# Graphs Of Trigonometric

## Exercise 19

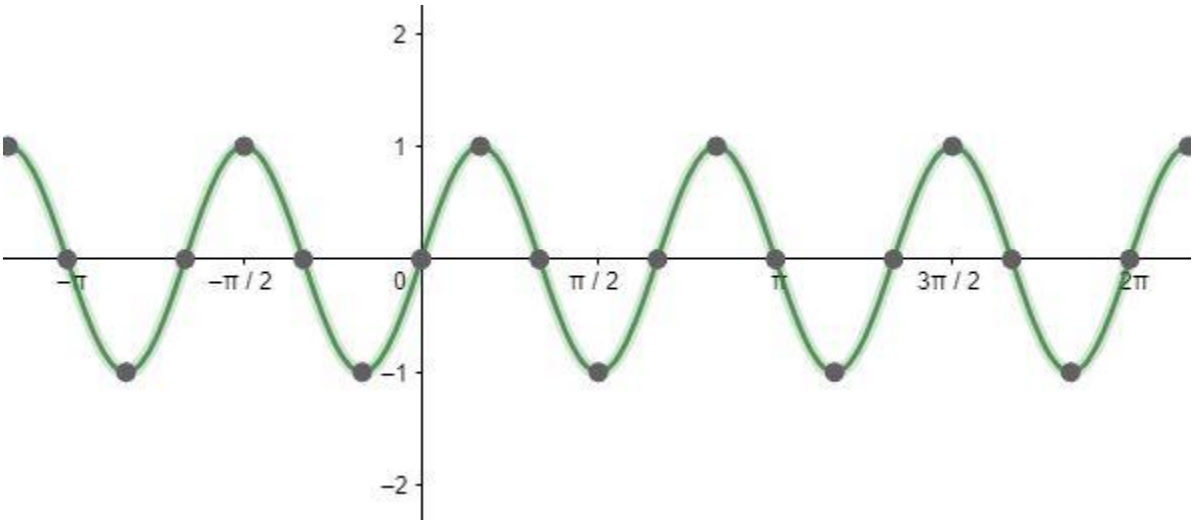
**Q. 1. Draw the graph of each of the following functions:**

**Sin 3x**

**Answer :** To draw the graph of the curve sin(3x) assume some standard angle measures which will help in locating the points and drawing the curve.

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

Therefore, the graph of curve sin(3x) can be drawn as




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

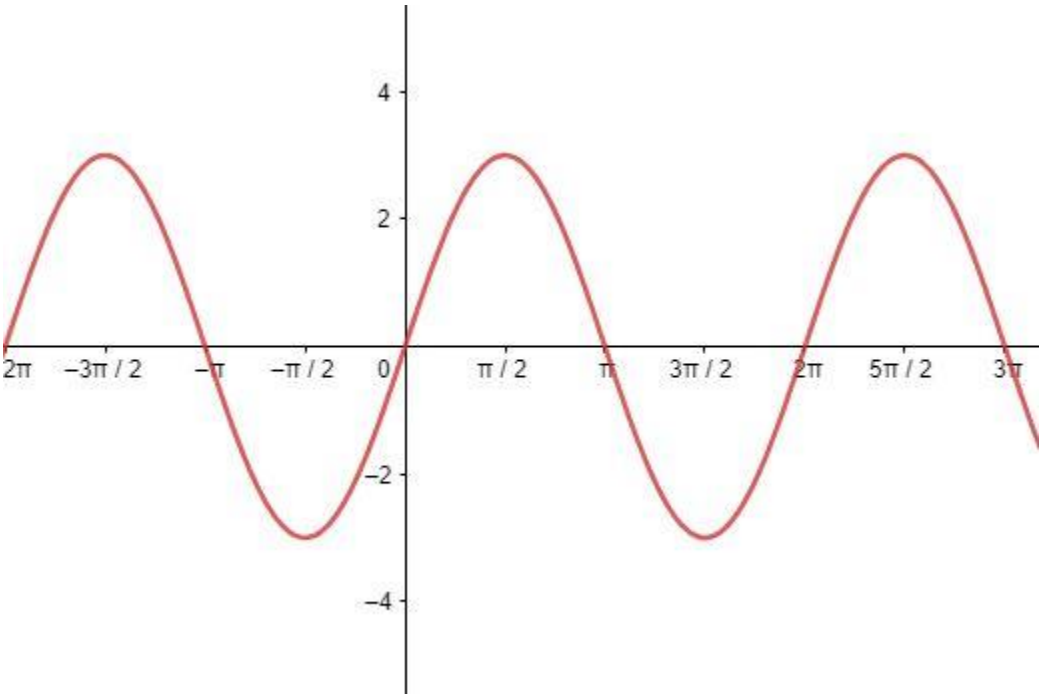
**Q. 2. Draw the graph of each of the following functions:**

**3sin x**

**Answer :** To draw the graph of the curve 3sin(x) assume some standard angle measures which will help in locating the points and drawing the curve.

