

RD Sharma
Solutions
Class 11 Maths
Chapter 6
Ex 6.3

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,

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

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

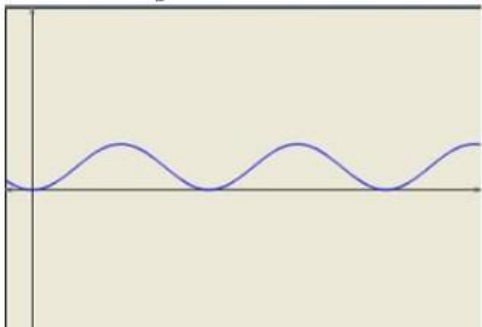
Shifting the origin at $\left(0, -\frac{1}{2}\right)$, we obtain

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

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,

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

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

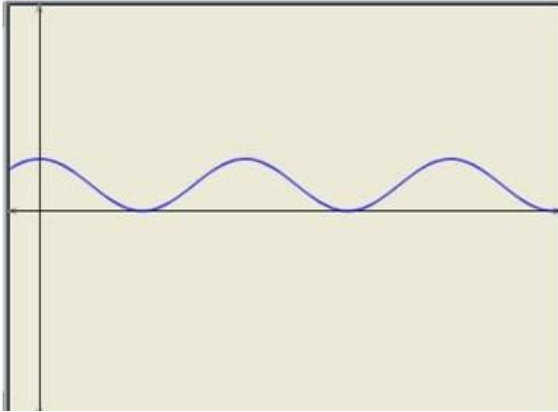
Shifting the origin at $(0, -\frac{1}{2})$, we obtain

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

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,

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

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

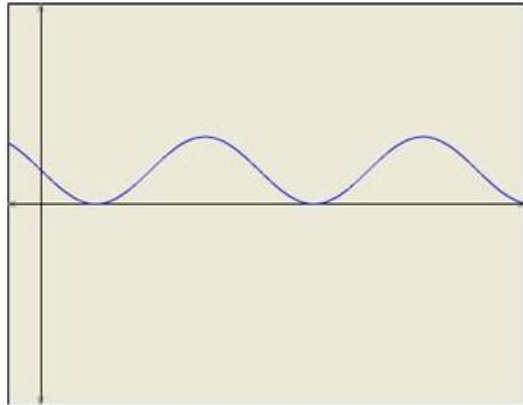
Shifting the origin at $(\frac{\pi}{4}, 0)$, we obtain

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

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.

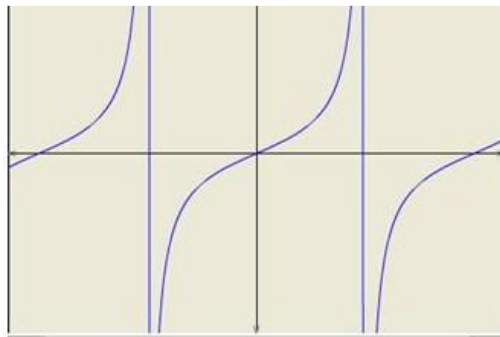


Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q4

To obtain the graph of $y = \tan 2x$ we first draw the graph of $y = \tan x$ in the interval

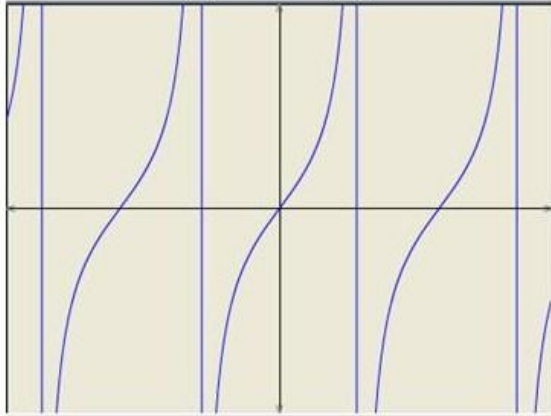
$(-\frac{\pi}{2}, \frac{\pi}{2})$ and then divide the x-coordinates of the points where it crosses x-axis by 2.





