(12) $\text{Cosec } 10x$

$= \text{Cosec}(10x + 2\pi)$

$= \text{Cosec } 10\left(x + \frac{2\pi}{10}\right)$

$= \text{Cosec } 10\left(x + \frac{\pi}{5}\right)$

$\therefore$ period of $\text{Cosec } 10x = \frac{\pi}{5}$ Ans.

---

(13) $3\sin x = 3\sin(x + 2\pi)$

$\therefore$ period of $3\sin x = 2\pi$ Ans.

---

(14) $2\cos x = 2\cos(x + 2\pi)$

$\therefore$ period of $2\cos x = 2\pi$ Ans.

---

(15) $3\cos\frac{x}{5} = 3\cos\left(\frac{x}{5} + 2\pi\right)$

$= 3\cos\frac{1}{5}(x + 10\pi)$

$\therefore$ period of $3\cos\frac{x}{5} = 10\pi$ Ans.

زندگی

زندگی اک خواب ہے
موت ہے جس کی تعبیر

زندگی اک آگ ہے
جلتے ارمانوں کی جاگیر

زندگی اک دشت ہے
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کس دم چھٹے جانے خبیر

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اوراق ہیں بہت لطیف

زندگی بس زندگی ہے
مقصدیت رکھو عزیز

(عامر محمود)

EXERCISE 11.2

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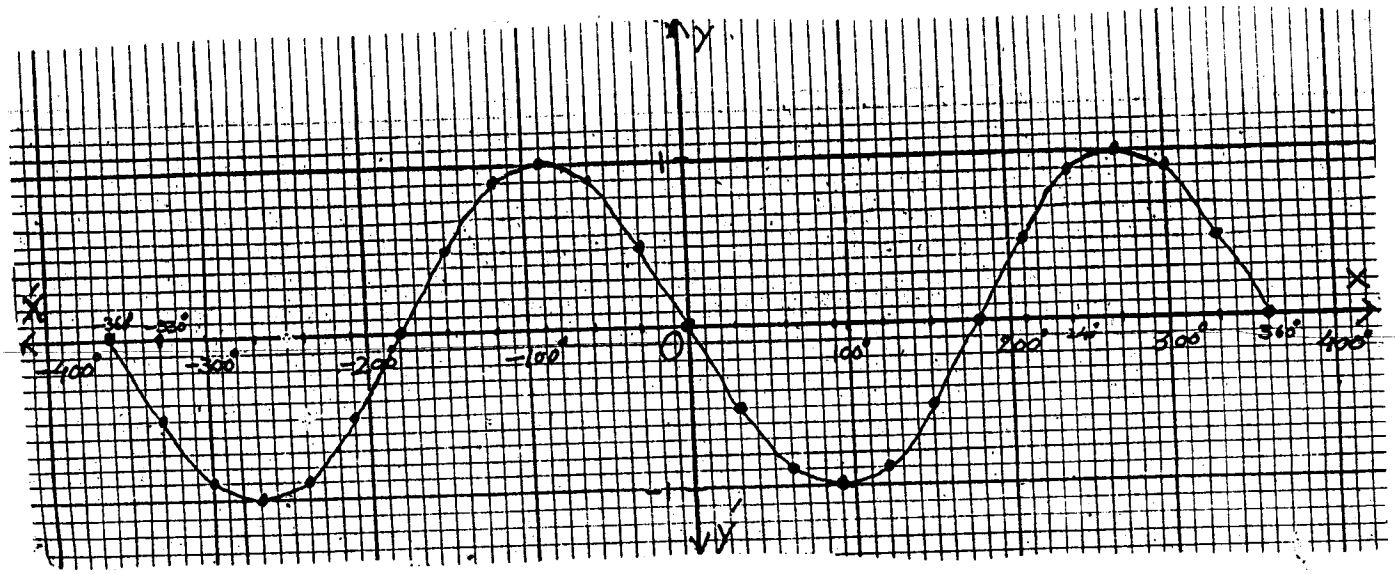
Govt. College Farooka (Sgd)

1. i) $y = -\sin x \; ; \; x \in [-2\pi, 2\pi]$

x	-360°	-330°	-300°	-270°	-240°	-210°	-180°	-150°	-120°	-90°	-60°	-30°	0°
y	0	-0.5	-0.9	-1	-0.9	-0.5	0	0.5	0.9	1	0.9	0.5	0
x	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°	
y	-0.5	-0.9	-1	-0.9	-0.5	0	0.5	0.9	1	0.9	0.5	0	

