

## Graphs Of Trigonometric Functions

### EXERCISE 19A

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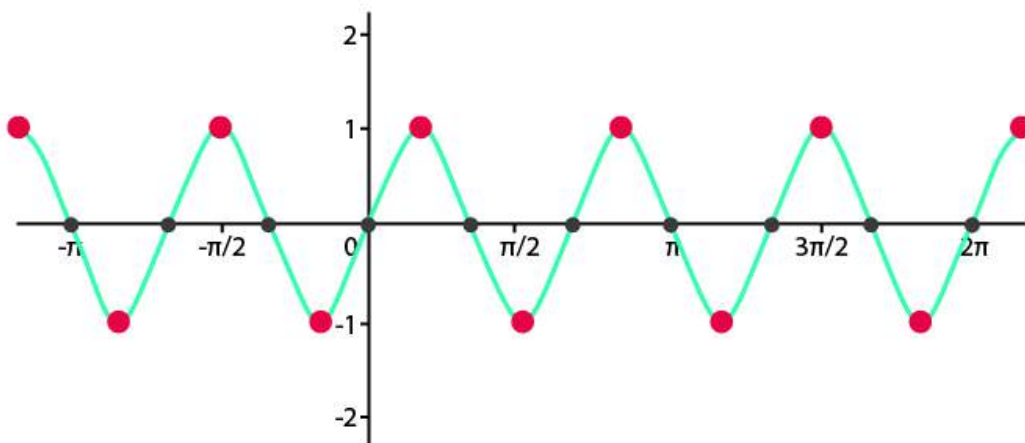
Q. 1. Draw the graph of each of the following functions:

Sin 3x

Solution:

X	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
Sin3x	1	0	-1	0	1	0

The graph of curve sin(3x) can be drawn as



Here, the frequency of the function sin(x) is increased by 3 times.

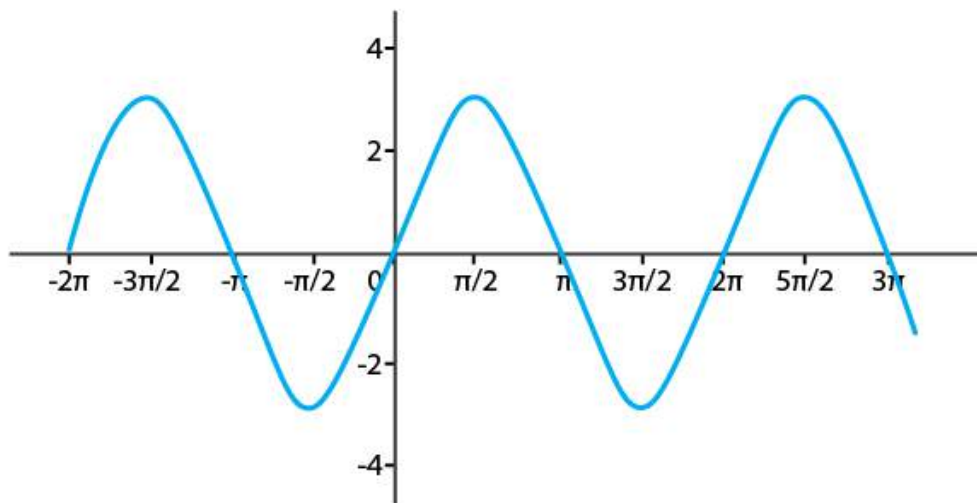
**Q. 2. Draw the graph of each of the following functions:**

**$3\sin x$**

**Solution:**

X	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$3\sin(x)$	$\frac{3}{2}$	$\frac{3\sqrt{3}}{2}$	3	0	-3	0

The graph of curve  $3\sin(x)$  can be drawn as



Here, the amplitude of the function  $\sin(x)$  is increased by 3 times.

