$

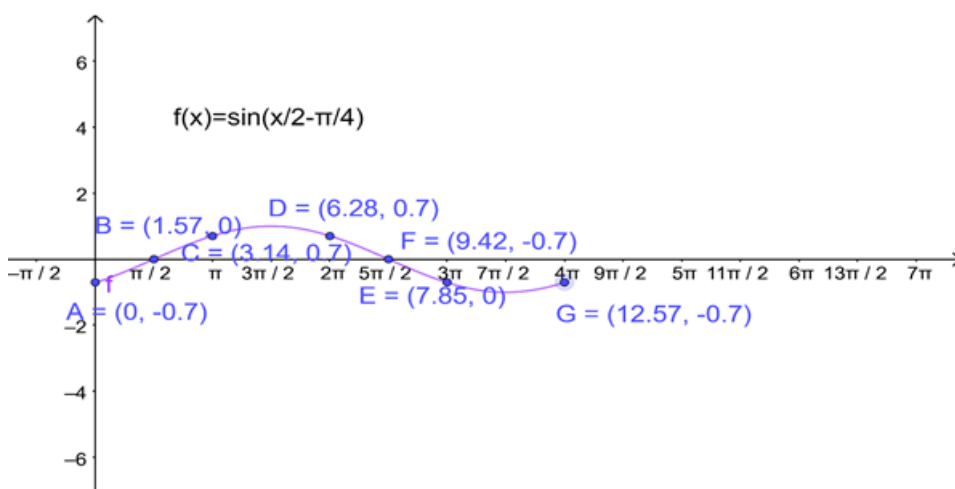
Answer

We know that if $f(x)$ is a periodic function with period T , then $f(ax + b)$ is periodic with period $T/|a|$.

$\therefore \theta(x) = \sin\left(\frac{x}{2} - \frac{\pi}{4}\right)$ is a periodic function with period 4π . So, we will draw the graph of $\theta(x) = \sin\left(\frac{x}{2} - \frac{\pi}{4}\right)$ in the interval $[0, 4\pi]$. The values of $\theta(x) = \sin\left(\frac{x}{2} - \frac{\pi}{4}\right)$ at various points in $[0, 4\pi]$ are listed in the following table:

X	0	$\pi/2$	π	2π	$5\pi/2$	3π	4π
$\theta(x)$ $= \sin\left(\frac{x}{2} - \frac{\pi}{4}\right)$	-0.7	0	$1/\sqrt{2}$ $= 0.7$	$1/\sqrt{2}$ $= 0.7$	0	$-1/\sqrt{2}$ $= -0.7$	$-1/\sqrt{2}$ $= -0.7$

By plotting the above points, we obtain the required curve.



1 G. Question

Sketch the graphs of the following functions :

$$u(x) = \sin^2 x, 0 \leq x \leq 2\pi \quad v(x) = |\sin x|, 0 \leq x \leq 2\pi$$

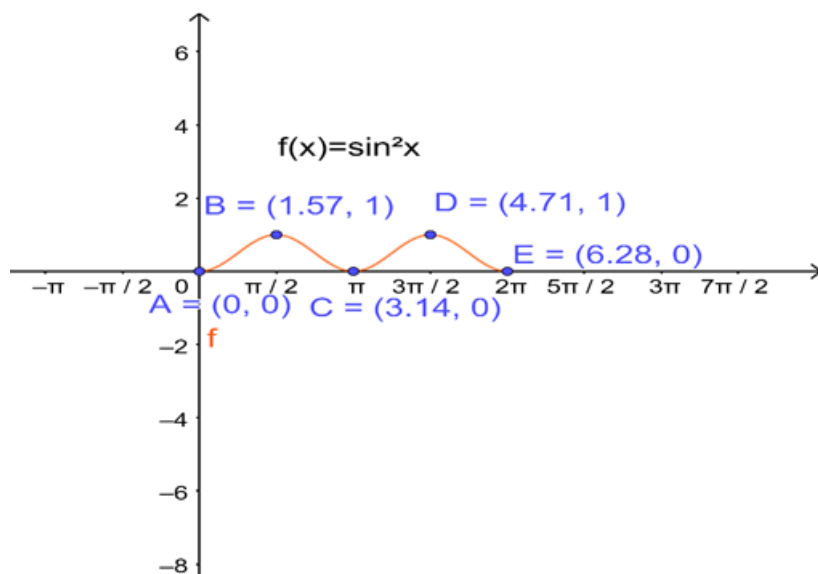
Answer

We know that $g(x) = \sin x$ is a periodic function with period π .

$\therefore u(x) = \sin^2 x$ is a periodic function with period 2π . So, we will draw the graph of $u(x) = \sin^2 x$ in the interval $[0, 2\pi]$. The values of $u(x) = \sin^2 x$ at various points in $[0, 2\pi]$ are listed in the following table:

X	0	$\pi/2$	π	$3\pi/2$	2π
$U(x) = \sin^2 x$	0	1	0	1	0

By plotting the above points, we obtain the required curve.

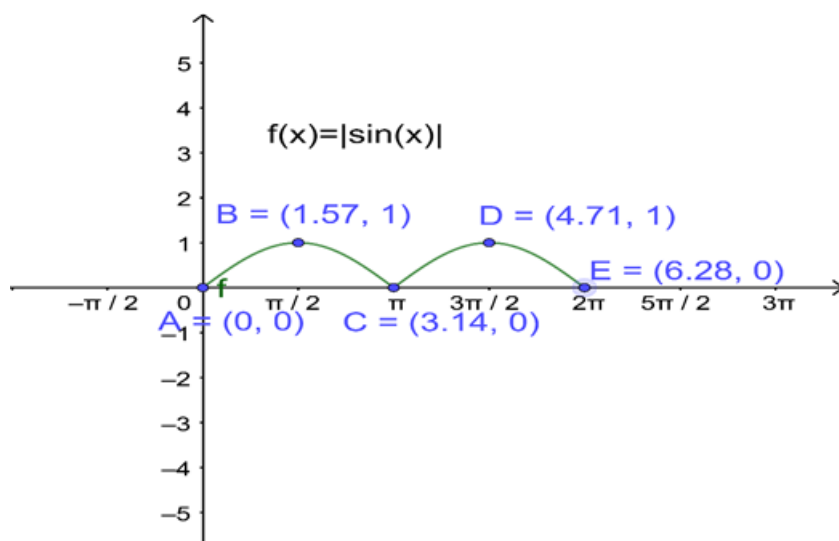


Then,

$\therefore u(x) = |\sin x|$ is a periodic function with period 2π . So, we will draw the graph of $u(x) = |\sin x|$ in the interval $[0, 2\pi]$. The values of $u(x) = |\sin x|$ at various points in $[0, 2\pi]$ are listed in the following table:

X	0	$\pi/2$	π	$3\pi/2$	2π
$U(x) = \sin x $	0	1	0	1	0

By plotting the above points, we obtain the required curve.



1 G. Question

Sketch the graphs of the following functions :

$$f(x) = 2 \sin \pi x, 0 \leq x \leq 2.$$

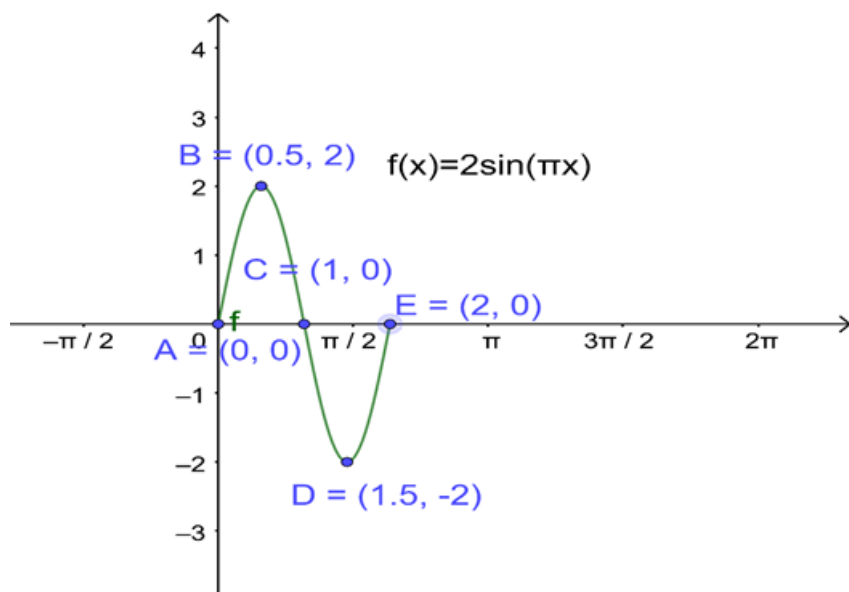
Answer

We know that $g(x) = \sin x$ is a periodic function with period 2π .

