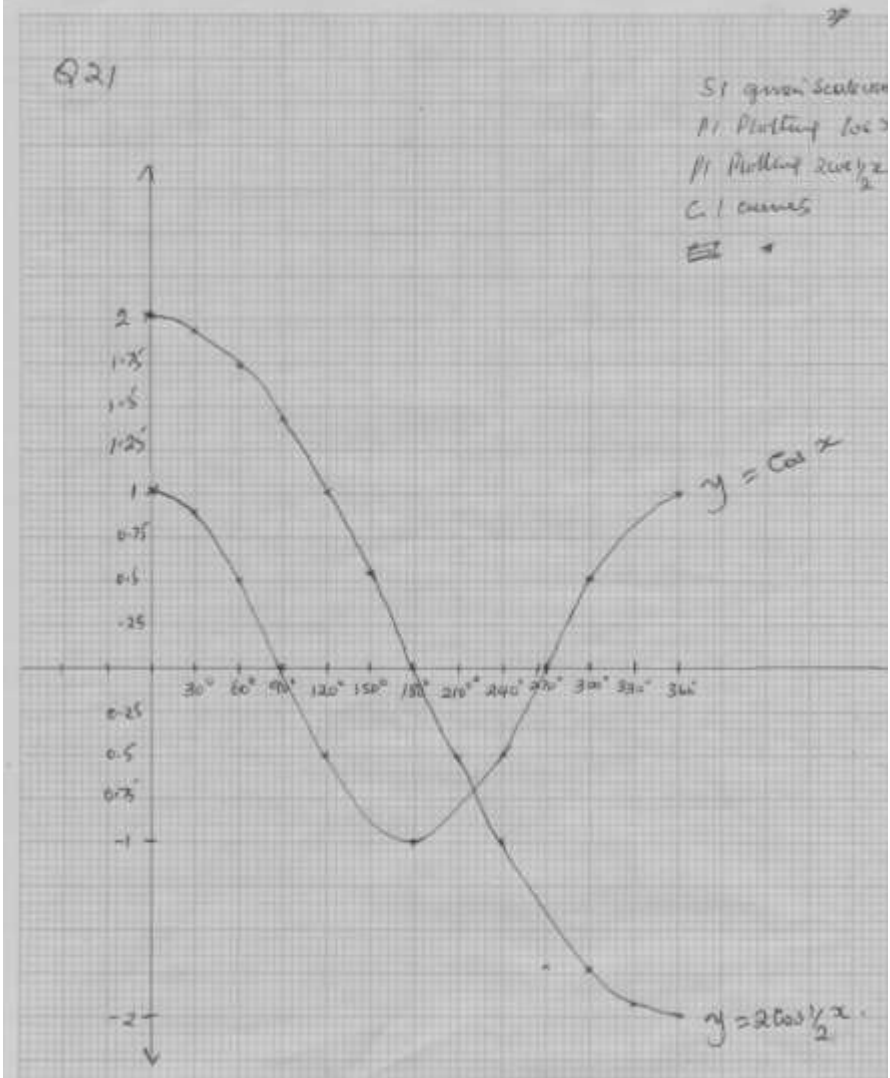


2. Trigonometric ratios 3

1.	X^0	0^0	30^0	60^0	90^0	120^0	150^0	180^0	210^0	240^0	270^0	300^0	330^0
	$\cos x$	1.00	0.87	0.50	0	-0.5	-0.87	-1	-0.87	-0.5	0.5	0.7	1
	$2\cos \frac{1}{2} x$	2.00	1.93	1.73	1.41	1	0.52	0.00	-0.52	-1	-1.73	-1.93	-2.00



B1 All values of $\cos x$
B1 All values of $\cos \frac{1}{2} x$
S1 Given scale used
P1 Plotting $\cos x$
P1 Plotting $2 \cos \frac{1}{2} x$
C1 Curve smooth continuous

