



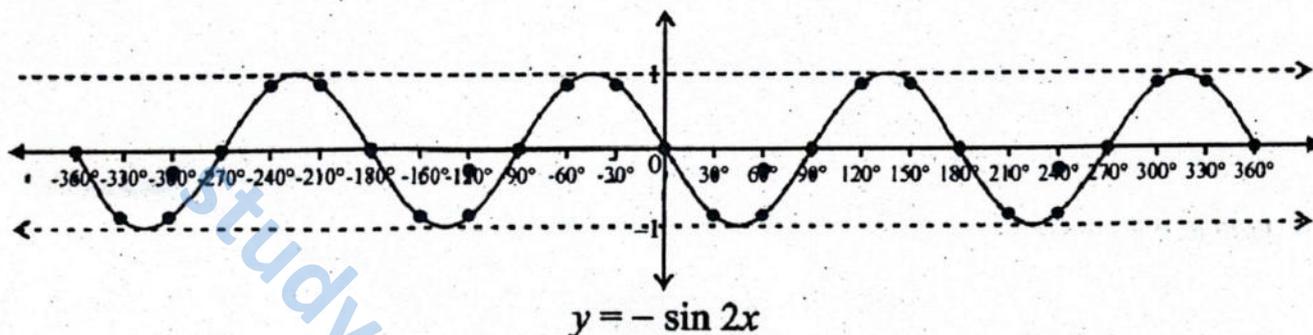
# Exercise 11.2



Q.1 Draw the graph of each of the following function for the intervals mentioned against each:

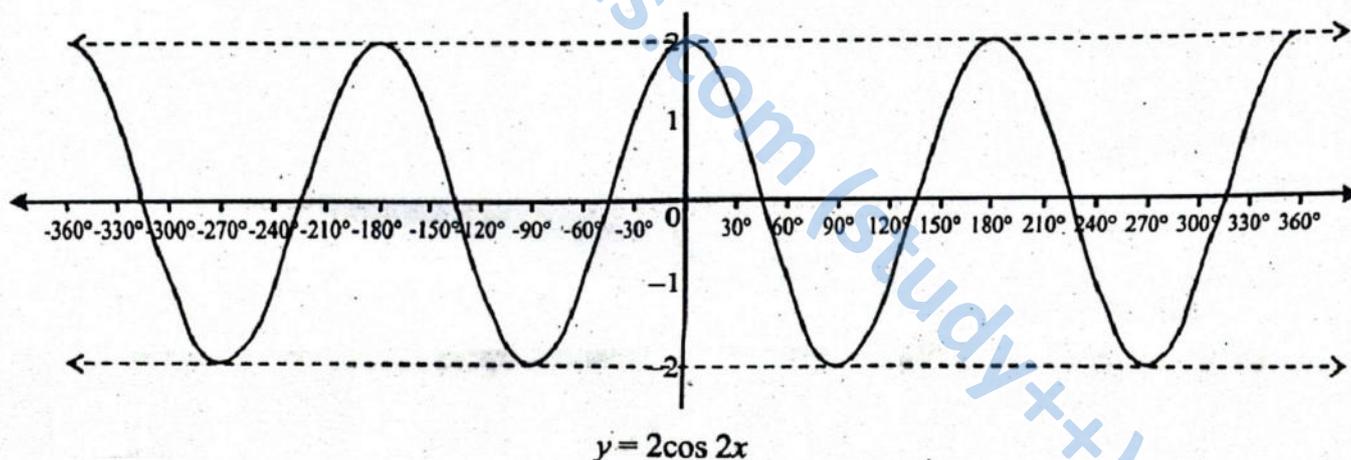
(i)  $y = -\sin 2x, x \in [-2\pi, 2\pi]$

x	-360°	-300°	-240°	-180°	-120°	-60°	0°	60°	120°	180°	240°	300°	360°
y	0	0.866	-0.866	0	0.866	-0.866	0	0.866	-0.866	0	0.866	-0.866	0