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

Therefore, the graph of curve 3sin(x) can be drawn as




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

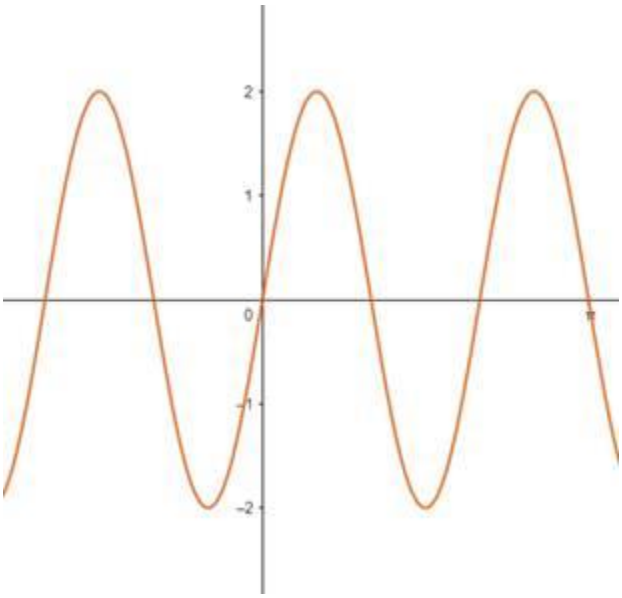
**Q. 3. Draw the graph of each of the following functions:**

**2sin 3x**

**Answer :** To draw the graph of the curve 2sin(3x) assume some standard angle measures which will help in locating the points and drawing the curve

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

The graph looks like:



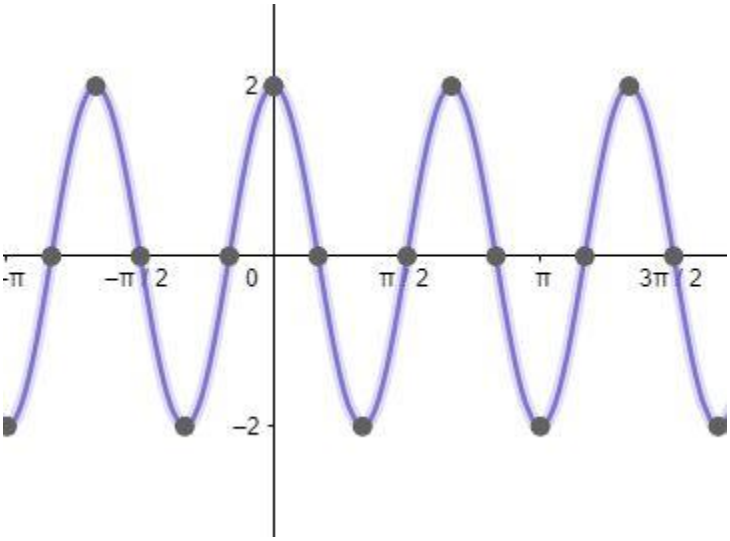

**Q. 4. Draw the graph of each of the following functions:**

**2cos 3x**

**Answer :** To draw the graph of the curve 2cos(3x) assume some standard angle measures which will help in locating the points and drawing the curve.

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

Therefore, the graph of curve 2cos(3x) can be drawn as




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

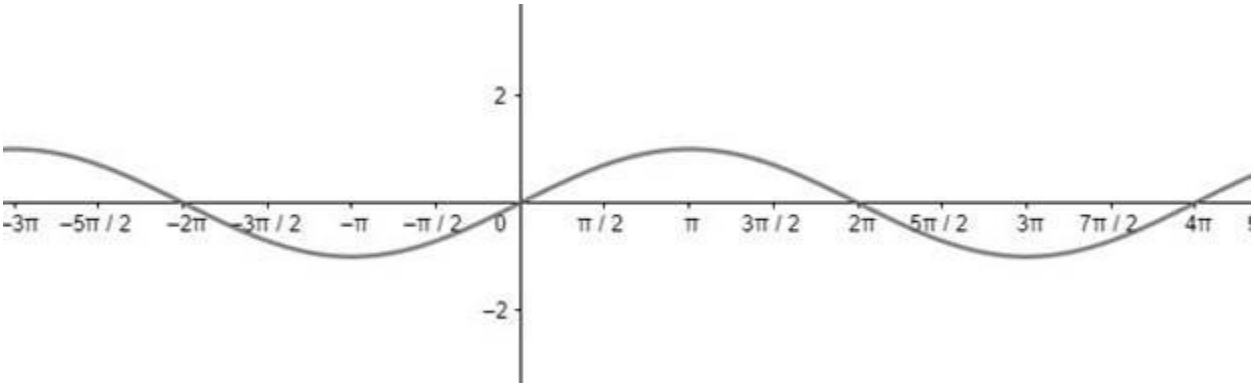
**Q. 5. Draw the graph of each of the following functions:**

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

**Answer :** To draw the graph of the curve sin(x/2) assume some standard angle measures which will help in locating the points and drawing the curve.