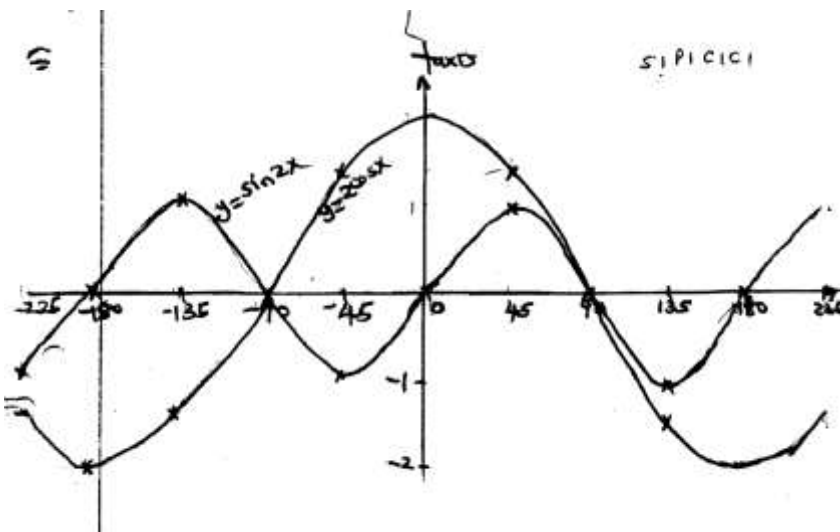
B1
B1

- (a) amplitude = 2 **B1**
 period = 720^0 **B1**
- (b) $2\cos \frac{1}{2} x = \cos x$
 $X = 222^0 \pm 6^0$

1. a)

X°	-225	-180	-135	-90	-45	0	45	90	135	180	225
$y = \sin 2x$		0		0	1.0		1.0	0		0	
$y = 2\cos x$		-2.0		0	1.4		1.4	0		-2.0	

b)



(c) -90° or 90°

(d) (i) Highest point 1 unit

Lowest point - 1.4

2.

x	0	30	60	90	120	150	180	210
$2\sin(x+15^\circ)$	0.52	1.41	1.93	1.93	1.41	0.52	-0.52	-1.41
$\cos(2x-30^\circ)$	0.87	0.87	0	-0.87	0.87	0	0.87	0.87

x	240	270	300	330	360
$2\sin(x+15^\circ)$	-1.93	-1.93	-1.41	-0.52	0.52
$\cos(2x-30^\circ)$	0	-0.87	-0.87	0	0.87