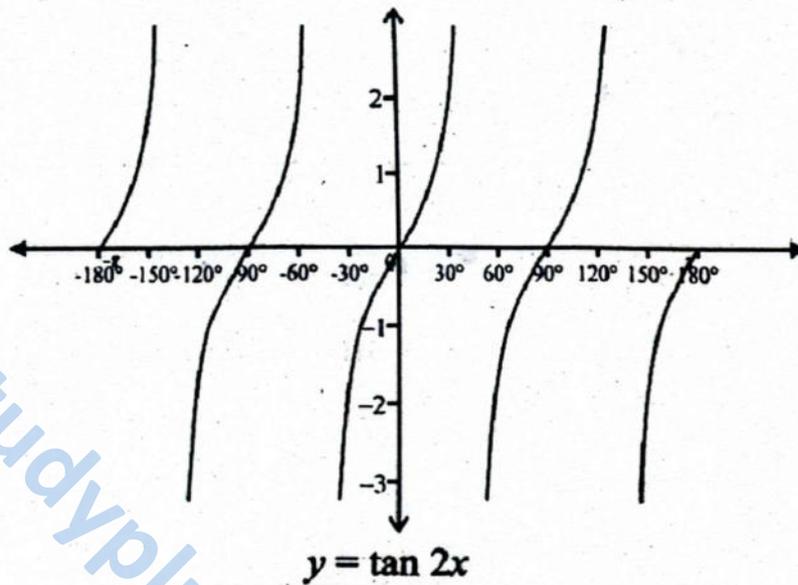
(ii)  $y = 2\cos 2x, x \in [-2\pi, 2\pi]$

x	-360°	-300°	-240°	-180°	-120°	-60°	0°	60°	120°	180°	240°	300°	360°
y	2	-1	-1	2	-1	-1	2	-1	-1	2	-1	-1	2