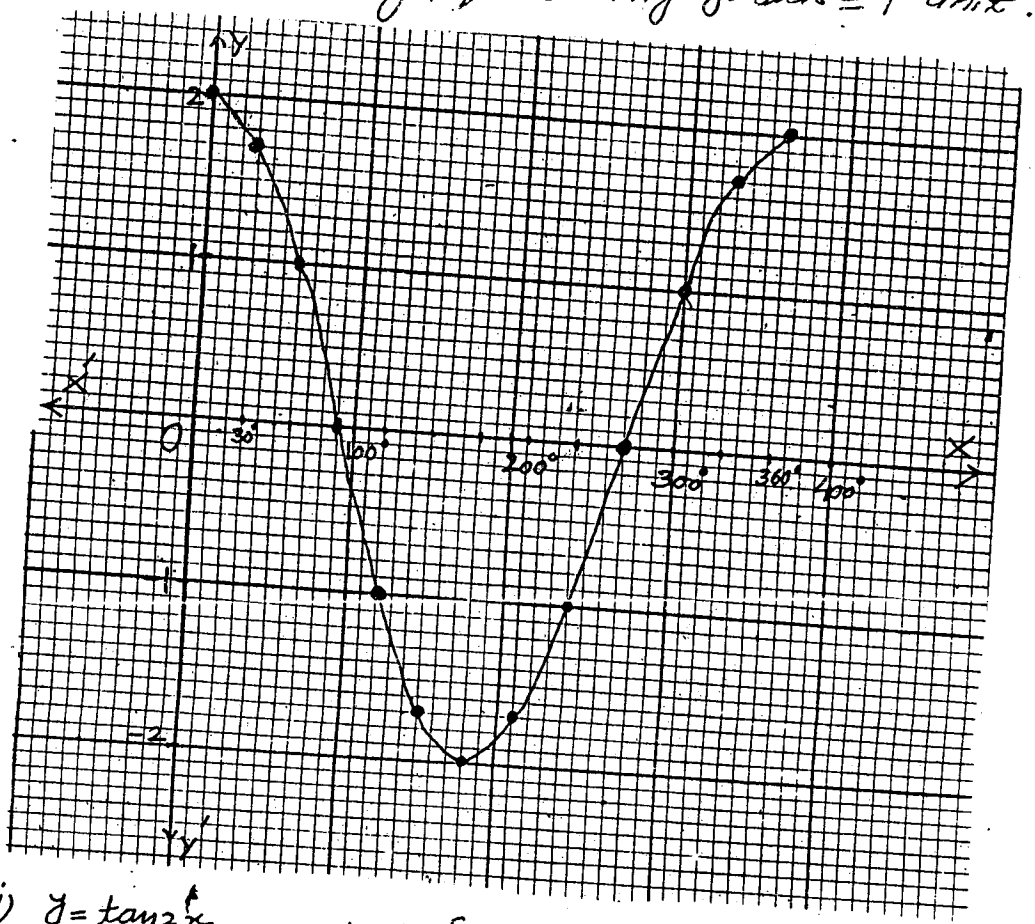
Scale: One big square along x-axis $= 100^\circ$
One big Square along y-axis $= 1$ unit.



ii) $y = 2\cos x \quad ; \quad x \in [0, 2\pi]$

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
y	2	1.7	1	0	-1	-1.7	-2	-1.7	-1	0	1	1.7	2

Scale: One big Square along x-axis = 100°
One big Square along y-axis = 1 unit.