B_1 B_1
 B_1 B_1

(i) Amplitudes: $y = 2 \sin (x + 15)$

= 2units

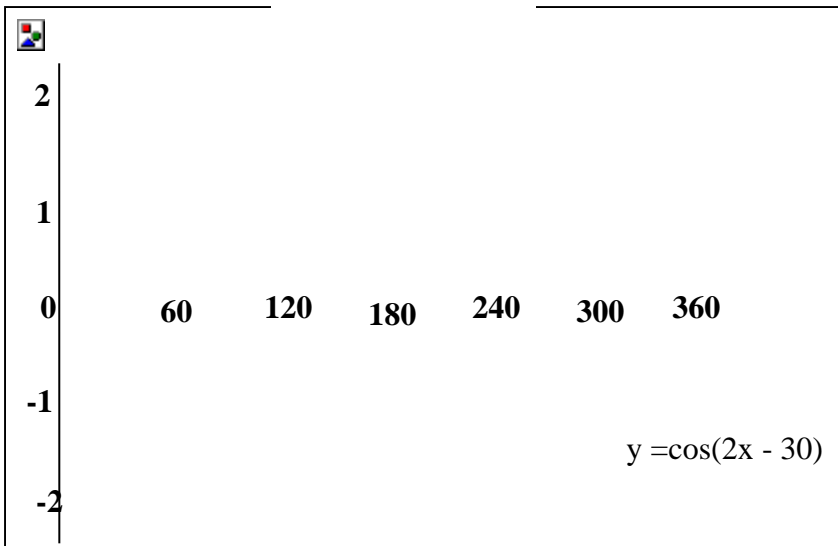
$y = \cos (2x - 30)$

= 1unit

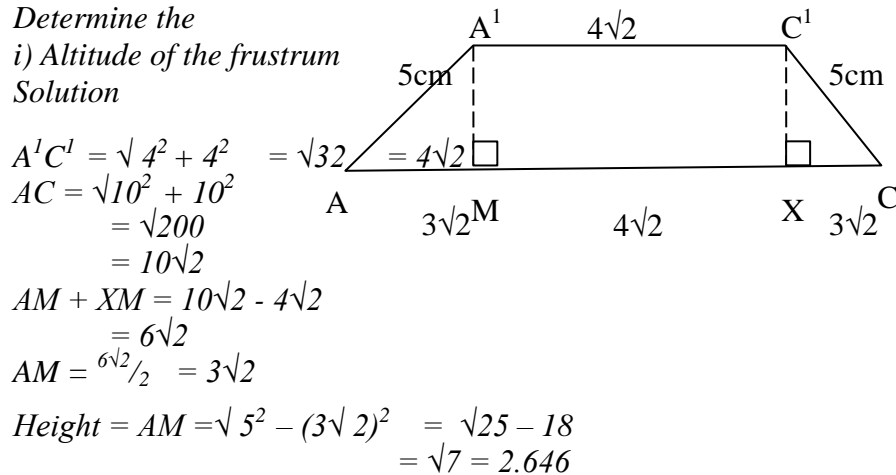
B_1

B_1

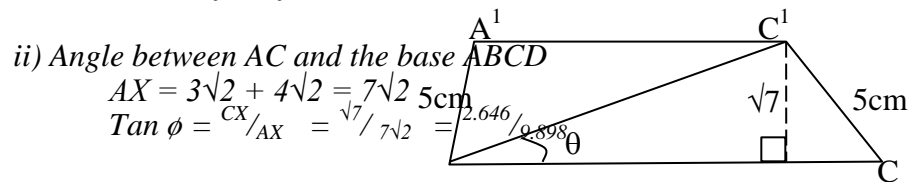
$12^\circ, 159^\circ$



3. Determine the
i) Altitude of the frustrum
Solution



\therefore the altitude of the frustrum = 2.646 cm



$$= 0.2673$$

$$\theta = \tan^{-1} 0.2673 \quad A \quad 7\sqrt{2} \quad X$$

$$= 14.96^\circ$$

iii) Volume of pyramid = $\frac{1}{3}bh$

$AC = 10\sqrt{2}$

$A_1C_1 = 4\sqrt{2}$

L.S.F = 10:4

$\therefore \frac{h + 2.646}{h} = \frac{10}{4}$

$4(h + 2.646) = 10h$

$4h + 10.584 = 10h$

$6h = 10.584$

$h = 1.764$

$H = h + 2.646$

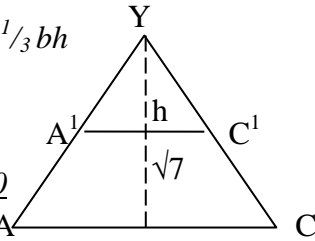
$= 1.764 + 2.646 = 4.410$

$V_f = (\frac{1}{3} \times 10 \times 10 \times 4.41) - (\frac{1}{3} \times 4 \times 4 \times 1.76)$

$= \frac{441.0}{3} - \frac{28.224}{3}$

$= \frac{413.776}{3}$

$= 137.592 \text{cm}^3$



4. ✓(a) table completed
- (b)
- (c) (i) 3 PI – pl ✓ otting
- SI – ✓ scale
- CI – smooth curv ✓ e
- (ii) 180°
- (iii) Line y = 1 drawn
- x = 4.5° or 72.8° – 107.2° – 175.4°

5. $(\frac{A}{B})^2 = \frac{p + 33q}{q - 3P}$

$A^2q - 3A^2P = BP + 3Bq$

$Aq^2 - 3Bq = BP + 3A^2P$

$2(A^2 - 3B) = BP + 3A^2P$

$Q = \frac{BP + 3A^2P}{A^2 - 3B}$

7.7.