$\therefore f(x) = 2 \sin \pi x$ is a periodic function with period 2. So, we will draw the graph of $f(x) = 2 \sin \pi x$ in the interval $[0, 2]$. The values of $f(x) = 2 \sin \pi x$ at various points in $[0, 2]$ are listed in the following table:

X	0	$1/2$	1	$3/2$	2
$f(x) = 2 \sin \pi x$	0	2	0	-2	0

By plotting the above points, we obtain the required curve.



2 A. Question

Sketch the graphs of the following pairs of functions on the same axes :

$$f(x) = \sin x, g(x) = \sin\left(x + \frac{\pi}{4}\right)$$

Answer

We observe that the functions $f(x) = \sin x$ and $g(x) = \sin(x + \pi/4)$ are periodic functions with periods 2π and $7\pi/4$.

The values of these functions are tabulated below:

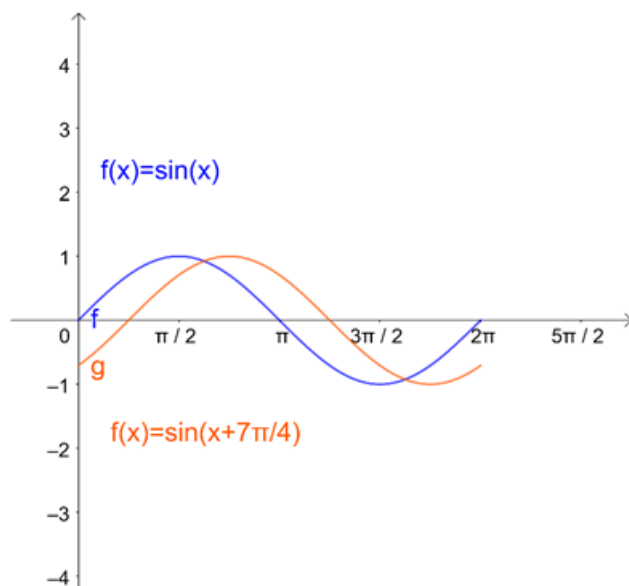
Values of $f(x) = \sin x$ in $[0, 2\pi]$

X	0	$\pi/2$	π	$3\pi/2$	2π
$f(x) = \sin x$	0	1	0	-1	0

Values of $g(x) = \sin(x + \pi/4)$ in $[0, 7\pi/4]$

X	0	$\pi/4$	$3\pi/4$	$5\pi/4$	$7\pi/4$
$g(x) = \sin\left(x + \frac{\pi}{4}\right)$	$1/\sqrt{2} = 0.7$	1	0	-1	0

By plotting the above points, we obtain the required curve.



2 B. Question

Sketch the graphs of the following pairs of functions on the same axes :

$$f(x) = \sin x, g(x) = \sin 2x$$

Answer

We observe that the functions $f(x) = \sin x$ and $g(x) = \sin 2x$ are periodic functions with periods 2π and π .

The values of these functions are tabulated below:

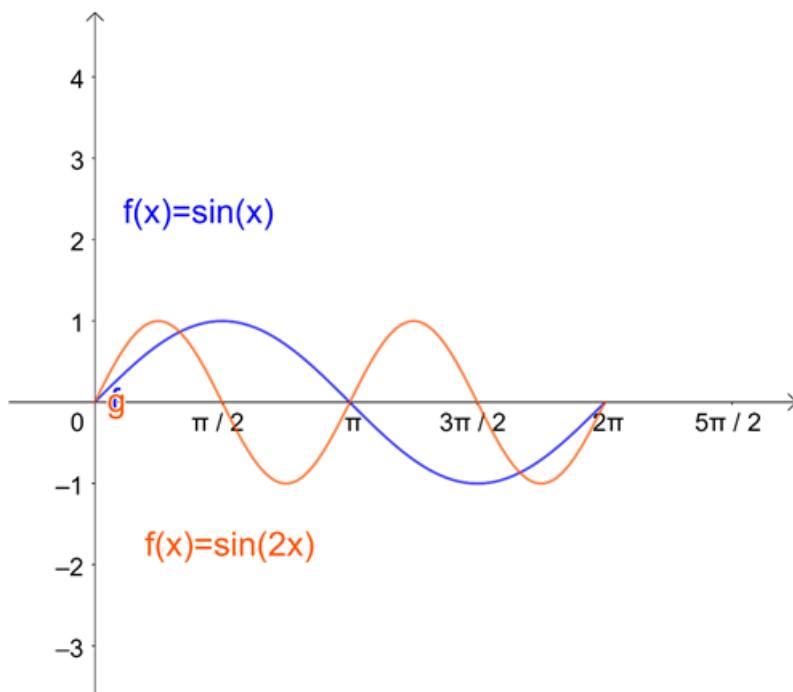
Values of $f(x) = \sin x$ in $[0, 2\pi]$

x	0	$\pi/2$	π	$3\pi/2$	2π
$f(x) = \sin x$	0	1	0	-1	0

Values of $g(x) = \sin(2x)$ in $[0, \pi]$

x	0	$\pi/4$	$\pi/2$	$3\pi/4$	π	$5\pi/4$	$3\pi/2$	$7\pi/4$	2π
$g(x) = \sin(2x)$	0	1	0	-1	0	1	0	-1	0

By plotting the above points, we obtain the required curve.



2 C. Question

Sketch the graphs of the following pairs of functions on the same axes :

$$f(x) = \sin 2x, g(x) = 2 \sin x$$

Answer

We observe that the functions $f(x) = \sin 2x$ and $g(x) = 2 \sin x$ are periodic functions with periods π and 2π .

The values of these functions are tabulated below:

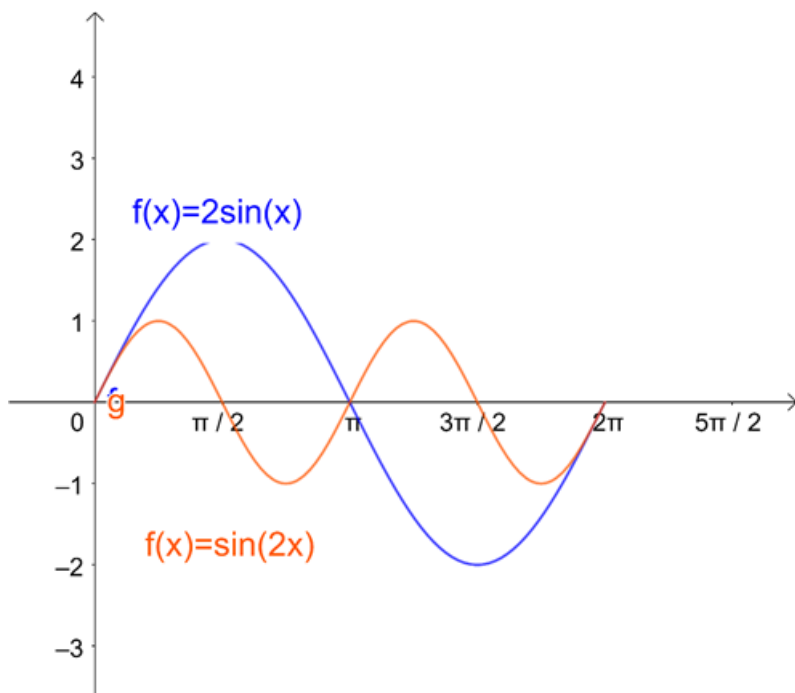
Values of $f(x) = \sin(2x)$ in $[0, \pi]$

x	0	$\pi/4$	$\pi/2$	$3\pi/4$	π	$5\pi/4$	$3\pi/2$	$7\pi/4$	2π
$f(x) = \sin(2x)$	0	1	0	-1	0	1	0	-1	0

Values of $g(x) = 2 \sin x$ in $[0, \pi]$

x	0	$\pi/2$	π	$3\pi/2$	2π
$g(x) = 2 \sin x$	0	1	0	-1	0

By plotting the above points, we obtain the required curve.