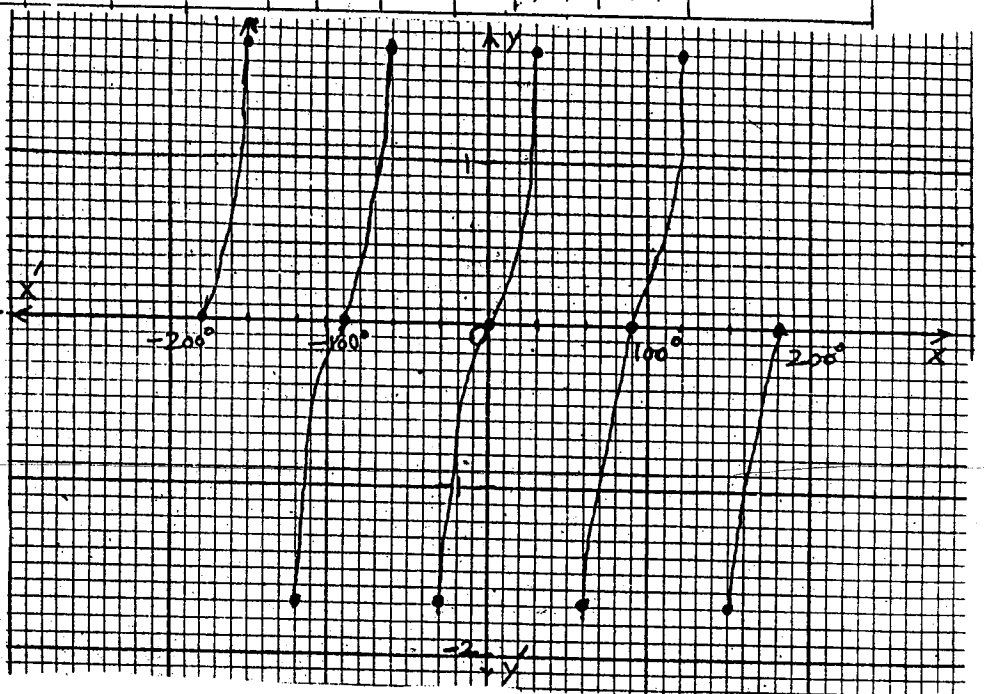
iii) $y = \tan 2x \quad ; \quad x \in [-\pi, \pi]$

x	-180°	-150°	-120°	-90°	-60°	-30°	0°	30°	60°	90°	120°	150°	180°
y	0	1.7	-1.7	0	1.7	-1.7	0	1.7	-1.7	0	1.7	-1.7	0