$$\frac{\sqrt{3}}{2} x \frac{1}{2}$$

$$\frac{1}{\sqrt{3}} x \frac{1}{\sqrt{2}}$$

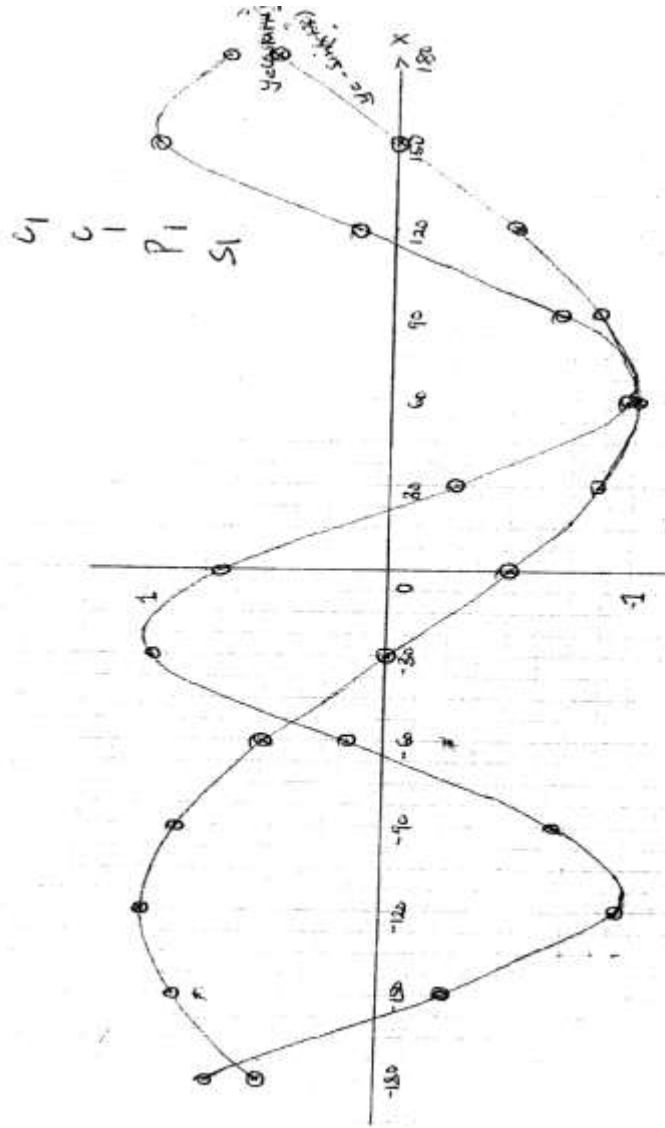
$$\frac{\sqrt{3}}{4} x \frac{\sqrt{6}}{1}$$

$$\frac{\sqrt{18}}{4}$$

$$\frac{3}{4} \sqrt{2}$$

x°	-180	-150	-120	-90	-60	-30	0	30	60	90	120	150	180
$y = \cos(x+45^\circ)$	0.71	-0.26	-0.97	-0.71	0.26	0.97	0.71	0.26	0.97	0.71	0.26	0.97	0.71
$y = \sin(x+45^\circ)$	0.87	0.87	1.00	0.87	0.50	0.00	-0.50	-0.87	-1.00	-0.87	-0.50	0.00	0.50

$$f = -\sin(x+45^\circ) = 0.87 \quad 0.87 \quad 1.00 \quad 0.87 \quad 0.50 \quad 0.00 \quad -0.50 \quad -0.87 \quad -1.00 \quad -0.87 \quad -0.50 \quad 0.00 \quad 0.50 \quad 0.87$$

