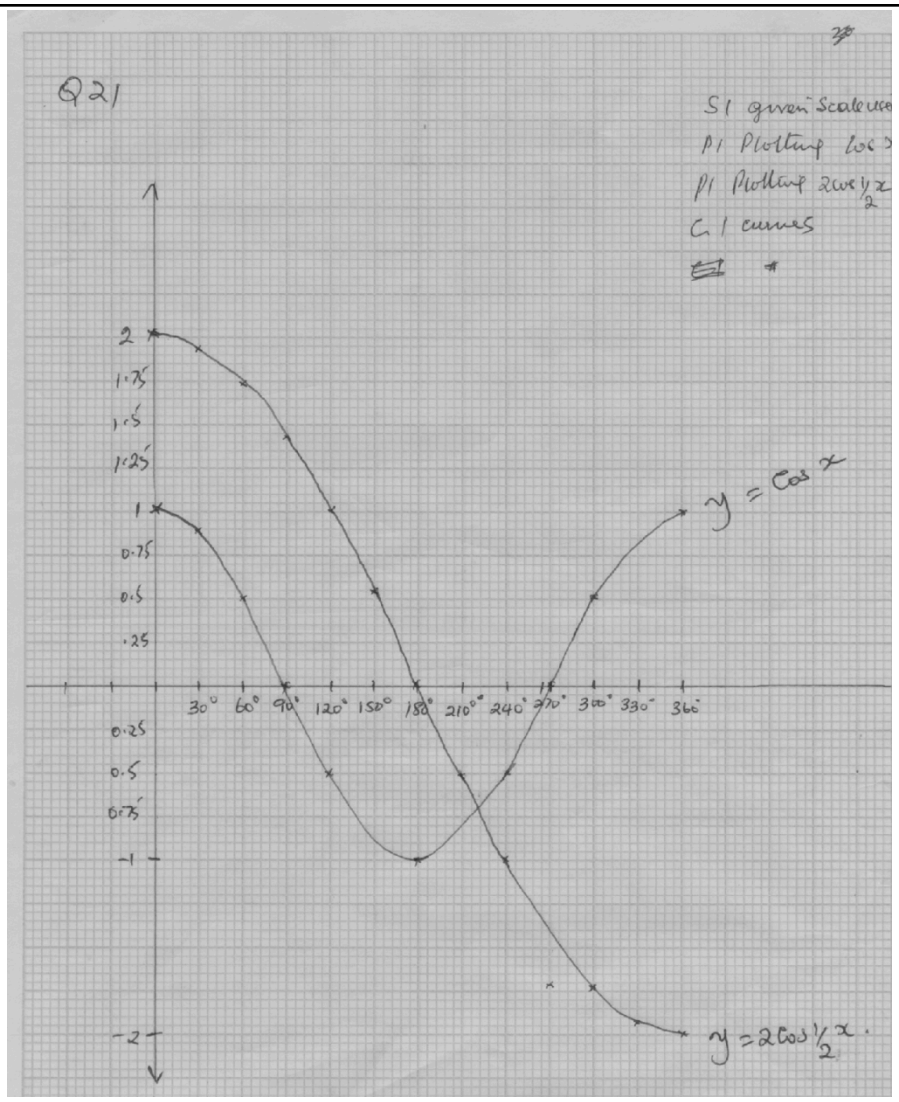
2. *Trigometric ratios 3*

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
2cos ½ 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 ½ x
S1	Given scale used
P1	Plotting cos x
P1	Ploting 2 cos ½ x
C1	Curve smooth continous
B1	
B1	