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

Therefore, the graph of curve 2cos(3x) can be drawn as




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

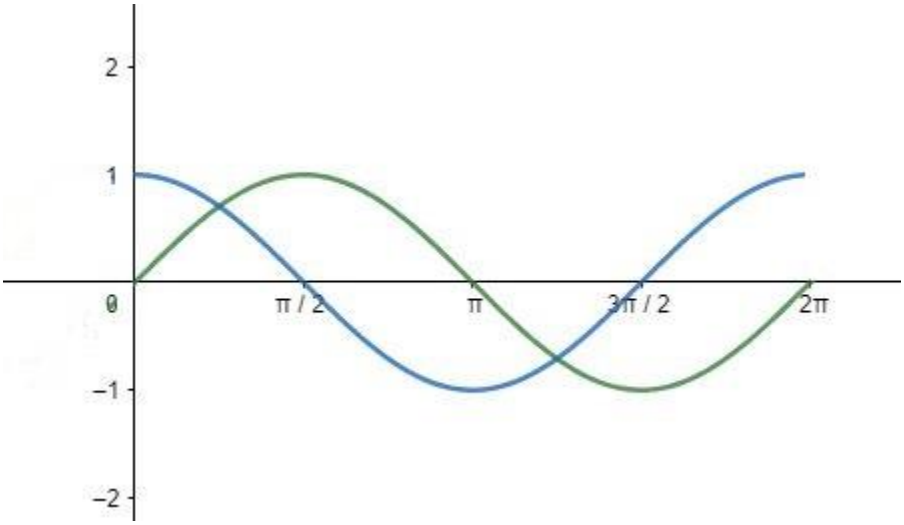
**Q. 6. Draw the graphs of y = sin x and $y = \cos x \text{ in } [0, 2\pi]$ on the same axes.**

**Answer :** For sinx

| X | $\frac{\pi}{6}$ | $\frac{\pi}{3}$ | $\frac{\pi}{2}$ | π | $\frac{3\pi}{2}$ | $2\pi$ |
|---|---|---|---|---|---|---|
| Sinx | $\frac{1}{2}$ | $\frac{\sqrt{3}}{2}$ | 1 | 0 | -1 | 0 |

For cosx

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




The green line represents curve for sin(x) and blue for cos(x) for [0,2π].

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

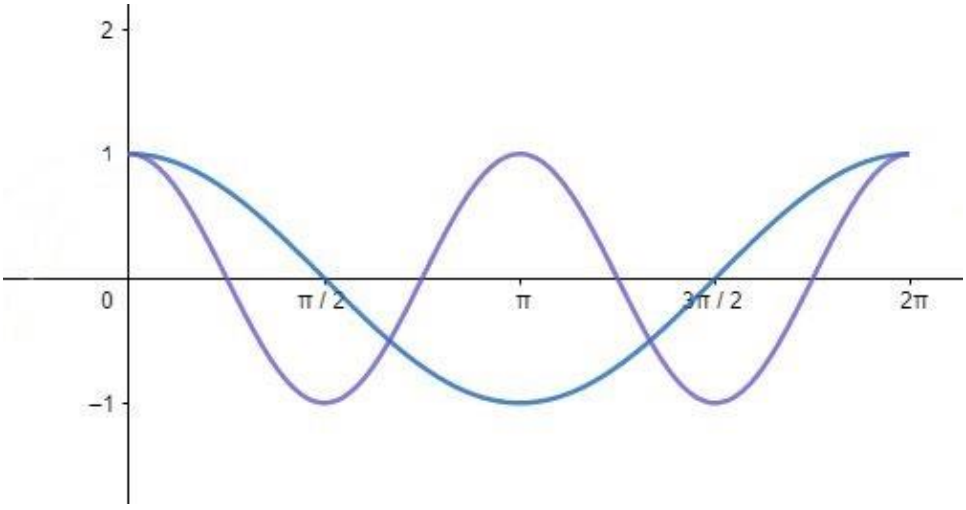
**Answer :** For cosx

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

For cos(2x)

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

The graph is:-




Blue line depicts curve cos(2x)

Purple lines depict cos(x).