2 D. Question

Sketch the graphs of the following pairs of functions on the same axes :

$$f(x) = \sin \frac{x}{2}, g(x) = \sin x$$

Answer

We observe that the functions $f(x) = \sin x/2$ and $g(x) = \sin x$ are periodic functions with periods π and 2π .

The values of these functions are tabulated below:

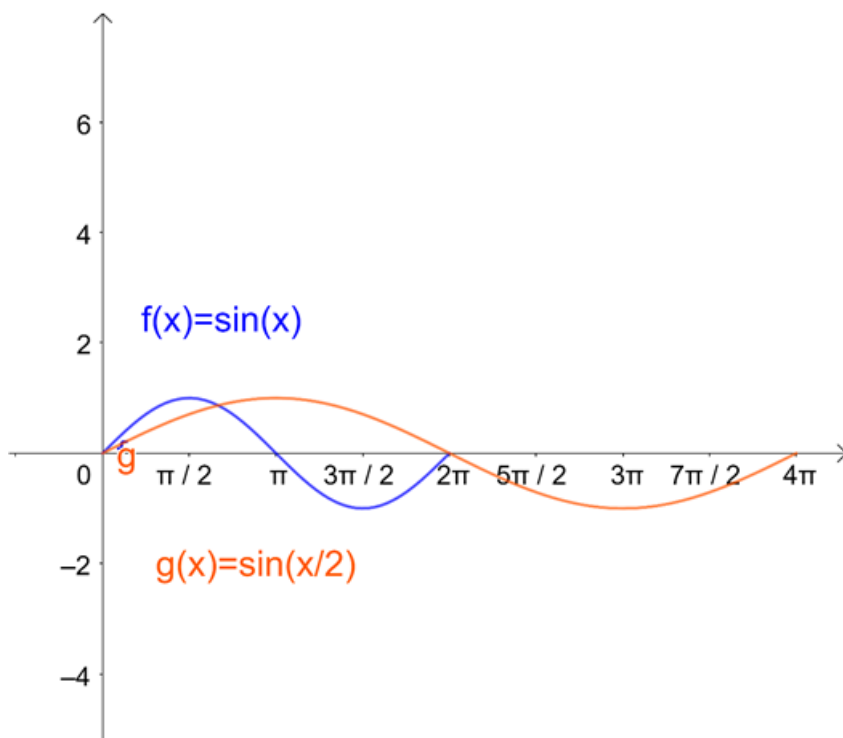
Values of $f(x) = \sin x/2$ in $[0, \pi]$

x	0	π	2π	3π	4π
$f(x) = \sin x/2$	0	1	0	-1	0

Values of $g(x) = \sin(x)$ in $[0, 2\pi]$

x	0	$\pi/2$	π	$3\pi/2$	2π	$5\pi/2$	3π	$7\pi/2$	4π
$g(x) = \sin(2x)$	0	1	0	-1	0	1	0	-1	0

By plotting the above points, we obtain the required curve.



Exercise 6.2

1 A. Question

Sketch the graphs of the following trigonometric functions :

$$f(x) = \cos\left(x - \frac{\pi}{4}\right)$$

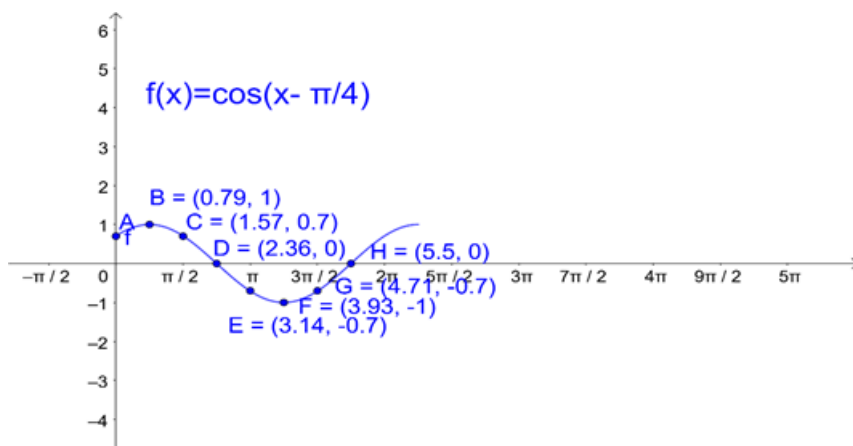
Answer

We know that $g(x) = \cos x$ is a periodic function with period 2π .

$\therefore f(x) = \cos(x - \pi/4)$ is a periodic function with period π . So, we will draw the graph of $f(x) = \cos(x - \pi/4)$ in the interval $[0, \pi]$. The values of $f(x) = \cos(x - \pi/4)$ at various points in $[0, \pi]$ are listed in the following table:

X	0	$\pi/4$	$\pi/2$	$3\pi/4$	π	$5\pi/4$	$3\pi/2$	$7\pi/4$
$f(x) = \cos(x - \pi/4)$	$1/\sqrt{2}$ = 0.7	1	$1/\sqrt{2}$ = 0.7	0	$-1/\sqrt{2}$ = -0.7	-1	$-1/\sqrt{2}$ = -0.7	0

By plotting the above points, we obtain the required curve.



1 B. Question

Sketch the graphs of the following trigonometric functions :

$$g(x) = \cos \left(x + \frac{\pi}{4} \right)$$

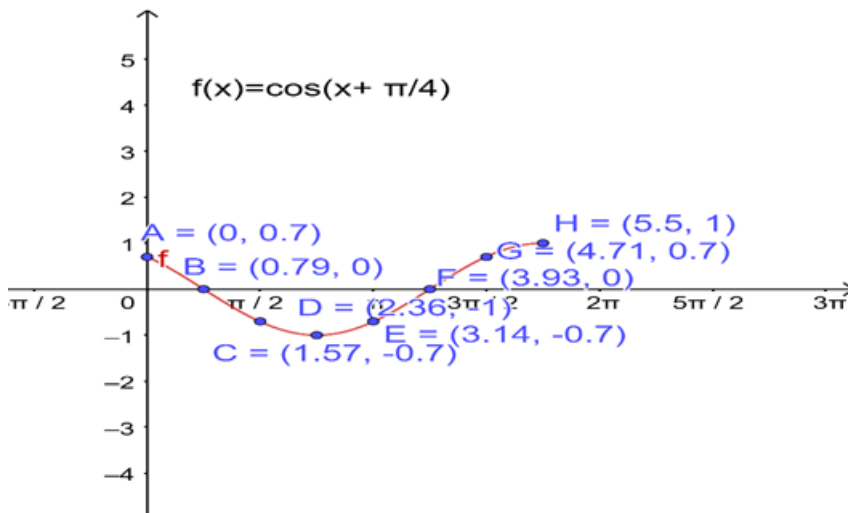
Answer

We know that $f(x) = \cos x$ is a periodic function with period 2π .

$\therefore g(x) = \cos(x + \pi/4)$ is a periodic function with period π . So, we will draw the graph of $g(x) = \cos(x + \pi/4)$ in the interval $[0, \pi]$. The values of $g(x) = \cos(x + \pi/4)$ at various points in $[0, \pi]$ are listed in the following table:

X	0	$\pi/4$	$\pi/2$	$3\pi/4$	π	$5\pi/4$	$3\pi/2$	$7\pi/4$
$g(x) = \cos(x + \pi/4)$	$1/\sqrt{2} = 0.7$	0	$-1/\sqrt{2} = -0.7$	-1	$-1/\sqrt{2} = -0.7$	0	$1/\sqrt{2} = 0.7$	1

By plotting the above points, we obtain the required curve.