(a) amplititude = 2 B1
period = 720^0 B1

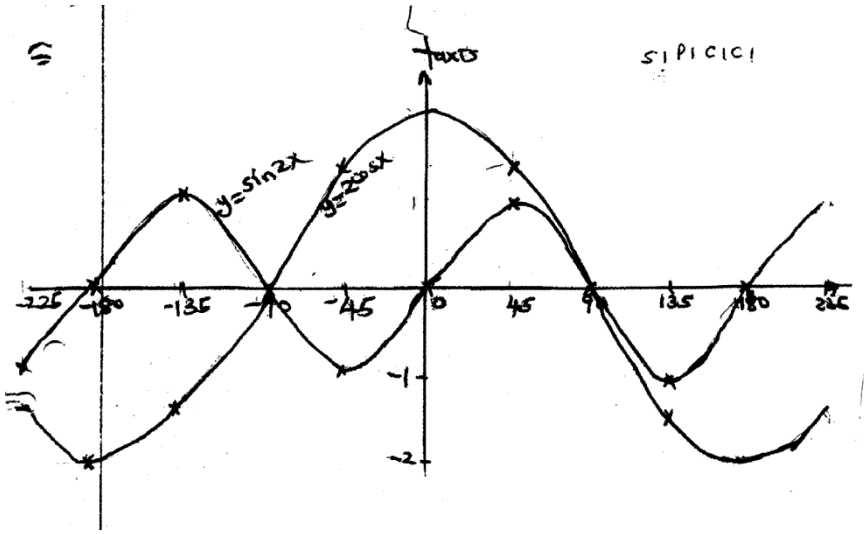
(b) $2\cos \frac{1}{2} x = \cos x$
$X = 222^0 \pm 6^0$

1. a)

X^o	*-225*	*-180*	*-135*	*-90*	*-45*	*0*	*45*	*90*	*135*	*180*	*225*
y = sin 2x		*0*		*0*	*1.0*		*1.0*	*0*		*0*	

y = 2cos x		*-2.0*		*0*	*1.4*		*1.4*	*0*		*-2.0*	

b)



(c) -90º or 90º

(d) (i) Highest point 1 unit

Lowest point - 1.4

2.

x	*0*	*30*	*60*	*90*	*120*	*150*	*180*	*210*
2sin(x+15º)	*0.52*	*1.41*	*1.93*	*1.93*	*1.41*	*0.52*	*-0.52*	*-1.41*
Cos(2x -30º)	*0.87*	*0.87*	*0*	*-0.87*	*0.87*	*0*	*0.87*	*0.87*

x	*240*	*270*	*300*	*330*	*360*
2sin(x+15º)	*-1.93*	*-1.93*	*-1.41*	*-0.52*	*0.52*
Cos (2x -30º)	*0*	*-0.87*	*-0.87*	*0*	*0.87*

B_1 B_1 B_1

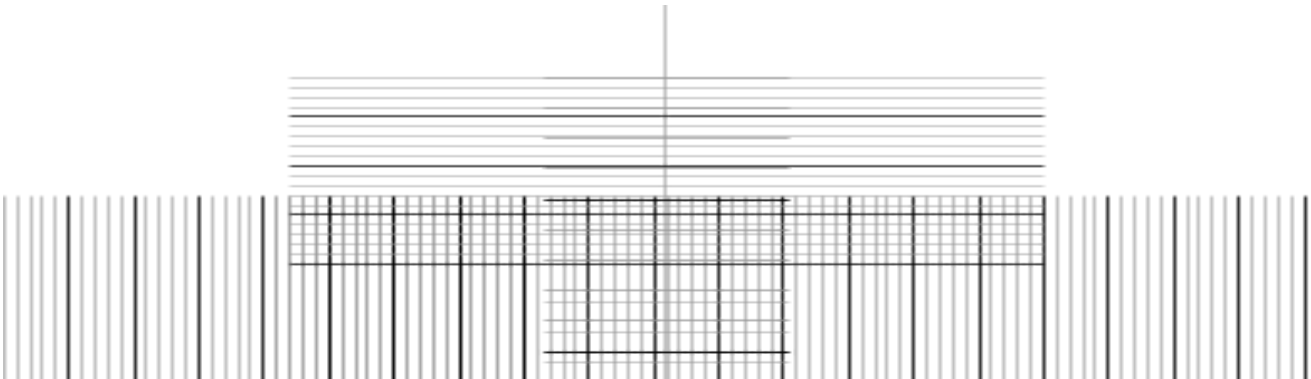
(i) Amplitudes:, y = 2 sin (x + 15)