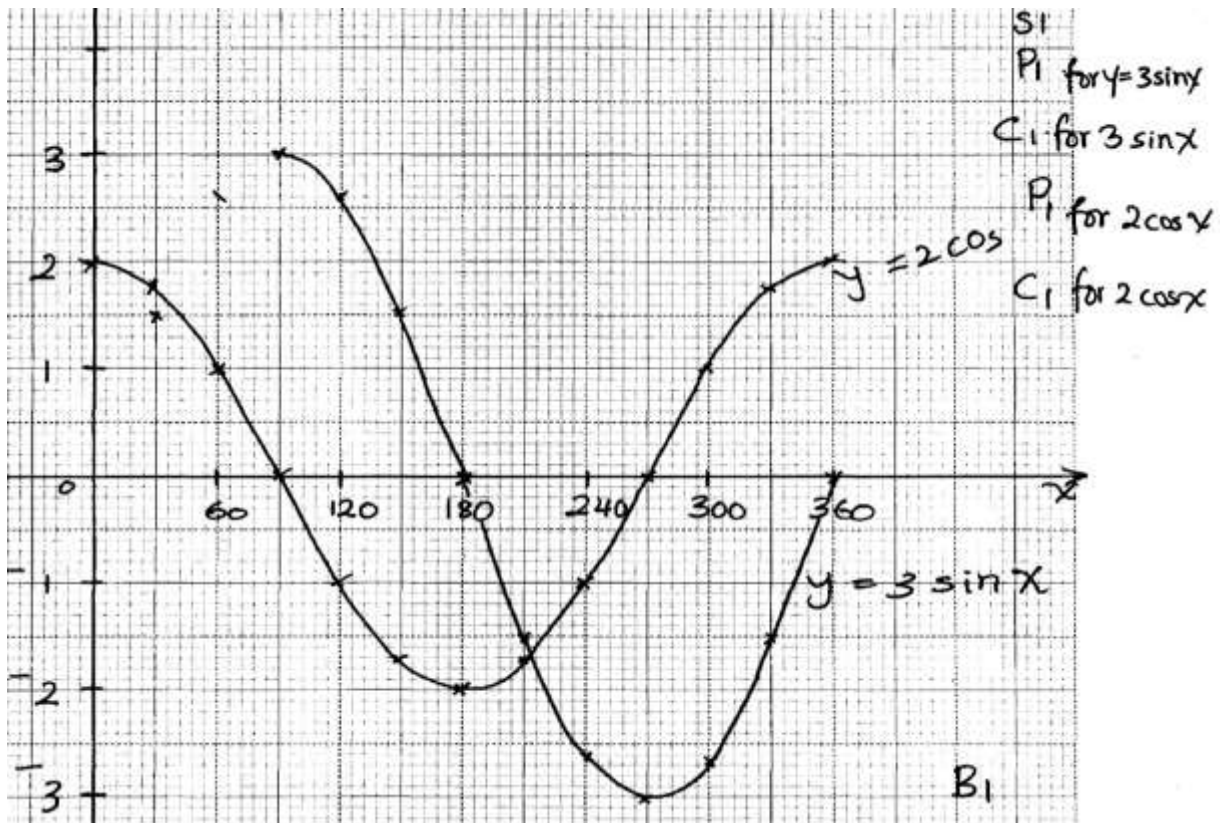


$$\cos(x+45^\circ) + \sin(x+45^\circ) = 0$$

$$x = -54^\circ, 67.5^\circ, A_1$$

8. a)

x	0	30	60	90	120	150	180	210	240	270	300	330	360
$3\sin x$		1.5			2.6	1.5					-2.6		0
$2\cos x$	2			0	-1.0			-1.7		0			