1 C. Question

Sketch the graphs of the following trigonometric functions :

$$h(x) = \cos^2 2x$$

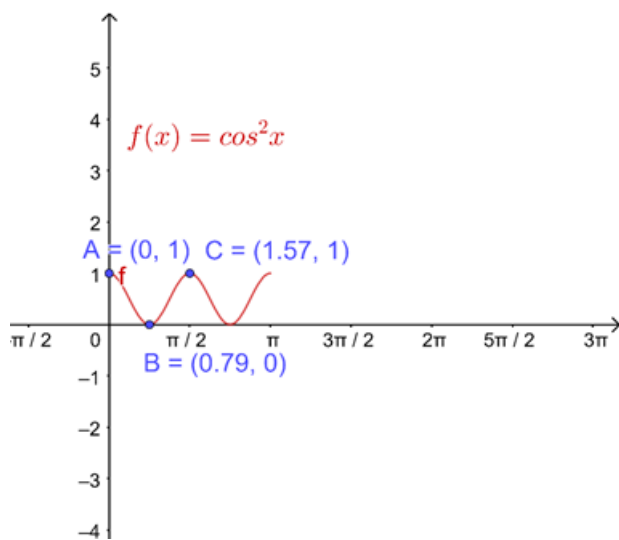
Answer

We know that $f(x) = \cos x$ is a periodic function with period 2π .

$\therefore h(x) = \cos^2 2x$ is a periodic function with period π . So, we will draw the graph of $h(x) = \cos^2 2x$ in the interval $[0, \pi]$. The values of $h(x) = \cos^2 2x$ at various points in $[0, \pi]$ are listed in the following table:

X	0	$\pi/4$	$\pi/2$	$3\pi/4$	π	$5\pi/4$	$3\pi/2$
$h(x) = \cos^2 2x$	1	0	1	0	1	0	1

By plotting the above points, we obtain the required curve.



1 D. Question

Sketch the graphs of the following trigonometric functions :

$$\phi(x) = 2 \cos\left(x - \frac{\pi}{6}\right)$$

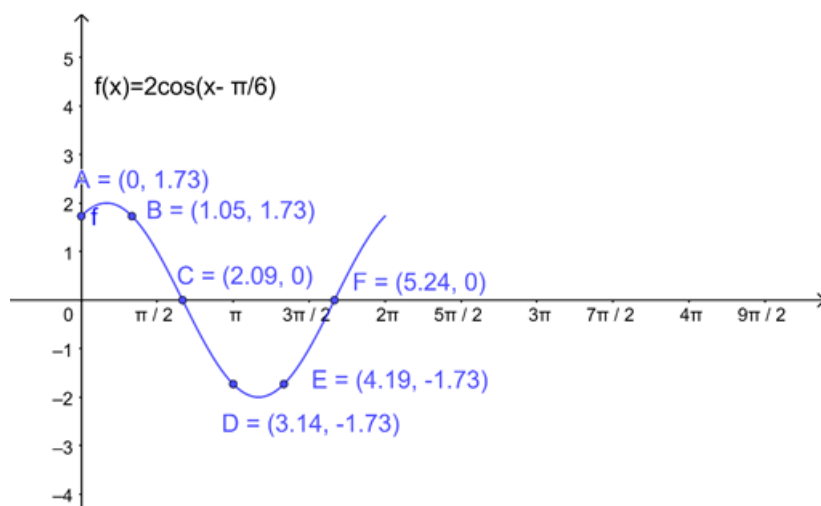
Answer

We know that $f(x) = \cos x$ is a periodic function with period 2π .

$\therefore \phi(x) = 2\cos(x - \pi/6)$ is a periodic function with period π . So, we will draw the graph of $\phi(x) = 2\cos(x - \pi/6)$ in the interval $[0, \pi]$. The values of $\phi(x) = 2\cos(x - \pi/6)$ at various points in $[0, \pi]$ are listed in the following table:

x	0	$\pi/3$	$2\pi/3$	π	$4\pi/3$	$5\pi/3$
$\phi(x) = 2\cos(x - \pi/6)$	$\sqrt{3} = 1.73$	$\sqrt{3} = 1.73$	0	$-\sqrt{3} = -1.73$	$-\sqrt{3} = -1.73$	0

By plotting the above points, we obtain the required curve.



1 E. Question

Sketch the graphs of the following trigonometric functions :

$$\psi(x) = \cos 3x$$

Answer

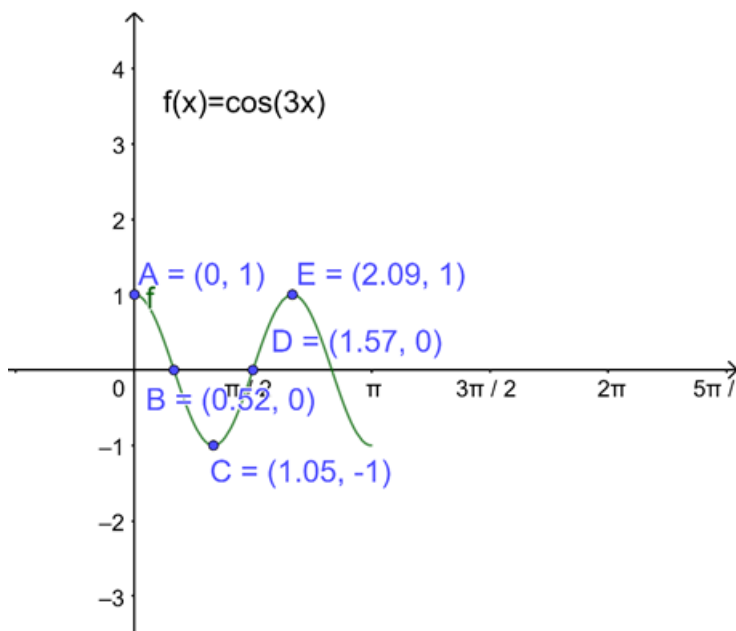
We know that $f(x) = \cos x$ is a periodic function with period 2π .

$\therefore \psi(x) = \cos(3x)$ is a periodic function with period $2\pi/3$. So, we will draw the graph of $\psi(x) = \cos(3x)$ in the

interval $[0, 2\pi/3]$. The values of $\psi(x) = \cos(3x)$ at various points in $[0, 2\pi/3]$ are listed in the following table:

X	0	$\pi/6$	$\pi/3$	$\pi/2$	$2\pi/3$	$5\pi/6$
$\psi(x) = \cos(3x)$	1	0	-1	0	1	0

By plotting the above points, we obtain the required curve.



1 F. Question

Sketch the graphs of the following trigonometric functions :

$$u(x) = \cos^2 \frac{x}{2}$$

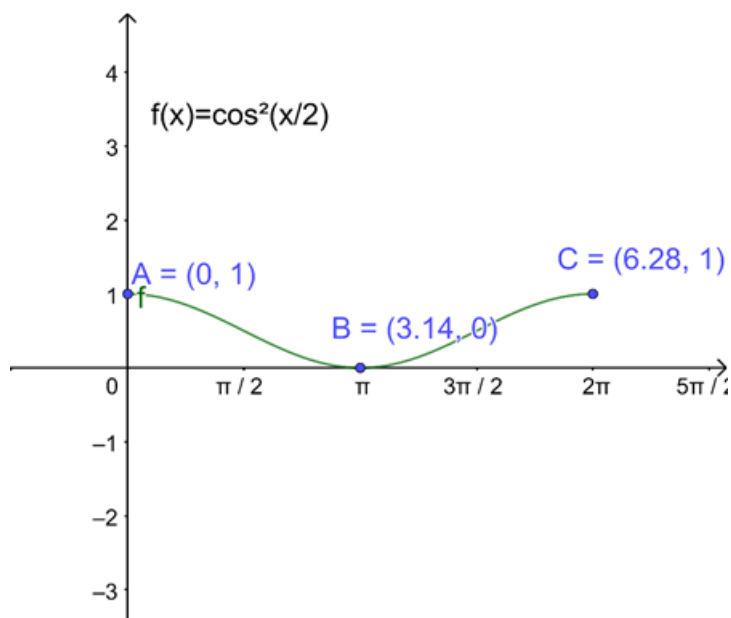
Answer

We know that $f(x) = \cos x$ is a periodic function with period 2π .