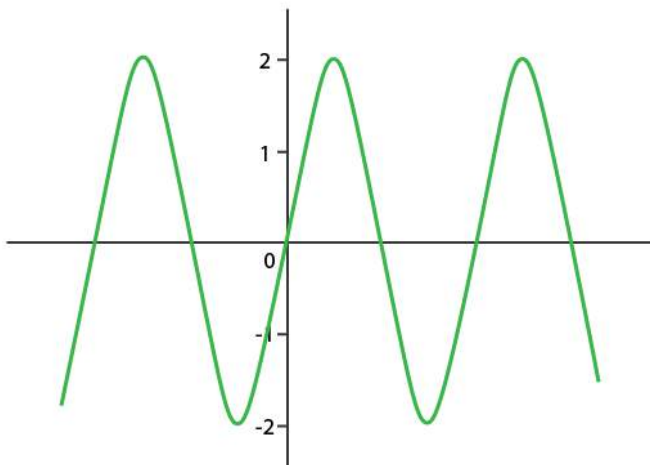
**Q. 3. Draw the graph of each of the following functions:**

**$2\sin 3x$**

**Solution:**

X	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$2\sin(3x)$	2	0	-2	0

The graph of curve  $2\sin 3(x)$  can be drawn as



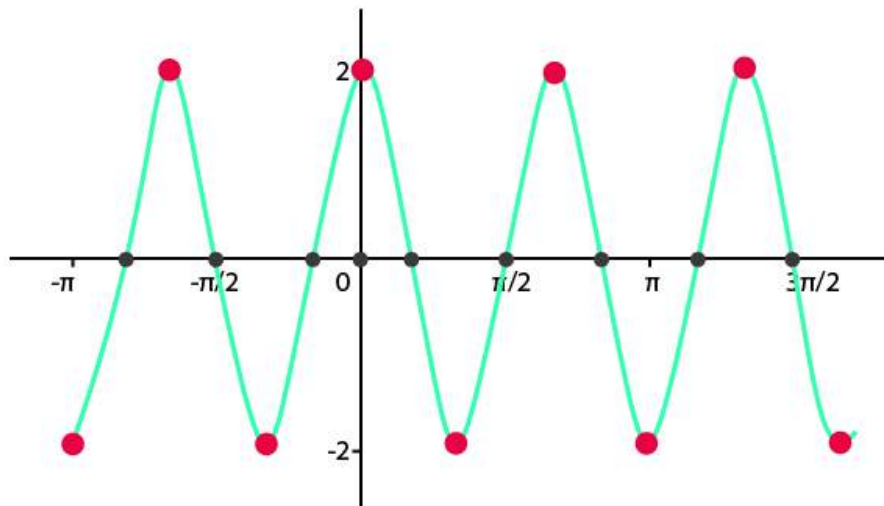
**Q. 4. Draw the graph of each of the following functions:**

**$2\cos 3x$**

**Solution:**

X	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$2\cos(3x)$	0	-2	0	-2	0	2

The graph of curve  $2\cos(3x)$  can be drawn as



Here, the amplitude and frequency of the function  $\cos(x)$  is increased by 2 and 3 times respectively.

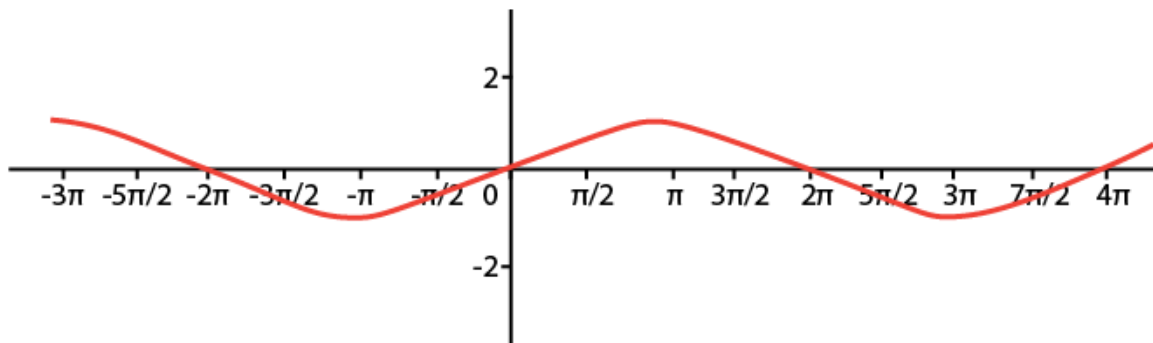
**Q. 5. Draw the graph of each of the following functions:**

$$\sin \frac{x}{2}$$

**Solution:**

X	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$\sin(x/2)$	$\frac{\sqrt{3}-1}{2\sqrt{2}}$	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	1	$\frac{1}{\sqrt{2}}$	0

The graph of curve  $2\cos(3x)$  can be drawn as



Here, the frequency of the function  $\sin(x)$  is decreased by 0.5 times.