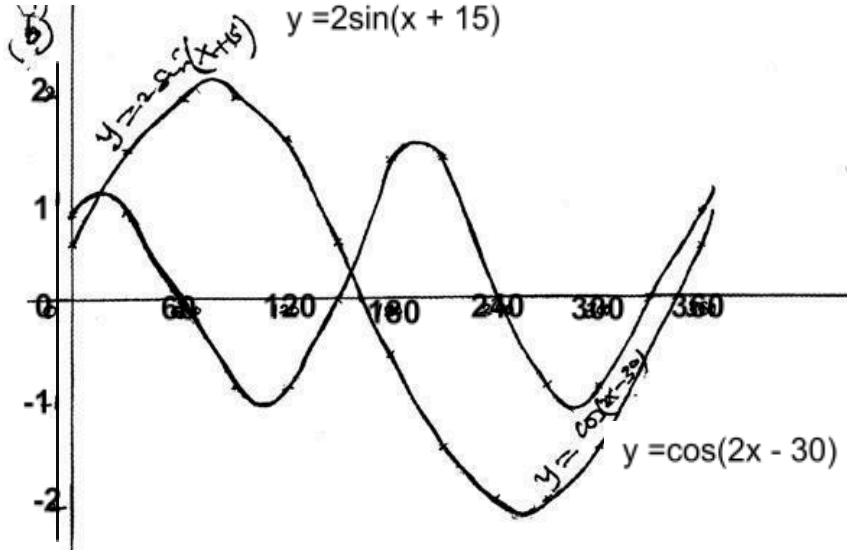
= 2units

y = cos (2x – 30) B_1

=1unit B_1

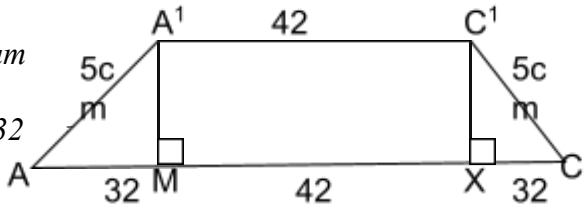
12º, 159º





3. *Determine the*

i) Altitude of the frustrum



Solution

$A^1C^1 = \sqrt{4^2 + 4^2} = \sqrt{32}$

$AC = \sqrt{10^2 + 10^2}$

$= \sqrt{200}$

$= 10\sqrt{2}$

$AM + XM = 10\sqrt{2} - 4\sqrt{2}$

$= 6\sqrt{2}$

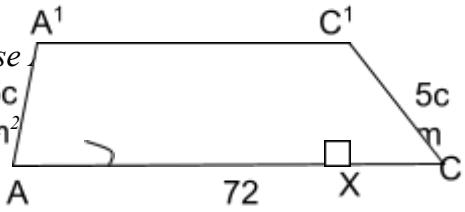
$AM = {}^{6\sqrt{2}}/_{2} = 3\sqrt{2}$

$Height = AM = \sqrt{5^2 - (3\sqrt{2})^2} = \sqrt{25 - 18}$

$= \sqrt{7} = 2.646$

$\therefore$ *the altitude of the frustrum = 2.646 cm*

ii) Angle between AC and the base



$AX = 3\sqrt{2} + 4\sqrt{2} = 7\sqrt{2}$

$Tan\ \phi = {}^{CX}/_{AX} = {}^{\sqrt{7}}/_{7\sqrt{2}}$

$= 0.2673$

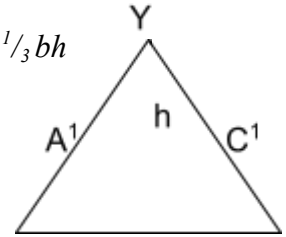
$\theta = tan^{-1}0.2673$

$= 14.96°$

iii) Volume of pyramid $= {}^{1}/_{3}bh$

$AC = 10\sqrt{2}$

$A1C1 = 4\sqrt{2}$



7

L.S.F = 10:4

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

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

Vf = ($^1/_3$ x 10 x 10 x 4.41) – ($^1/_3$x 4 x 4 x 1.76)