$\therefore u(x) = \cos^2(x/2)$ is a periodic function with period π . So, we will draw the graph of $u(x) = \cos^2(x/2)$ in the interval $[0, \pi]$. The values of $u(x) = \cos^2(x/2)$ at various points in $[0, \pi]$ are listed in the following table:

X	0	π	2π	3π
$u(x) = \cos^2(x/2)$	1	0	1	0

By plotting the above points, we obtain the required curve.



1 G. Question

Sketch the graphs of the following trigonometric functions :

$$f(x) = \cos \pi x$$

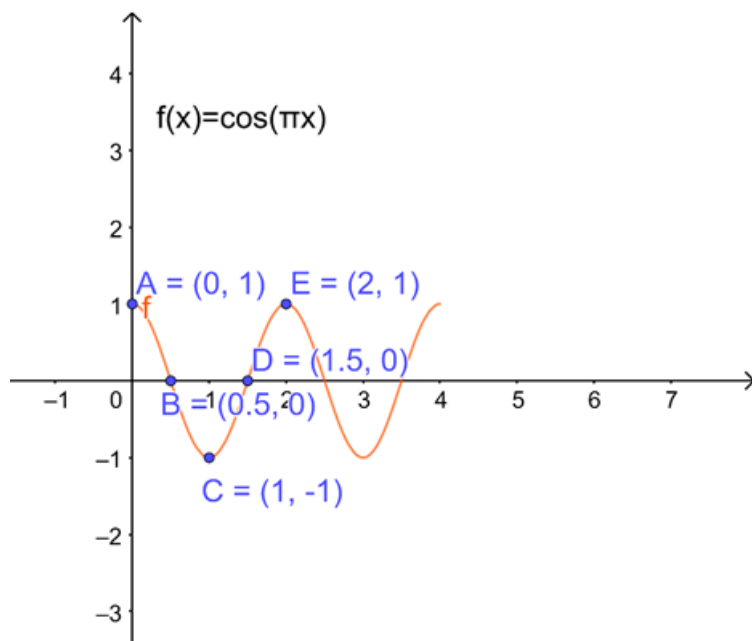
Answer

We know that $g(x) = \cos x$ is a periodic function with period 2π .

$\therefore f(x) = \cos(\pi x)$ is a periodic function with period 2. So, we will draw the graph of $f(x) = \cos(\pi x)$ in the interval $[0, 2]$. The values of $f(x) = \cos(\pi x)$ at various points in $[0, 2]$ are listed in the following table:

x	0	1/2	1	3/2	2	5/2
$f(x) = \cos(\pi x)$	1	0	-1	0	1	0

By plotting the above points, we obtain the required curve.



1 H. Question

Sketch the graphs of the following trigonometric functions :

$$g(x) = \cos 2\pi x$$

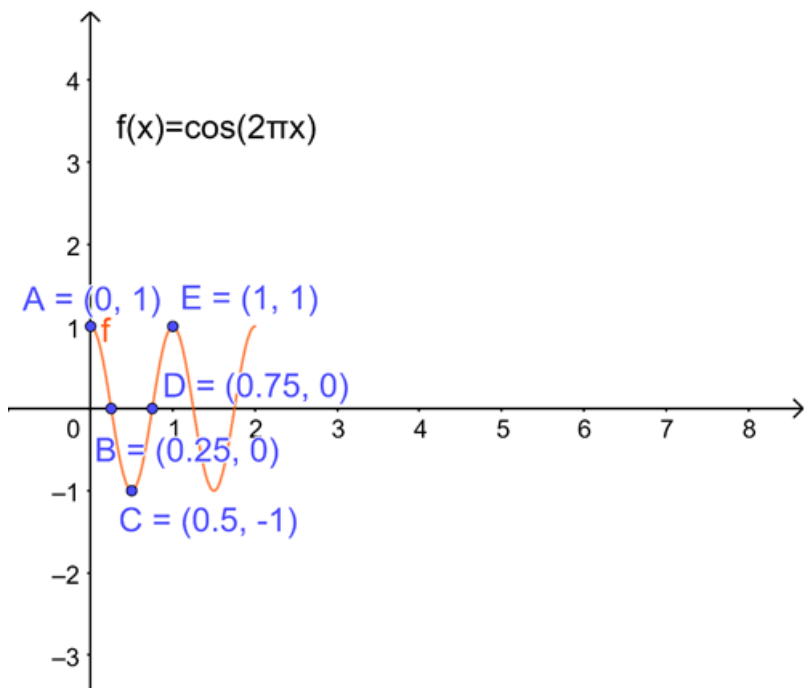
Answer

We know that $f(x) = \cos x$ is a periodic function with period 2π .

$\therefore g(x) = \cos(2\pi x)$ is a periodic function with period 1. So, we will draw the graph of $g(x) = \cos(2\pi x)$ in the interval $[0, 1]$. The values of $g(x) = \cos(2\pi x)$ at various points in $[0, 1]$ are listed in the following table:

x	0	1/4	1/2	3/4	1	5/4	3/2	7/4	2
$g(x) = \cos(2\pi x)$	1	0	-1	0	1	0	-1	0	1

By plotting the above points, we obtain the required curve.



2 A. Question

Sketch the graphs of the following curves on the same scale and the same axes :

$$y = \cos x \text{ and } y = \cos \left(x - \frac{\pi}{4} \right)$$

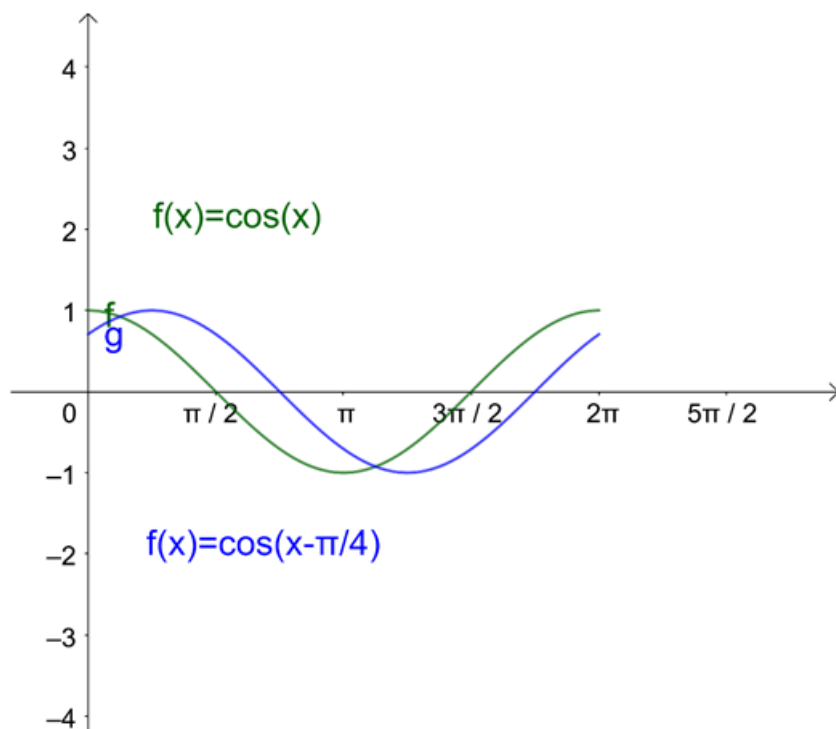
Answer

We observe that the functions $y = \cos x$ and $y = \cos(x - \pi/4)$ are periodic functions with periods π and π .

The values of these functions are tabulated below:

x	0	$\pi/4$	$\pi/2$	$3\pi/4$	π	$5\pi/4$	$3\pi/2$	$7\pi/4$
$y = \cos x$	1	$1/\sqrt{2} = 0.7$	0	$-1/\sqrt{2} = -0.7$	-1	$-1/\sqrt{2} = -0.7$	0	1
$y = \cos(x - \pi/4)$	$1/\sqrt{2} = 0.7$	1	$1/\sqrt{2} = 0.7$	0	$-1/\sqrt{2} = -0.7$	-1	$-1/\sqrt{2} = -0.7$	0

By plotting the above points, we obtain the required curve.