(c) (i) Amplitude = 3

(ii) $x = 36^\circ$

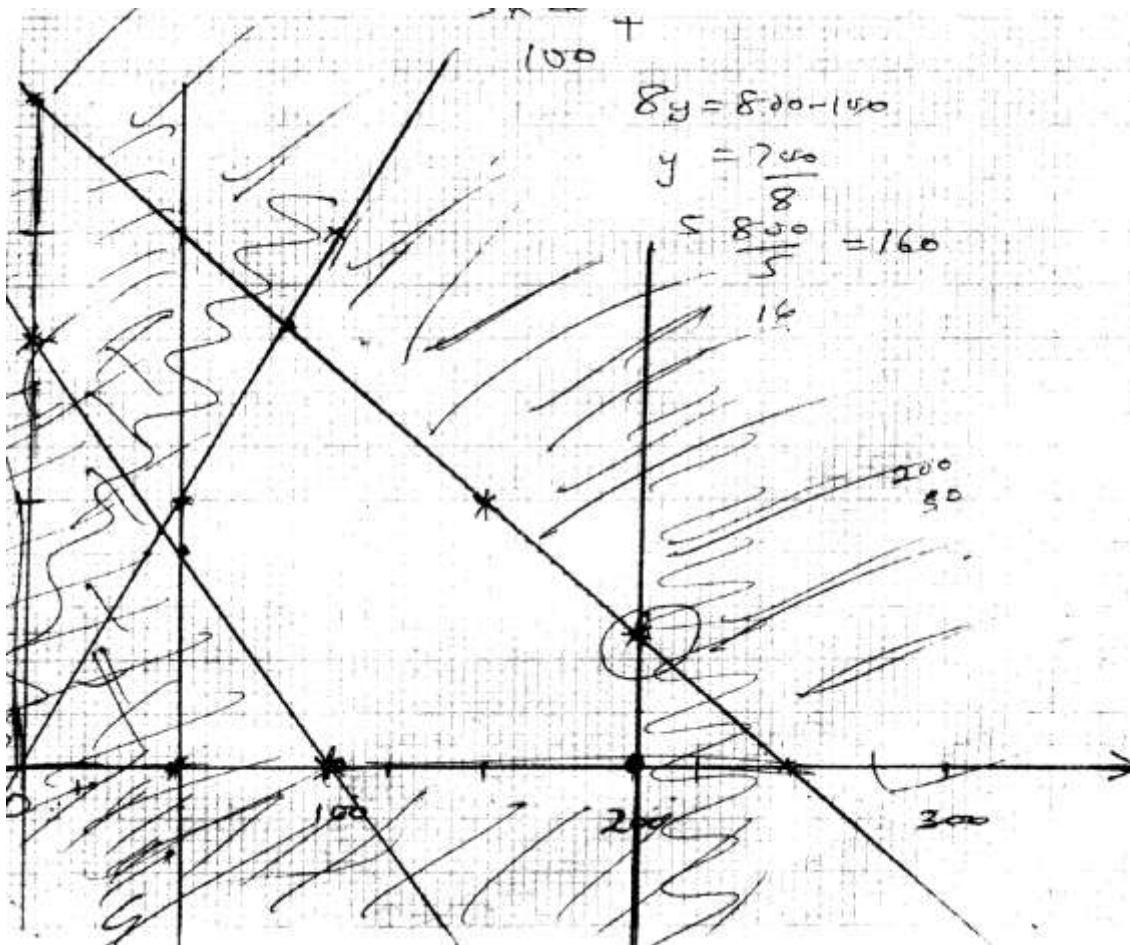
$x = 216^\circ$

(iii) $33^\circ \leq x \leq 213^\circ$

9.

x	0	90	180	270	360	450	540	630	720	810
$\sin \frac{1}{2}x$	0	0.71	1	0.71	0	-0.71	-1	-0.71	0	0.71
$3\sin(\frac{1}{2}x + 60)$	2.6	2.9	1.5	-0.78	-2.6	2.9	-1.5	0.78	2.6	2.9

x	0°	30°	60°	90°	120°	150°	180°
$2 \sin x$	0	1	1.73	2	1.73	1.00	0
$1 - \cos X$	1	0.13	0.50	1	0.06	1.87	2