Scale

One big Square along x-axis = 100°

One big Square along y-axis = 1 unit

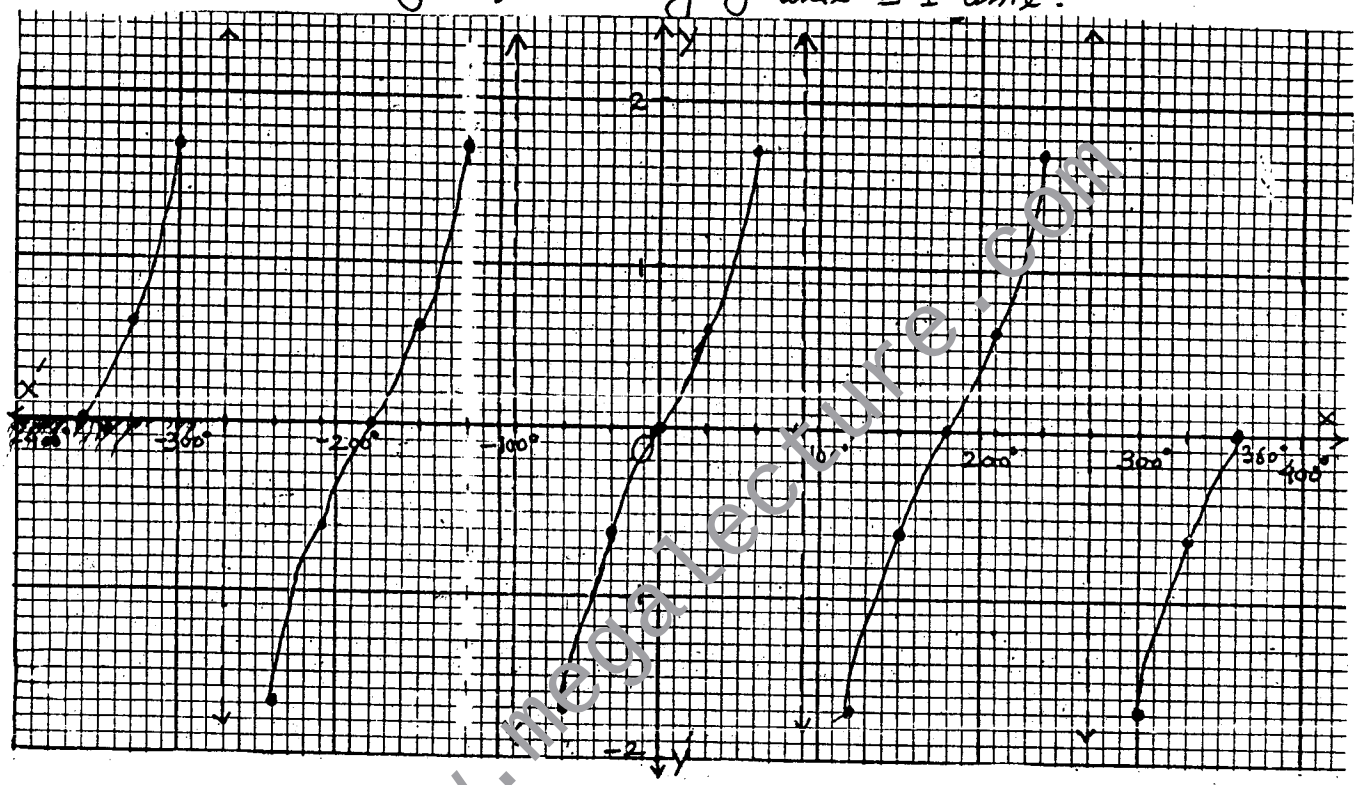


(iv) $y = \tan x$; $x \in [-2\pi, 2\pi]$

x	-360°	-330°	-300°	-270°	-240°	-210°	-180°	-150°	-120°	-90°	-60°	-30°	0°
y	0	0.6	1.7	∞	-1.7	-0.6	0	0.6	1.7	∞	-1.7	-0.6	0
x	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°	
y	0.6	1.7	∞	-1.7	-0.6	0	0.6	1.7	∞	-1.7	-0.6	0	

Scale: One big Square along x-axis $= 100^\circ$

One big Square along y-axis $= 1$ unit.

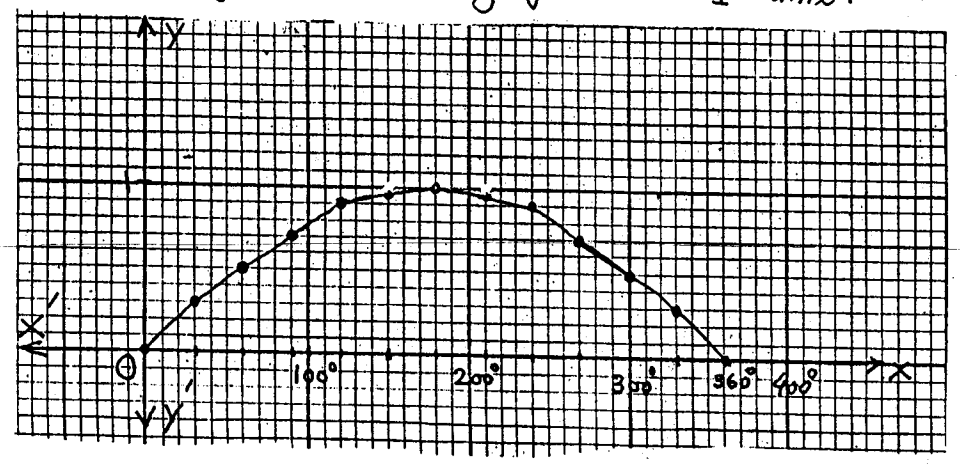


(v) $y = \sin \frac{x}{2}$; $x \in [0, 2\pi]$

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
y	0	0.3	0.5	0.7	0.9	0.96	1.0	0.96	0.9	0.7	0.5	0.3	0

Scale: One big Square along x-axis $= 100^\circ$

One big Square along y-axis $= 1$ unit.