2 B. Question

Sketch the graphs of the following curves on the same scale and the same axes :

$$y = \cos 2x \text{ and } y = \cos \left(x - \frac{\pi}{4} \right)$$

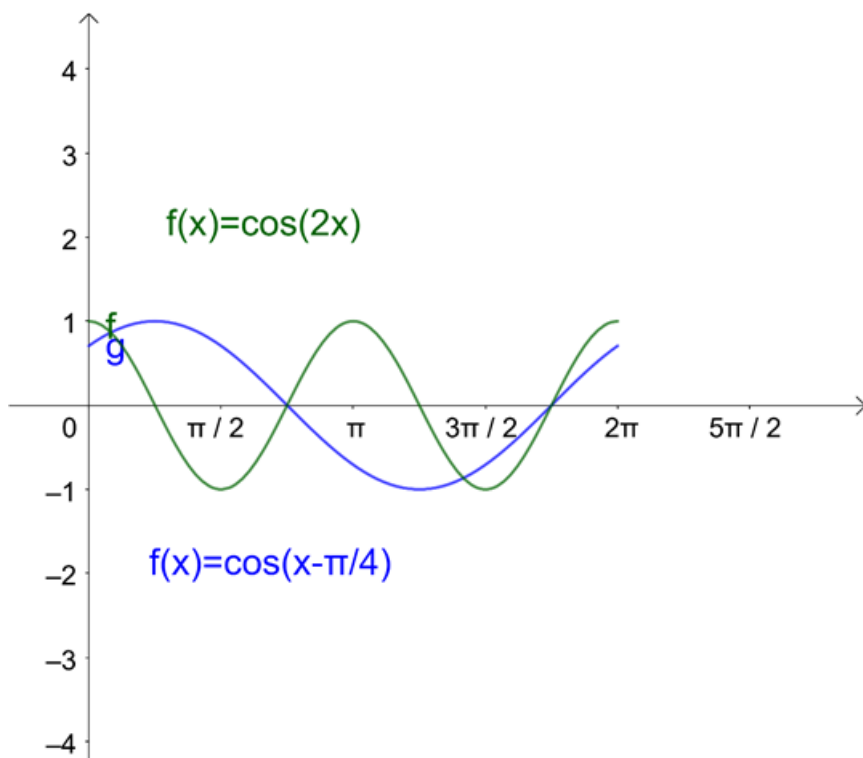
Answer

We observe that the functions $y = \cos 2x$ and $y = \cos 2(x - \pi/4)$ are periodic functions with periods π and π .

The values of these functions are tabulated below:

X	0	$\pi/4$	$\pi/2$	$3\pi/4$	π	$5\pi/4$	$3\pi/2$	$7\pi/4$
$y = \cos 2x$	1	0	-1	0	1	0	-1	0
$y = \cos 2(x - \pi/4)$	0	1	0	-1	0	1	0	-1

By plotting the above points, we obtain the required curve.



2 C. Question

Sketch the graphs of the following curves on the same scale and the same axes :

$$y = \cos x \text{ and } y = \cos \frac{x}{2}$$

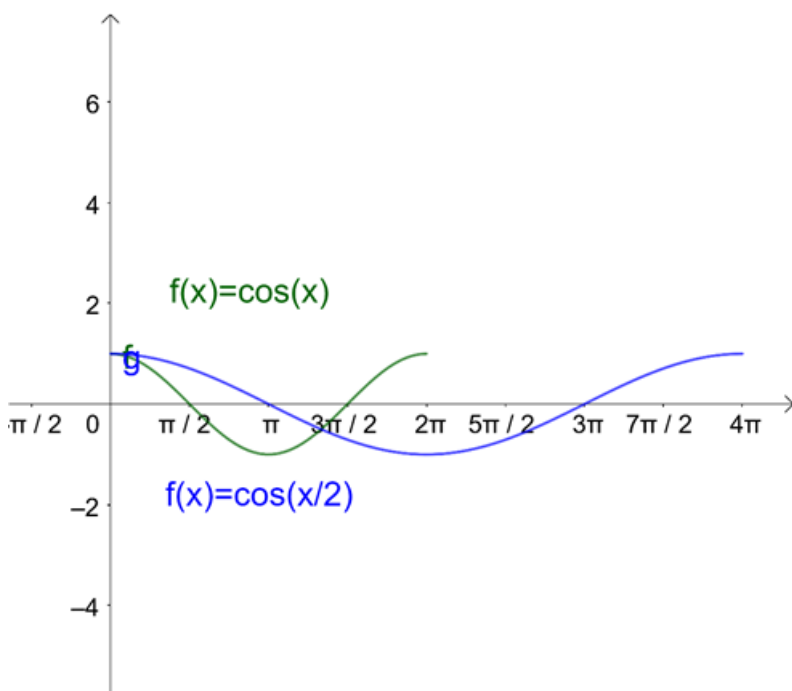
Answer

We observe that the functions $y = \cos x$ and $y = \cos (x/2)$ are periodic functions with periods π and 2π .

The values of these functions are tabulated below:

x	0	$\pi/2$	π	$3\pi/2$	2π
$y = \cos x$	1	0	-1	0	1
$y = \cos (x/2)$	1	$1/\sqrt{2}$ = 0.7	0	$-1/\sqrt{2}$ = -0.7	-1

By plotting the above points, we obtain the required curve.



2 D. Question

Sketch the graphs of the following curves on the same scale and the same axes :

$$y = \cos^2 x \text{ and } y = \cos x$$

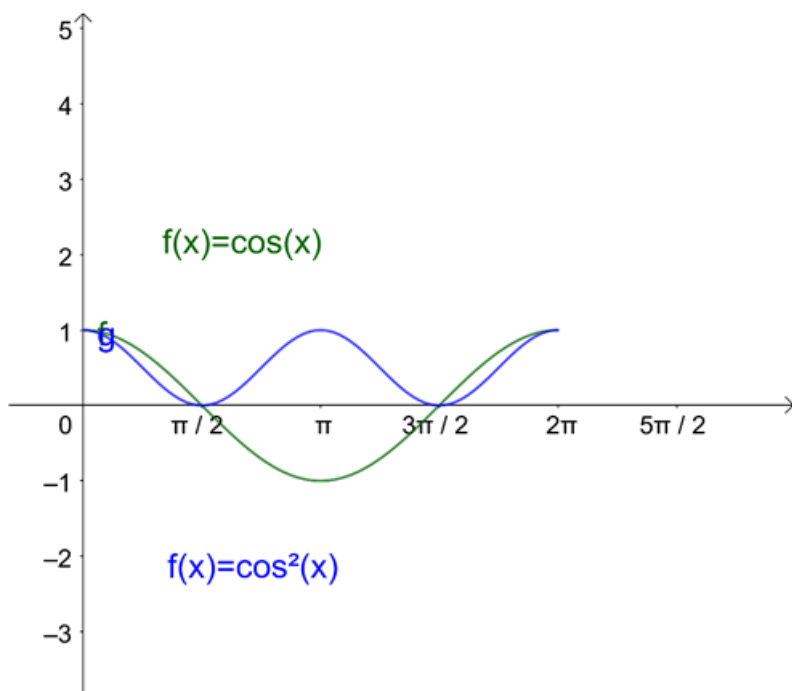
Answer

We observe that the functions $y = \cos^2 x$ and $y = \cos(x)$ are periodic functions with period 2π .

The values of these functions are tabulated below:

X	0	$\pi/2$	π	$3\pi/2$	2π
$y = \cos^2 x$	1	0	1	0	1
$y = \cos x$	1	0	-1	0	1

By plotting the above points, we obtain the required curve.