11. $\sin (x + 30) = 0.5$
 $x + 30 = 30^\circ$
 $x = 0$
 $0, 180, 360$

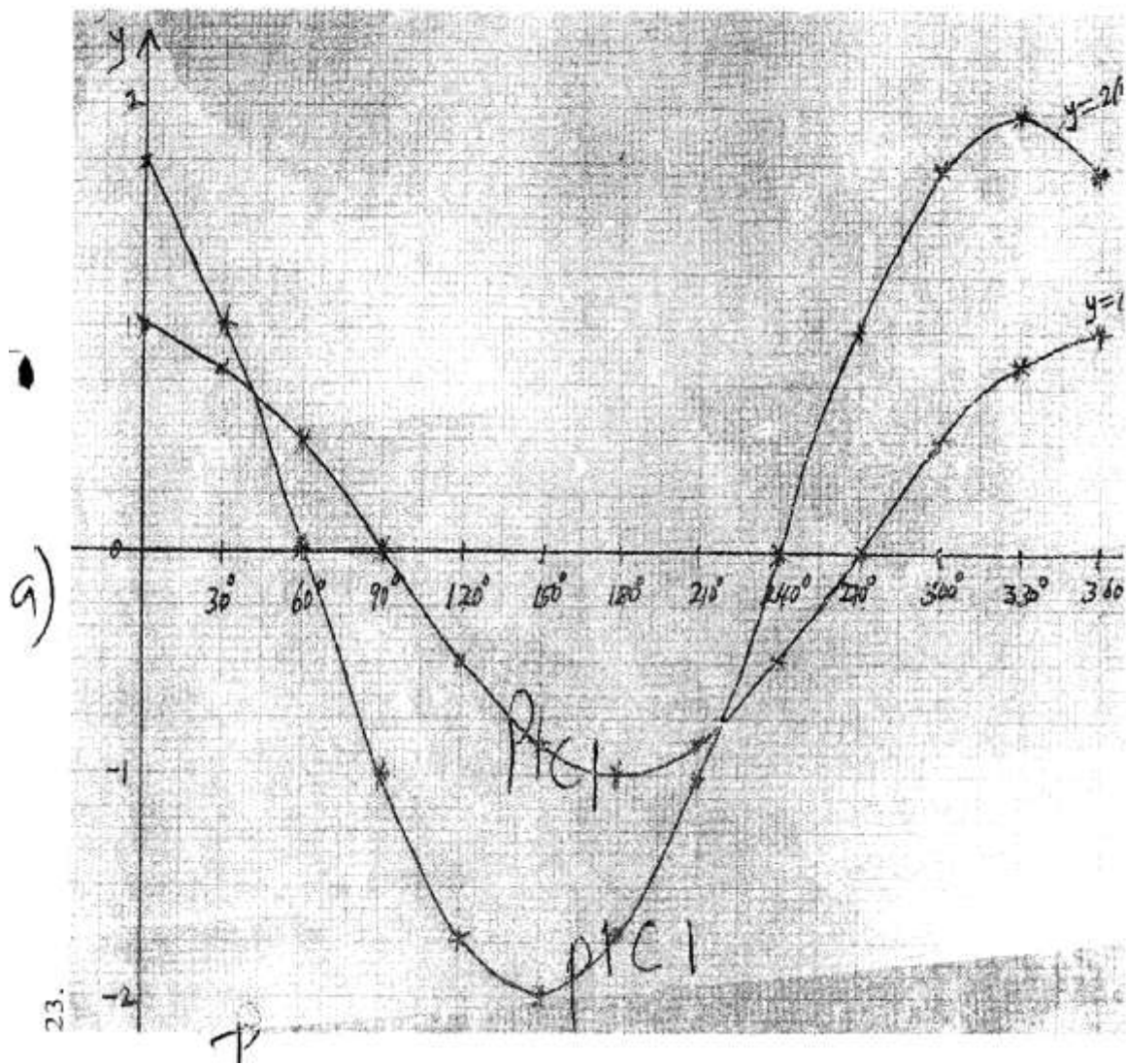
12. (c) $10\sin x = -1/50 + 5$
 $Y = -1/50 + 5$

X	0	50
y	5	4

$X_1 = 28^\circ \pm 1$

$X_2 = 70^\circ \pm 1$

12.



