



## Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q1

We know that

$$y = \sin^2 x = \frac{1 - \cos 2x}{2} = \frac{1}{2} - \frac{1}{2} \cos 2x$$

We have,

$$y = \frac{1}{2} - \frac{1}{2} \cos 2x$$

$$\Rightarrow y - \frac{1}{2} = -\frac{1}{2} \cos 2x \quad \text{---(i)}$$

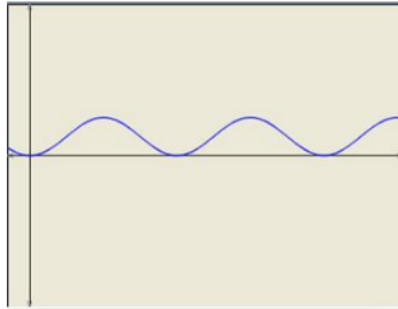
Shifting the origin at  $\left(0, -\frac{1}{2}\right)$ , we obtain

$$x = X, y = Y + \frac{1}{2}$$

Substituting these values in (i), we get

$$Y = -\frac{1}{2} \cos 2X.$$

Thus we draw the graph of  $Y = \cos 2X$ , adjust the maximum and minimum values to  $1/2$  and  $-1/2$  and shift it by  $\frac{1}{2}$  up to get the required graph.



## Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q2

We know that

$$y = \cos^2 x = \frac{1 + \cos 2x}{2} = \frac{1}{2} + \frac{1}{2} \cos 2x$$

We have,

$$y = \frac{1}{2} + \frac{1}{2} \cos 2x$$

$$\Rightarrow y - \frac{1}{2} = \frac{1}{2} \cos 2x \quad \text{---(i)}$$

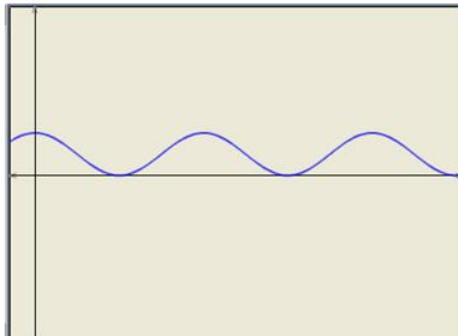
Shifting the origin at  $\left(0, \frac{1}{2}\right)$ , we obtain

$$x = X, y = Y + \frac{1}{2}$$

Substituting these values in (i), we get

$$Y = \frac{1}{2} \cos 2X.$$

Thus we draw the graph of  $Y = \cos 2X$ , adjust the maximum and minimum values to  $1/2$  and  $-1/2$  and shift it by  $\frac{1}{2}$  down to get the required graph.



## Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q3

We have,

$$y = \sin^2\left(x - \frac{\pi}{4}\right)$$

$$\Rightarrow y - 0 = \sin^2\left(x - \frac{\pi}{4}\right) \quad \text{---(i)}$$

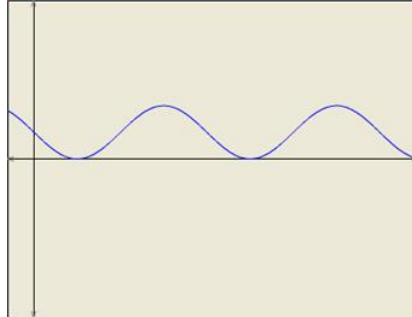
Shifting the origin at  $\left(\frac{\pi}{4}, 0\right)$ , we obtain

$$x = X + \frac{\pi}{4}, \quad y = Y + 0$$

Substituting these values in (i), we get

$$Y = \sin^2 X.$$

Thus we draw the graph of  $Y = \sin^2 X$  and shift it by  $\frac{\pi}{4}$  to the right to get the required graph.



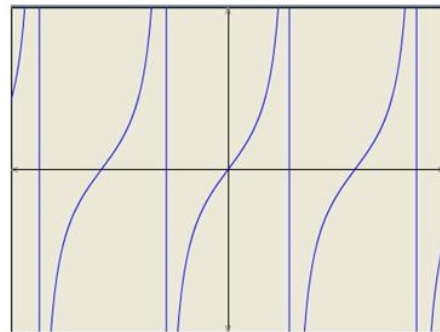
#### Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q4

To obtain the graph of  $y = \tan 2x$  we first draw the graph of  $y = \tan x$  in the interval  $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$  and then divide the x-coordinates of the points where it crosses x-axis by 2.



#### Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q5

To obtain the graph of  $y = 2 \tan 3x$  we first draw the graph of  $y = \tan x$  in the interval  $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$  and then divide the x-coordinates of the points where it crosses x-axis by 3. We then stretch the graph vertically by a factor of 2.



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