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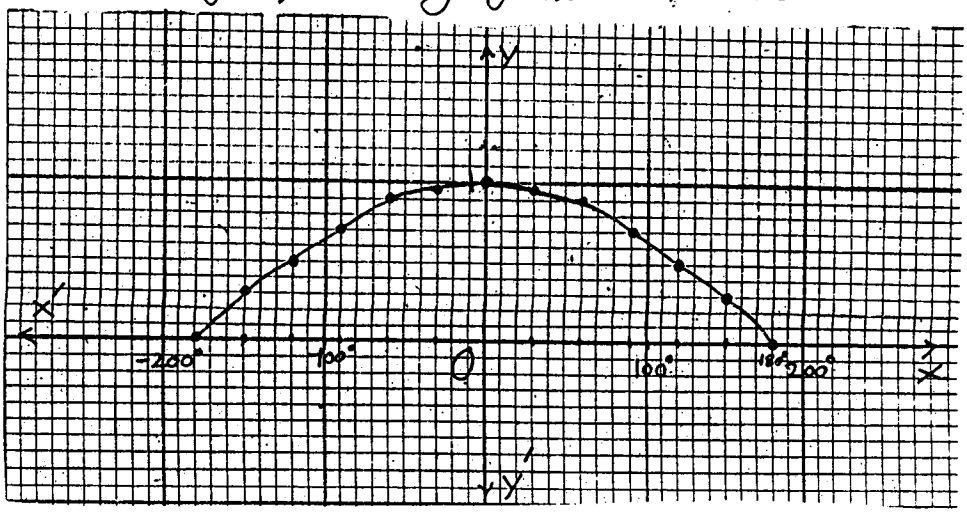
vi) $y = \cos\frac{x}{2}$; $x \in [-\pi, \pi]$

x	-180°	-150°	-120°	-90°	-60°	-30°	0°	30°	60°	90°	120°	150°	180°
y	0	0.3	0.5	0.7	0.9	0.96	1	0.96	0.9	0.7	0.5	0.3	0

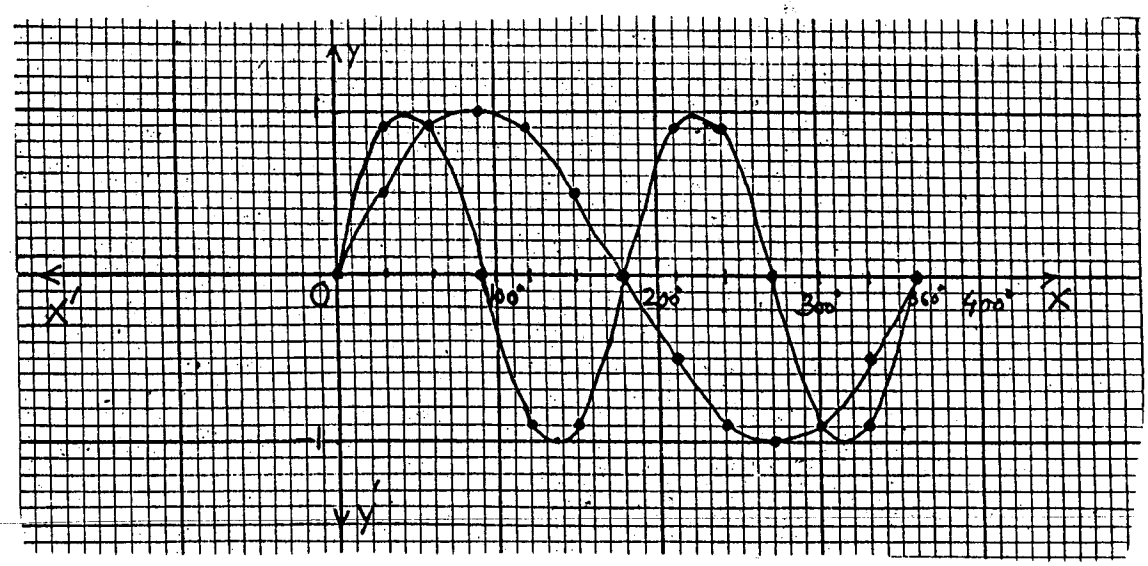
Scale: One big Square along x-axis $= 100^\circ$
One big Square along y-axis $= 1$ unit



2. (i) $y = \sin x$ and $y = \sin 2x$ $x \in [0, 2\pi]$

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$y=\sin x$	0	0.5	0.9	1	0.9	0.5	0	-0.5	-0.9	-1	-0.9	-0.5	0
$y=\sin 2x$	0	0.9	0.9	0	-0.9	-0.9	0	0.9	0.9	0	-0.9	-0.9	0