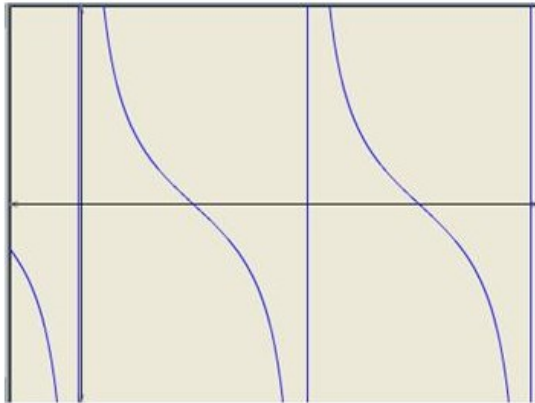
Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q5

To obtain the graph of $y = 2 \tan 3x$ we first draw the graph of $y = \tan x$ in the interval $(-\frac{\pi}{2}, \frac{\pi}{2})$ 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.



Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q6

To obtain the graph of $y = 2 \cot 2x$ we first draw the graph of $y = \cot x$ in the interval $(0, \pi)$ and then divide the x-coordinates of the points where it crosses x-axis by 2. We then stretch the graph vertically by a factor of 2.



Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q7

We have,

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

$$\Rightarrow y - 0 = \cos 2 \left(x - \frac{\pi}{6} \right) \quad \text{---(i)}$$

Shifting the origin at $(\frac{\pi}{6}, 0)$, we obtain

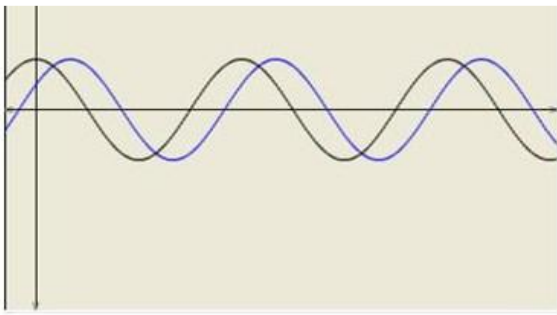
$$x = X + \frac{\pi}{6}, \quad y = Y + 0$$

Substituting these values in (i), we get

$$Y = \cos 2X.$$

Thus we draw the graph of $Y = \cos 2X$ and shift it by $\frac{\pi}{6}$ to the right to get the required graph.





Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q8

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 $(0, -\frac{1}{2})$, we obtain

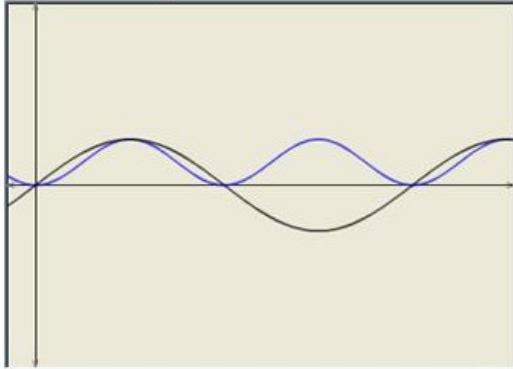
$$x = X, \quad y = Y + \frac{1}{2}$$

Substituting these values in (i), we get

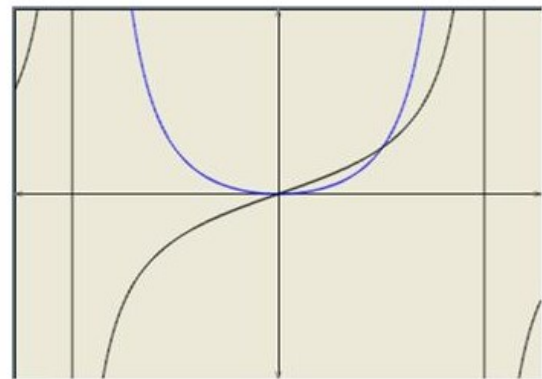
$$Y = -\frac{1}{2} \cos 2X.$$

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 Q9



Chapter 6 Graphs of Trigonometric Functions Ex 6.3 Q10