= $^{441.0}/_3$ - $^{28.224}/_3$

= $^{413.776}/_3$

= 137.592cm^3

4. *(a) table completed*

(b)

(c) (i) 3 P1 – plotting

S1- scale

C1 – smooth curve

(ii) 180^o

(iii) Line y = 1 drawn

x = 4.5^o or 72.8^o – 107.2^o - 175.4^o

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

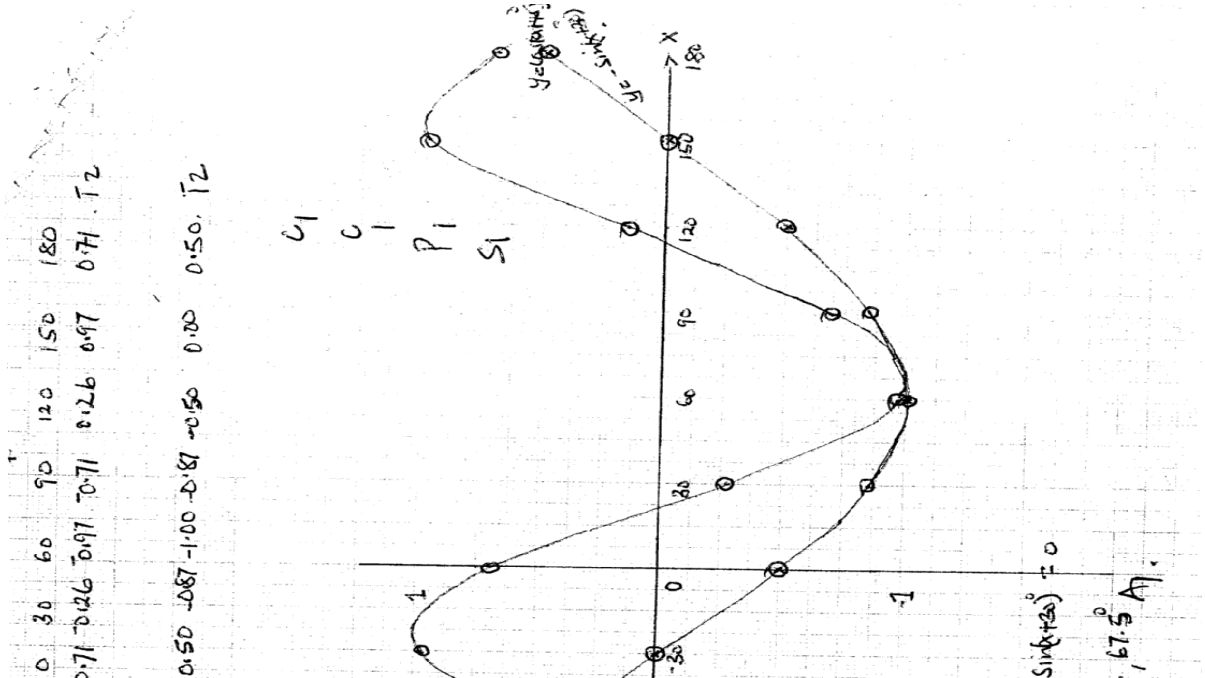
$A^2q – 3A^2P = BP + 3Bq$

$Aq^2 – 3Bq = BP + 3A^2P$

$2(A^2 – 3B) = BP + 3A^2P$

$Q = \frac{BP + 3A^2P}{A^2 – 3B}$

6.