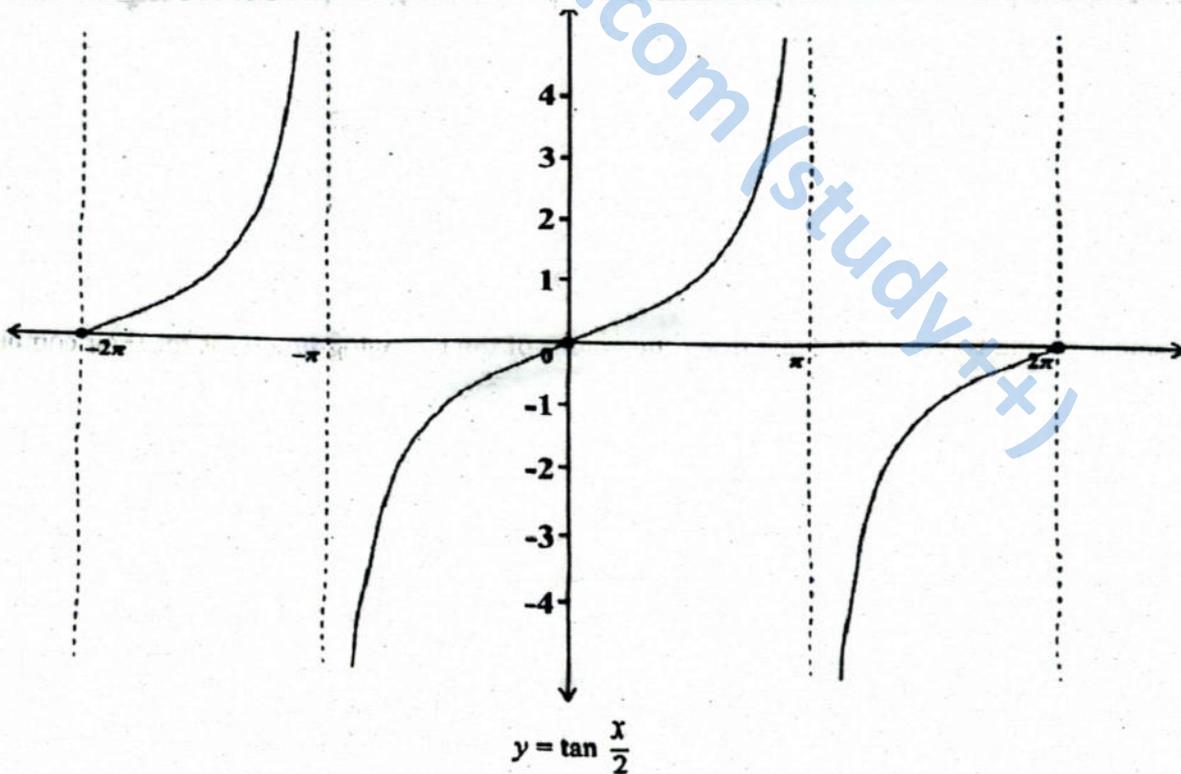
(iii)  $y = \tan 2x, x \in [-\pi, \pi]$

x	-180°	-120°	-60°	0°	60°	120°	180°
y	0	-1.732	1.732	0	-1.732	1.732	0



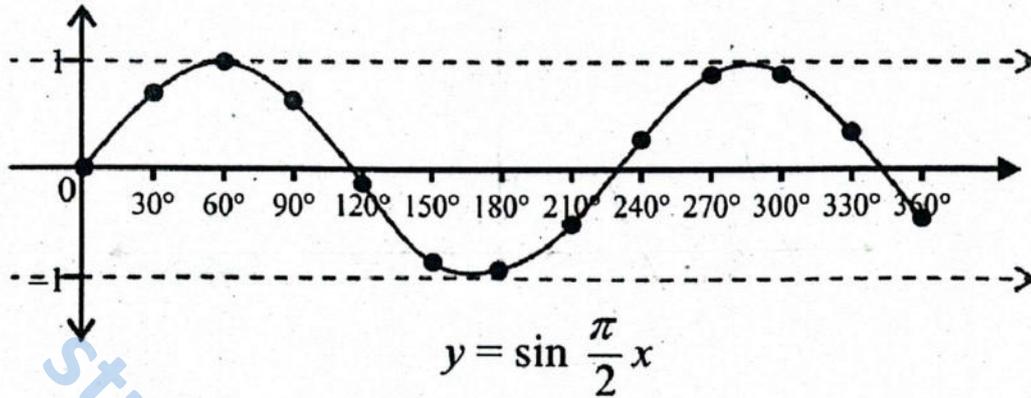
(iv)  $y = \tan \frac{x}{2}, x \in [-2\pi, 2\pi]$

x	-360°	-240°	-180°	-120°	-60°	0°	60°	120°	180°	240°	360°
y	0	1.732	∞	-1.732	-0.577	0	0.577	1.732	∞	-1.732	0