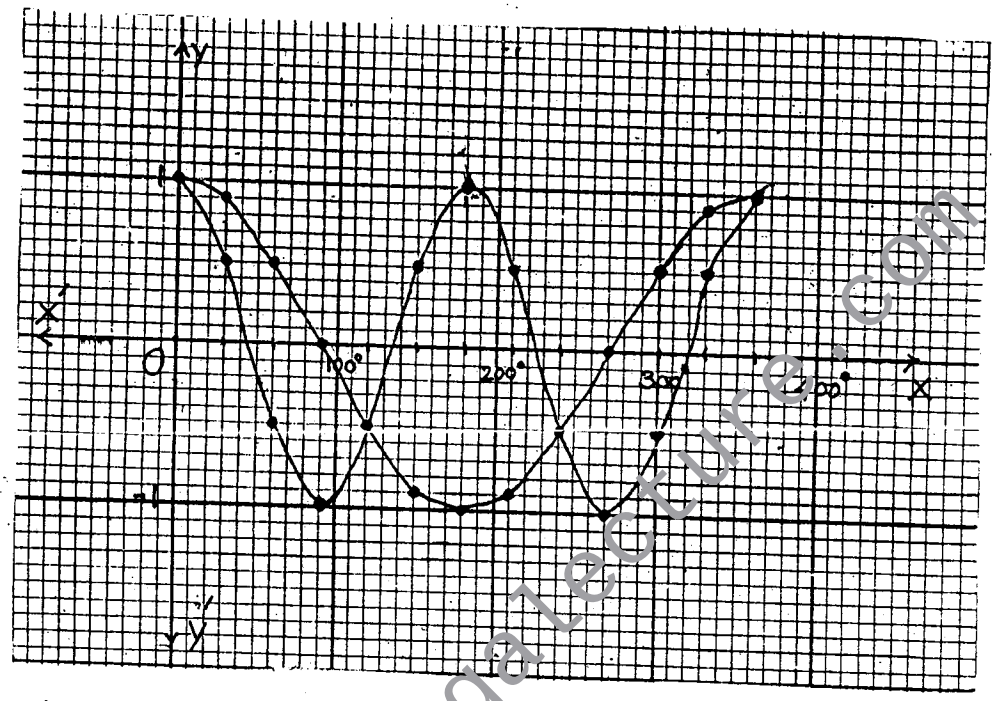
Scale: One big Square along x-axis $= 100^\circ$
One big Square along y-axis $= 1$ unit.



ii) $y = \cos x$ and $y = \cos 2x$; $x \in [0, 2\pi]$

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$y = \cos x$	1	0.9	0.5	0	-0.5	-0.9	-1	-0.9	-0.5	0	0.5	0.9	1
$y = \cos 2x$	1	0.5	-0.5	-1	-0.5	0.5	1	0.5	-0.5	-1	-0.5	0.5	1

Scale: One big Square along x-axis $= 100^\circ$
One big Square along y-axis $= 1$ unit.



3. Solve graphically:

(i) $\sin x = \cos x$; $x \in [0, \pi]$

We draw the graphs of $y = \sin x$ and $y = \cos x$; $x \in [0, \pi]$

x	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°
$y = \sin x$	0	0.25	0.5	0.7	0.86	0.96	1	0.96	0.86	0.7	0.5	0.25	0
$y = \cos x$	1	0.96	0.86	0.7	0.5	0.25	0	-0.25	-0.5	-0.7	-0.86	-0.96	-1

Scale: One big Square along x-axis $= 50^\circ$.
One big Square along y-axis $= 1$ unit.

(P.T.O)