Exercise 6.3

1. Question

Sketch the graphs of the following functions :

$$f(x) = 2 \operatorname{cosec} \pi x$$

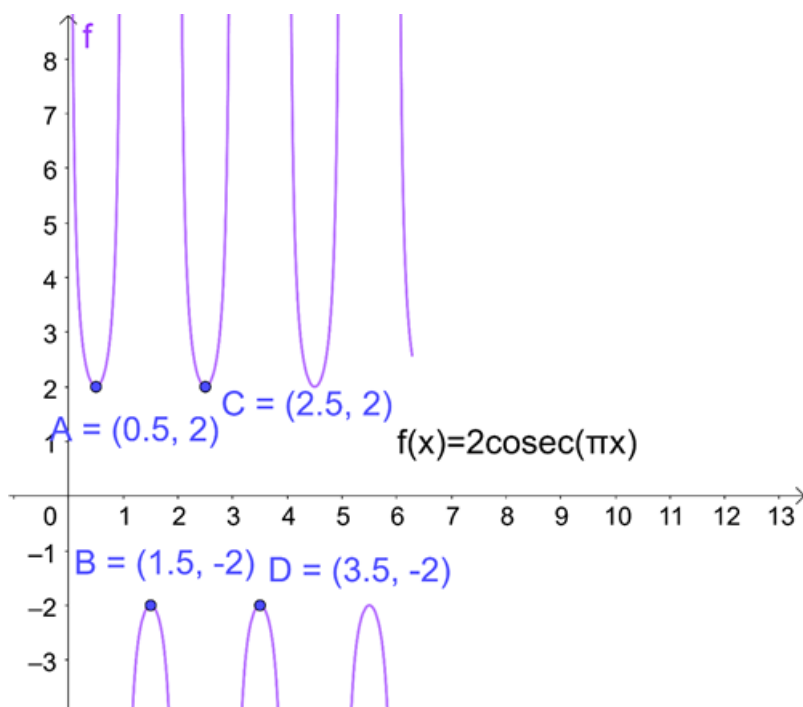
Answer

We know that $g(x) = \operatorname{cosec} x$ is a periodic function with period 2π .

$\therefore f(x) = 2 \operatorname{cosec}(\pi x)$ is a periodic function with period 2. So, we will draw the graph of $f(x) = 2 \operatorname{cosec}(\pi x)$ in the interval $[0, 2]$. The values of $f(x) = 2 \operatorname{cosec}(\pi x)$ at various points in $[0, 2]$ are listed in the following table:

x	0	$1/2$	1	1^-	$3/2$	2^-	2	$5/2$
$f(x) = 2 \operatorname{cosec}(\pi x)$	∞	2	∞	$-\infty$	-2	$-\infty$	∞	2

By plotting the above points, we obtain the required curve.



2. Question

Sketch the graphs of the following functions :

$$f(x) = 3 \sec x$$

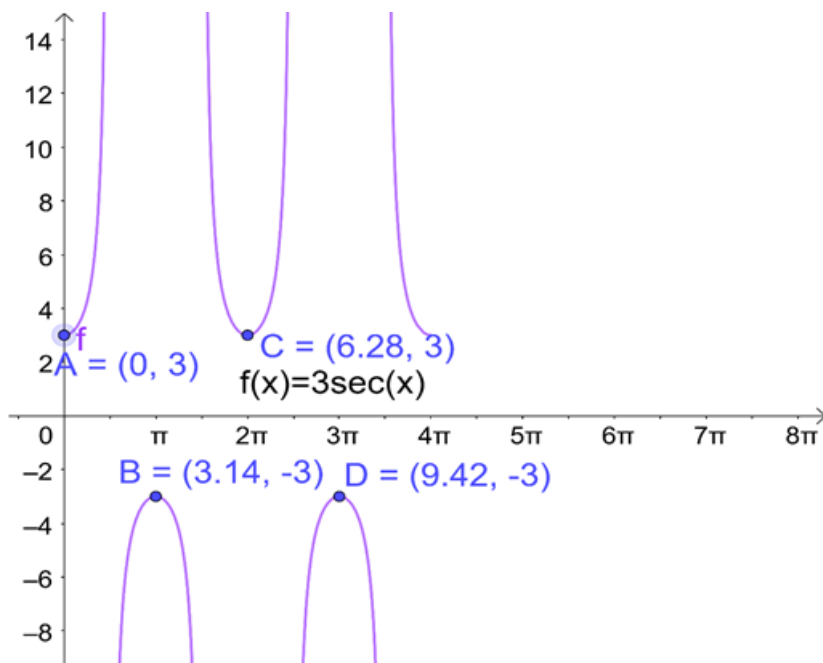
Answer

We know that $g(x) = \sec x$ is a periodic function with period π .

$\therefore f(x) = 3 \sec(x)$ is a periodic function with period π . So, we will draw the graph of $f(x) = 3 \sec(x)$ in the interval $[0, \pi]$. The values of $f(x) = 3 \sec(x)$ at various points in $[0, \pi]$ are listed in the following table:

x	0	$\pi/2$	$\pi/2^-$	π	$3\pi/2^-$	$3\pi/2$	2π	$5\pi/2$
$f(x) = 3 \sec(x)$	3	∞	$-\infty$	-3	$-\infty$	∞	3	∞

By plotting the above points, we obtain the required curve.



3. Question

Sketch the graphs of the following functions :

$$f(x) = \cot 2x$$



Sketch the graphs of the following functions :

$$f(x) = \tan^2 x$$

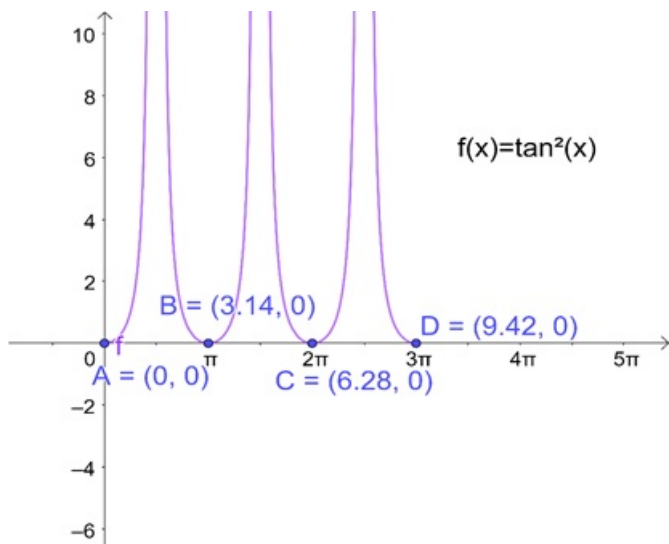
Answer

We know that $g(x) = \tan x$ is a periodic function with period π .

$\therefore f(x) = \tan^2(x)$ is a periodic function with period π . So, we will draw the graph of $f(x) = \tan^2(x)$ in the interval $[0, \pi]$. The values of $f(x) = \tan^2(x)$ at various points in $[0, \pi]$ are listed in the following table:

x	0	$\pi/2$	$\pi/2$	π	$3\pi/2$	$3\pi/2$	2π
$f(x) = \tan^2(x)$	0	∞	$\rightarrow \infty$	0	∞	$\rightarrow \infty$	0

By plotting the above points, we obtain the required curve.



6. Question

Sketch the graphs of the following functions :

$$f(x) = \cot^2 x$$

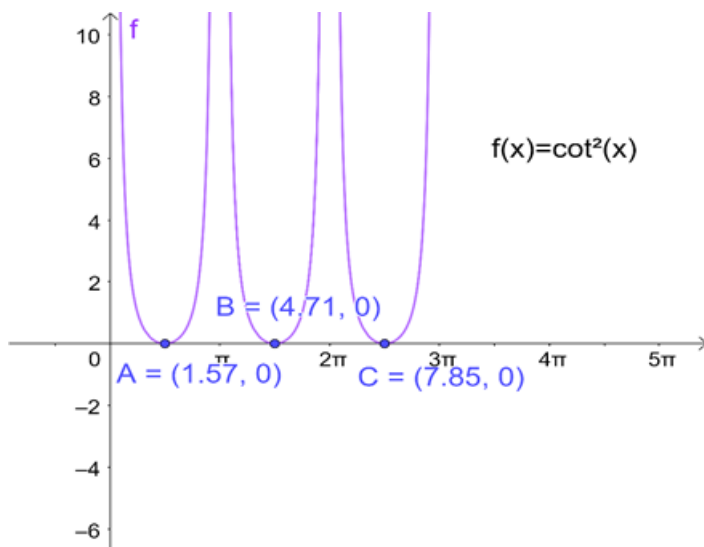
Answer

We know that $g(x) = \cot x$ is a periodic function with period π .