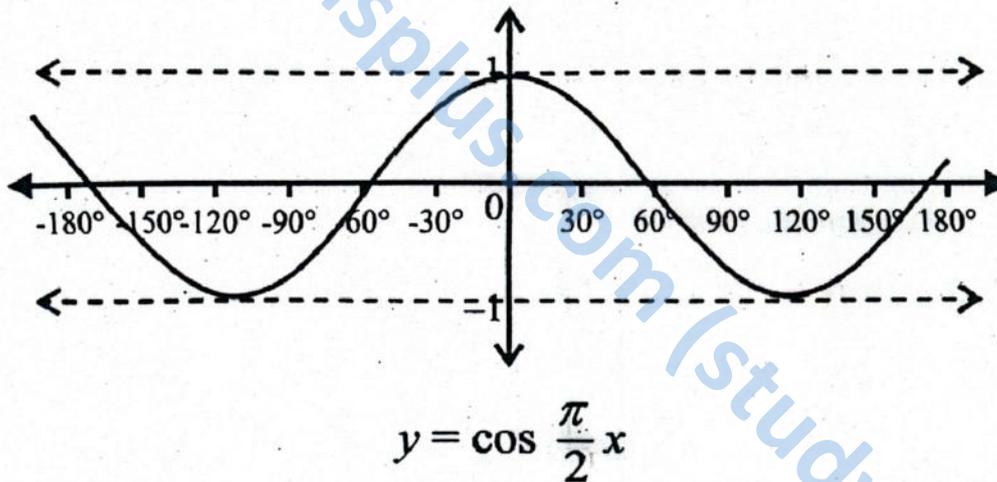
(v)  $y = \sin \frac{\pi}{2} x$ ,  $x \in [0, 2\pi]$

x	0°	60°	120°	180°	240°	300°	360°
y	0	1	0	-1	0.4	1	-0.4



(vi)  $y = \cos \frac{\pi}{2} x$ ,  $x \in [-\pi, \pi]$

x	-120°	-60°	0°	60°	120°
y	-1	0	1	0	-1

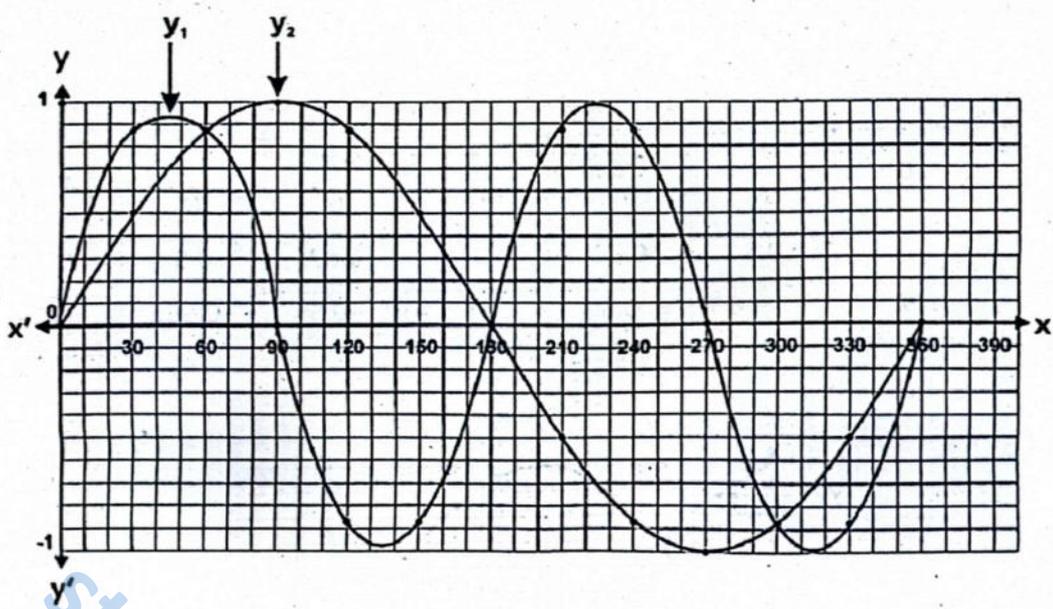


**Q.2** On the same axes and to the same scale draw the graphs of the following functions for their complete period

i.  $y = \sin x$  and  $y = \sin 2x$

**Sol.** Take  $y_1 = \sin x$  and  $y_2 = \sin 2x$

x	0	$\frac{\pi}{6}$	$\frac{2\pi}{6}$	$\frac{3\pi}{6}$	$\frac{4\pi}{6}$	$\frac{5\pi}{6}$	$\frac{6\pi}{6}$	$\frac{7\pi}{6}$	$\frac{8\pi}{6}$	$\frac{9\pi}{6}$	$\frac{10\pi}{6}$	$\frac{11\pi}{6}$	$2\pi$
$y_1$	0	0.5	0.87	1	0.87	0.5	0	-0.5	0.87	-1	-0.87	-0.5	0
$y_2$	0	0.87	0.87	0	0.87	0.87	0	0.87	0.87	0	-0.87	0.87	0