- b) i) amplitude = 1
 ii) Period = 360°
 iii) 45°, 219°

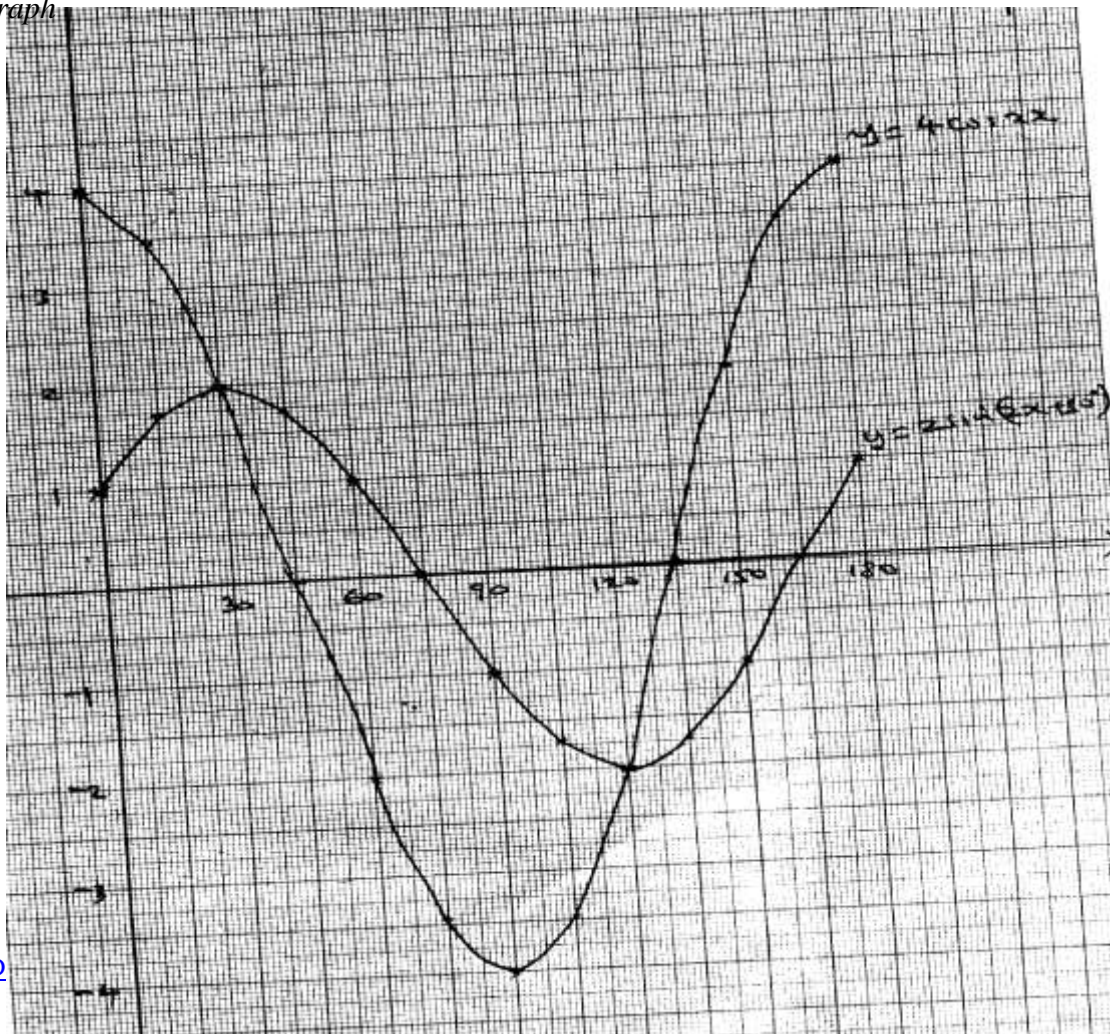
13. $2\theta + 10 = 210^\circ, 330^\circ, 570^\circ, 690^\circ$
 $2\theta = 200, 320, 560, 680$
 $= 100^\circ, 160^\circ, 280^\circ, 340^\circ$
 $= \frac{5\pi^c}{9}, \frac{8\pi^c}{9}, \frac{14\pi^c}{9}, \frac{17\pi^c}{9}$

14. $4\sin 2x + 4\cos x - 5 = 0$
 $4(1 - \cos 2x) + 4\cos x - 5 = 0$
 $4\cos 2x - 4\cos x + 1 = 0$
 $4\cos 2x - 2\cos x - 2\cos x + 1 = 0$
 $(2\cos x - 1)^2 = 0$
 $X = 60^\circ, 300^\circ$

15.

x	15°	60°	150°	165°
$4 \cos 2x$	3.46			3.46
$2 \sin (2x + 30^\circ)$		1.00	-1.00	

(b) graph



(c)(i) *Amplitude = 4*
(ii) *period = 180°*

(d) $x = 30^\circ, 120^\circ$