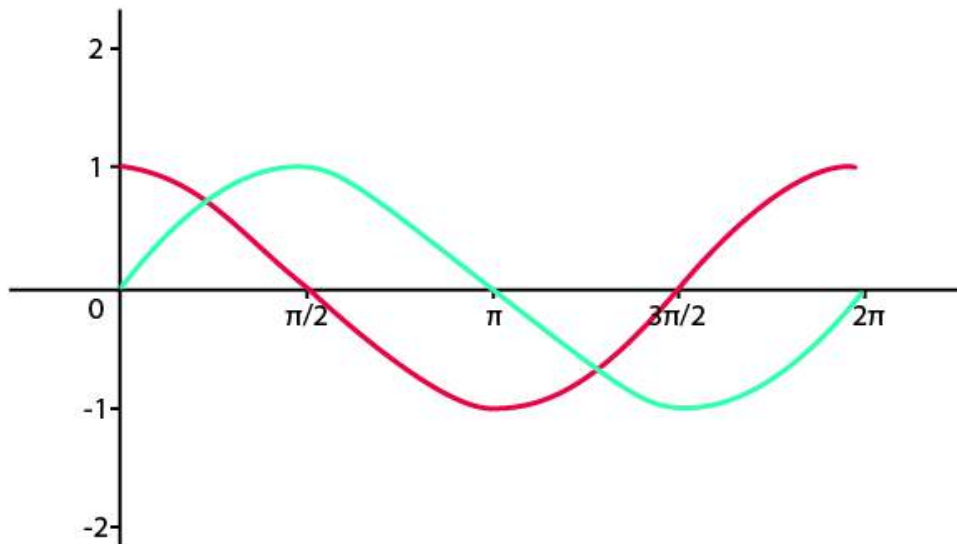
**Q. 6. Draw the graphs of  $y = \sin x$  and  $y = \cos x$  in  $[0, 2\pi]$  on the same axes.**

**Solution:** For  $\sin x$

X	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$\sin x$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0

For  $\cos x$

$x$	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$\cos x$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	0	-1	0	1



Green line depicts  $\sin(x)$

Red lines depict  $\cos(x)$ .

**Q. 7. Draw the graphs of  $y = \cos x$  and  $y = \cos 2x$  in  $[0, 2\pi]$  on the same axes.**

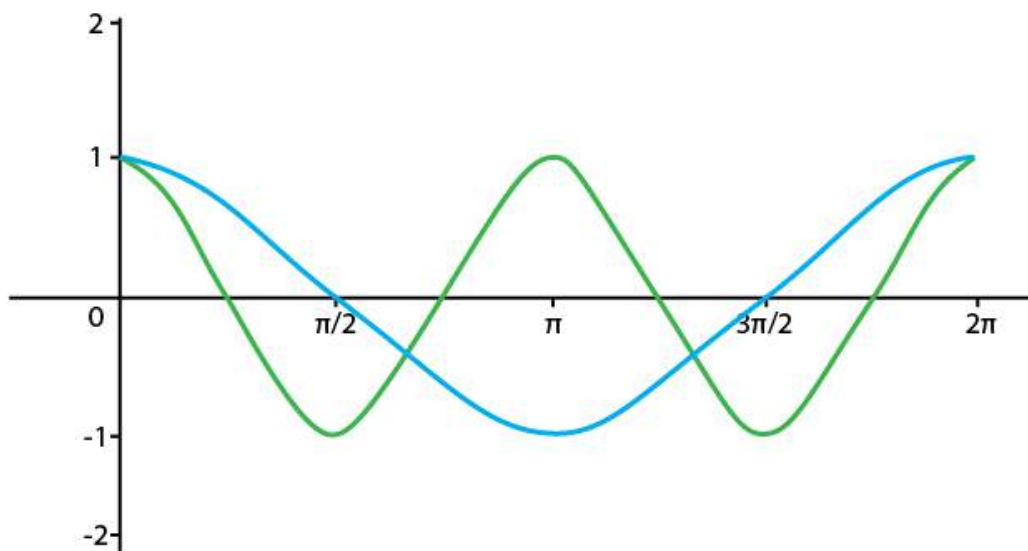
**Solution:** For  $\cos x$

x	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
cosx	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	0	-1	0	1

For cos(2x)

x	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
Cos(2x)	$\frac{1}{2}$	$-\frac{1}{2}$	-1	1	-1	1

The graph is:-



Blue line depicts  $\cos(2x)$

Green lines depict  $\cos(x)$ .