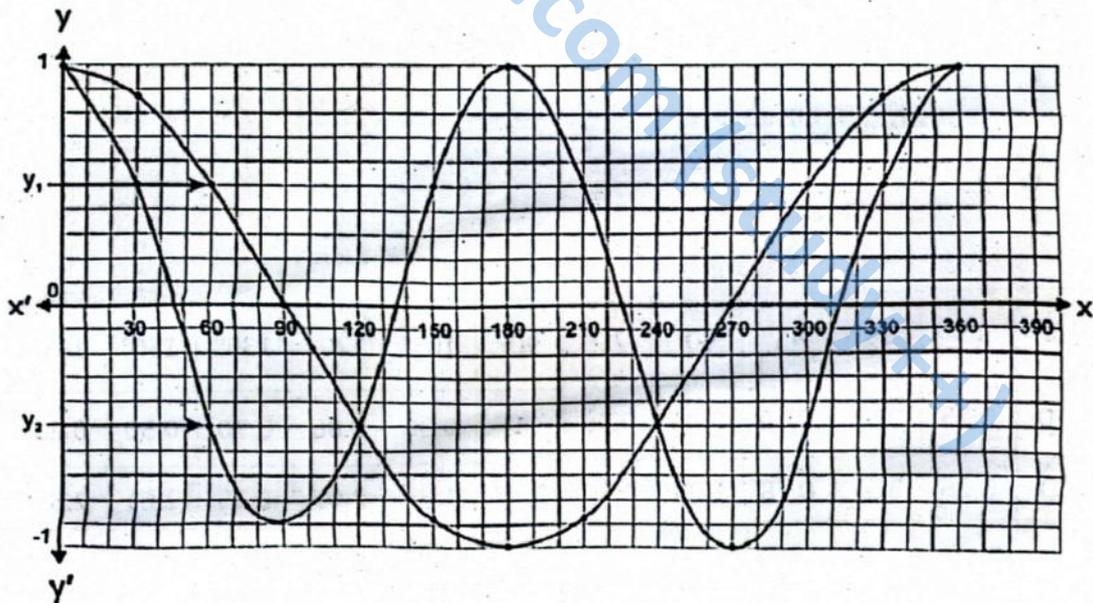
$$y = \sin x \quad \text{and} \quad y = \sin 2x$$

ii.  
Sol.

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

$$\text{Take } y_1 = \cos x \quad \text{and} \quad y_2 = \cos 2x$$

X	0	60°	120°	180°	240°	300°	360°
Y <sub>1</sub>	1	0.5	-0.5	-1	-0.5	0.5	1
Y <sub>2</sub>	1	-0.5	-0.5	1	-0.5	-0.5	1



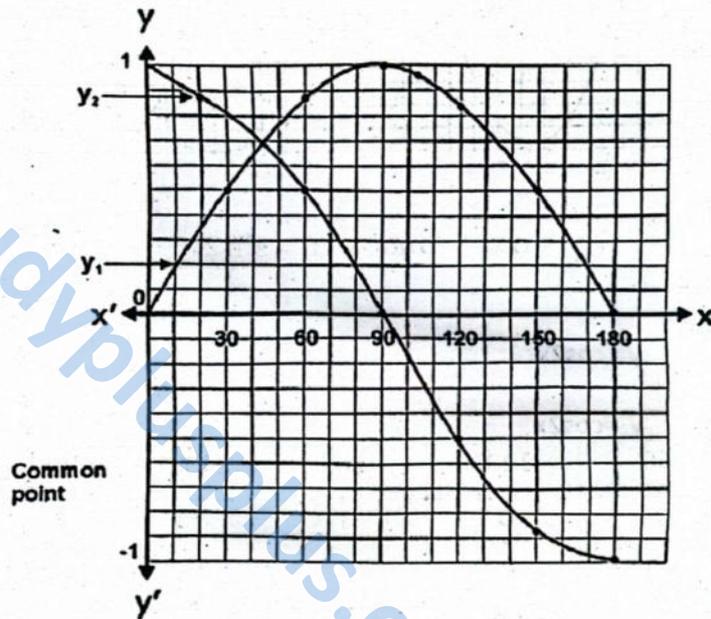
$$y = \cos x \quad \text{and} \quad y = \cos 2x$$