$\therefore f(x) = \cot^2(x)$ is a periodic function with period π . So, we will draw the graph of $f(x) = \cot^2(x)$ in the interval $[0, \pi]$. The values of $f(x) = \cot^2(x)$ at various points in $[0, \pi]$ are listed in the following table:

x	0	$\pi/2$	π	π	$3\pi/2$	2π
$f(x) = \cot^2(x)$	$\rightarrow \infty$	0	∞	$\rightarrow \infty$	0	∞

By plotting the above points, we obtain the required curve.



7. Question

Sketch the graphs of the following functions :

$$f(x) = \cot \frac{\pi x}{2}$$

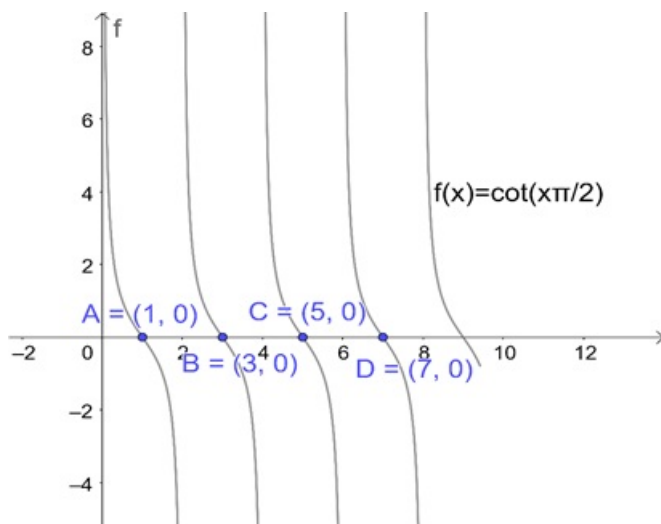
Answer

We know that $g(x) = \cot x$ is a periodic function with period π .

$\therefore f(x) = \cot(\pi x/2)$ is a periodic function with period 2. So, we will draw the graph of $f(x) = \cot(\pi x/2)$ in the interval $[0, 2]$. The values of $f(x) = \cot(\pi x/2)$ at various points in $[0, 2]$ is listed in the following table:

X	-2	-1	0-	0 +	1	2
$f(x) = \cot(\pi x/2)$	$\rightarrow \infty$	0	$\rightarrow -\infty$	$\rightarrow \infty$	0	$\rightarrow -\infty$

By plotting the above points, we obtain the required curve.



8. Question

Sketch the graphs of the following functions :

$$f(x) = \sec^2 x$$

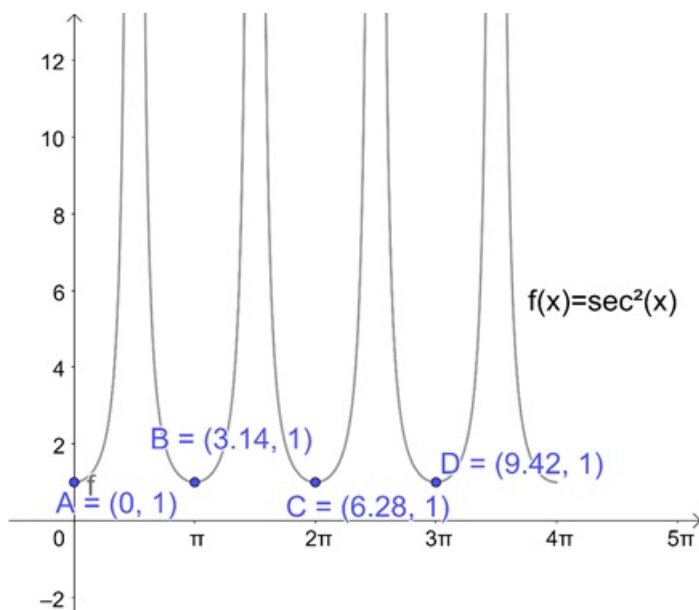
Answer

We know that $g(x) = \sec x$ is a periodic function with period π .

$\therefore f(x) = \sec^2(x)$ is a periodic function with period π . So, we will draw the graph of $f(x) = \sec^2(x)$ in the interval $[0, \pi]$. The values of $f(x) = \sec^2(x)$ at various points in $[0, \pi]$ are listed in the following table:

x	0	$\pi/2$	$\pi/2$	π	$3\pi/2$	$3\pi/2$	2π
$f(x) = \sec^2(x)$	1	$\rightarrow \infty$	$\rightarrow -\infty$	1	$\rightarrow \infty$	$\rightarrow -\infty$	1

By plotting the above points, we obtain the required curve.



9. Question

Sketch the graphs of the following functions :

$$f(x) = \operatorname{cosec}^2 x$$

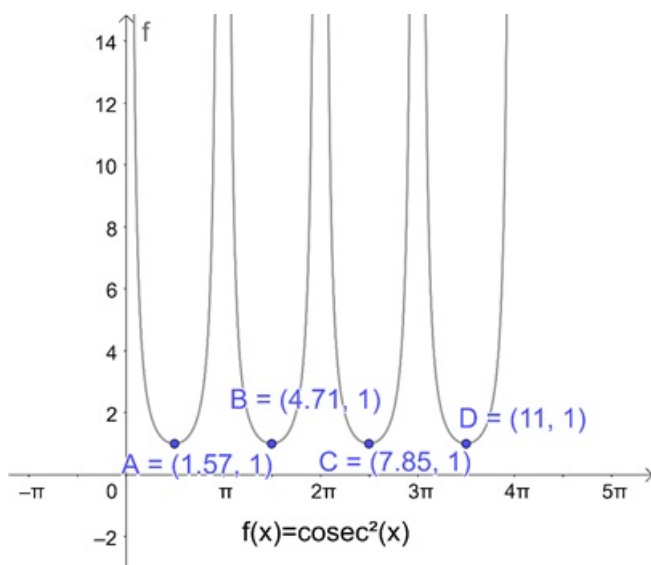
Answer

We know that $g(x) = \operatorname{cosec} x$ is a periodic function with period 2π .

$\therefore f(x) = \operatorname{cosec}^2(x)$ is a periodic function with period 2π . So, we will draw the graph of $f(x) = \operatorname{cosec}^2(x)$ in the interval $[0, 2\pi]$. The values of $f(x) = \operatorname{cosec}^2(x)$ at various points in $[0, 2\pi]$ are listed in the following table:

x	0	$\pi/2$	π	π	$3\pi/2$	2π
$f(x) = \operatorname{cosec}^2(x)$	$\rightarrow -\infty$	1	$\rightarrow \infty$	$\rightarrow -\infty$	1	$\rightarrow \infty$

By plotting the above points, we obtain the required curve.



10. Question

Sketch the graphs of the following functions :

$$f(x) = \tan 2x$$

Answer

We know that $g(x) = \tan x$ is a periodic function with period π .

$\therefore f(x) = \tan(2x)$ is a periodic function with period $\pi/2$. So, we will draw the graph of $f(x) = \tan(2x)$ in the interval $[0, \pi/2]$. The values of $f(x) = \tan(2x)$ at various points in $[0, \pi/2]$ are listed in the following table:

X	$-3\pi/4$	$-\pi/2$	$-\pi/4$	$-\pi/4$	0	$\pi/4$	$\pi/4$	$\pi/2$	$3\pi/4$
$f(x) = \tan(2x)$	$\rightarrow -\infty$	0	$\rightarrow \infty$	$\rightarrow -\infty$	0	$\rightarrow \infty$	$\rightarrow -\infty$	0	$\rightarrow \infty$

By plotting the above points, we obtain the required curve.