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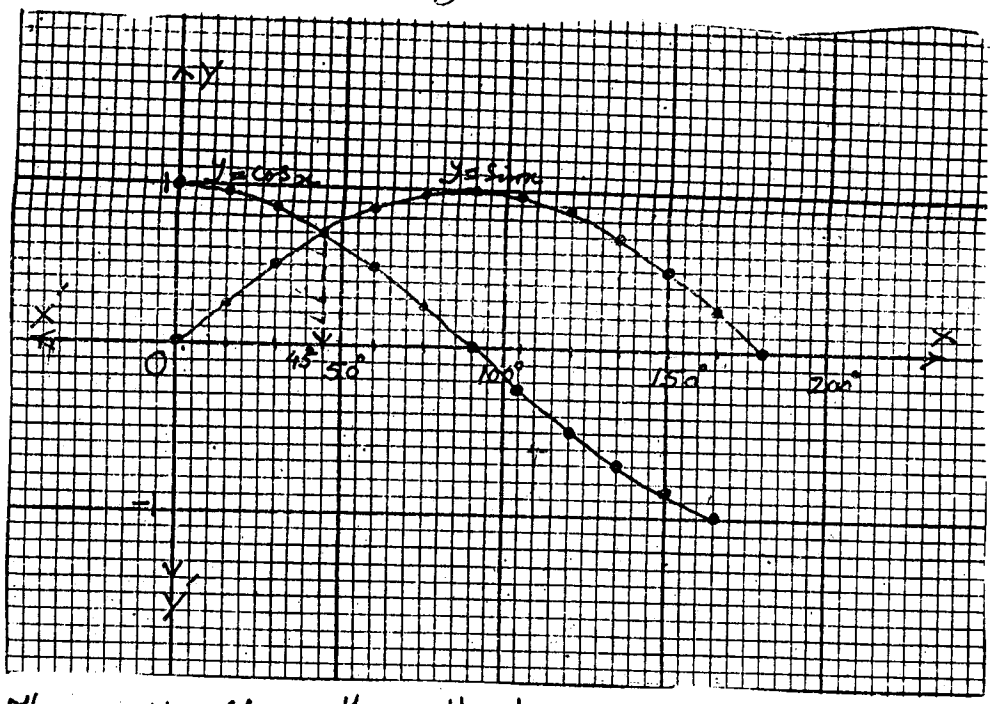
Q10]



The graph shows that the two curves intersect each other at a point where $x = 45°$.

Thus the solution set = $\{45°\}$ Ans.

---

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

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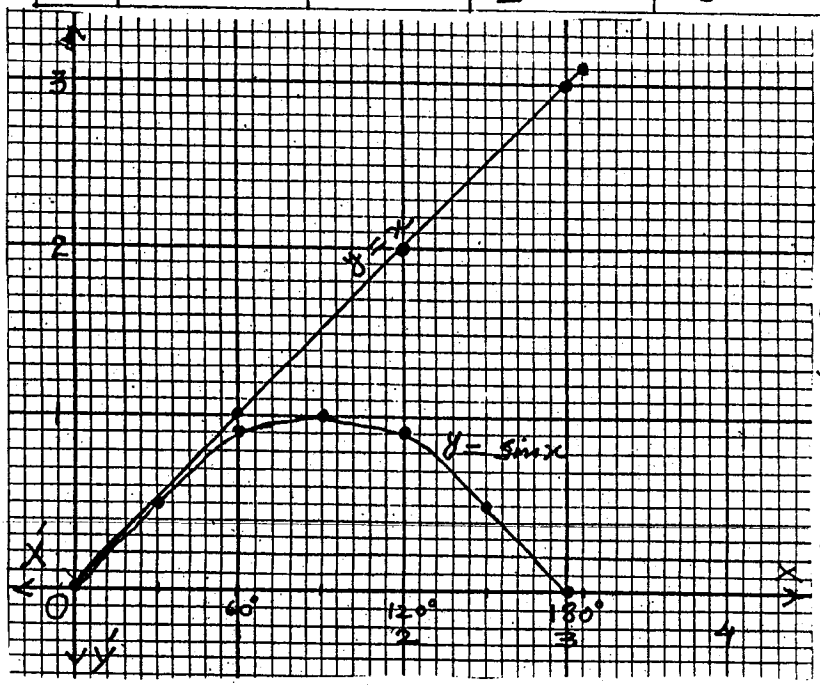
We draw the graphs of $y = \sin x$ and $y = x$

For $y = \sin x$

x	$0°$	$30°$	$60°$	$90°$	$120°$	$150°$	$180°$
$y = \sin x$	0	0.5	0.9	1	0.9	0.5	0

For $y = x$

x	0	1	2	3	3.14
y	0	1	2	3	3.14



Scale: For $y = \sin x$

One big square along x-axis = $60°$

One big square along y-axis = 1 unit

For $y = x$

One big square along x-axis = 1 unit

One big square along y-axis = 1 unit.

The graph shows that the line $y = x$ intersects the curve $y = \sin x$ at the point where $x = 0°$

Hence the solution set = $\{0°\}$

Ans.