3. Solve graphically

i.  $\sin x = \cos x$ ,  $x \in [0, \pi]$

Sol. Take  $y_1 = \sin x$   $y_2 = \cos x$

X	0	$\frac{\pi}{6}$	$\frac{2\pi}{6}$	$\frac{3\pi}{6}$	$\frac{4\pi}{6}$	$\frac{5\pi}{6}$	$\pi$
$Y_1$	0	0.5	0.87	1	0.87	0.5	0
$Y_2$	1	0.866	0.5	0	-0.5	-0.866	-1



Point of intersection is at  $\pi/4 = 45^\circ$ . Hence Solution set =  $\{ \pi/4 \}$

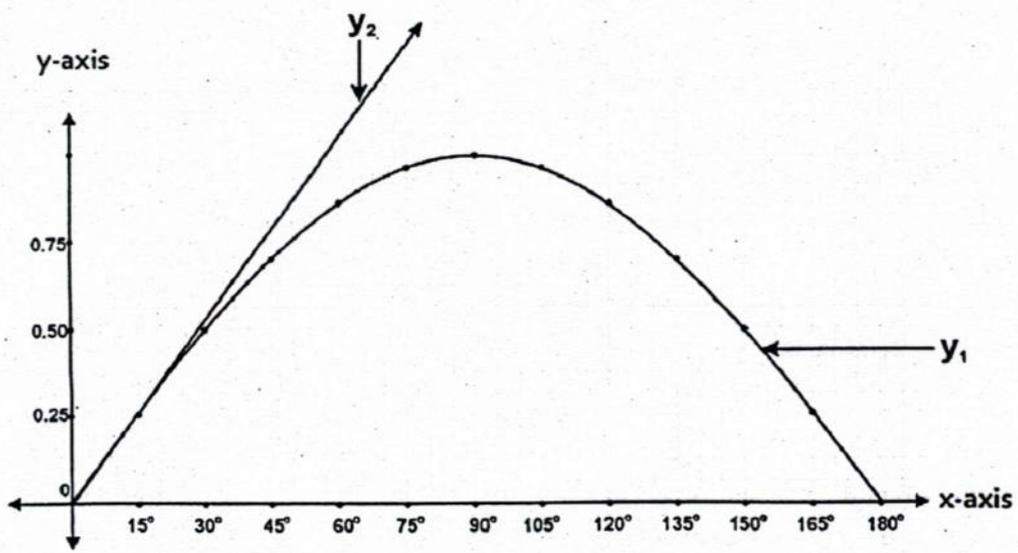
(ii).  $\sin x = x$ ;  $x \in [0, \pi]$

Let  $y_1 = \sin x$   $y_2 = x$

Sol.  $\{0\}$

x	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°
$y_1 = \sin x$	0	0.25	0.50	0.70	0.86	0.96	1	0.96	0.86	0.70	0.50	0.25	0
$y_2 = x$	0	0.26	0.52	0.78	1.04	1.30	1.57	1.83	2.09	2.35	2.61	2.87	3.14

$$1^\circ = \frac{\pi}{180} = 0.01745$$



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