7. 7. $\frac{\sqrt{3}}{2} \times \frac{1}{2}$

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

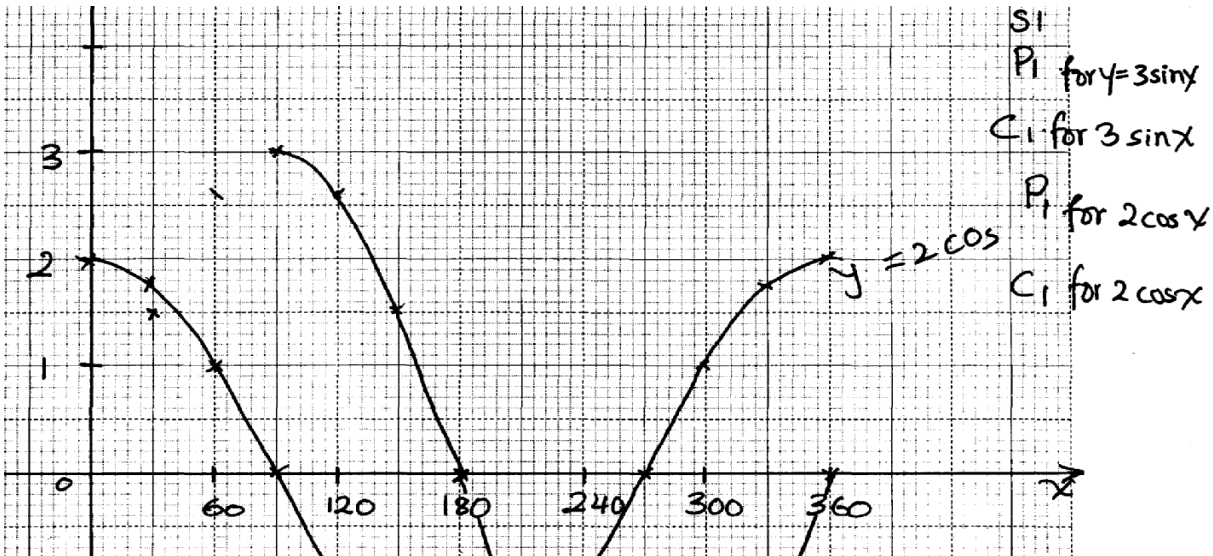
$\frac{\sqrt{3}}{4} \times \frac{\sqrt{6}}{1}$

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

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

8. a)

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



(c) (i) Amplitude =3

(ii) $x = 36^o$

$x = 216^o$

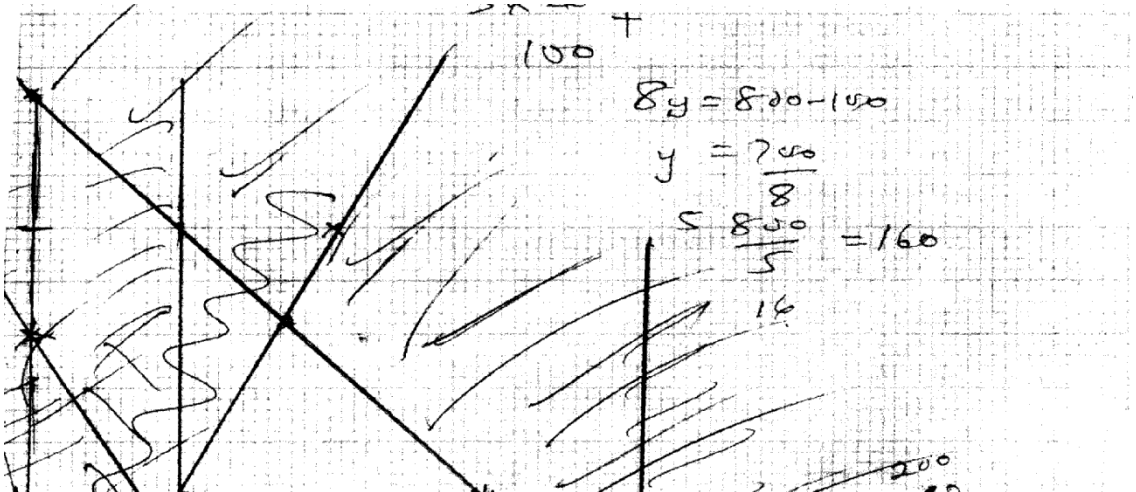
(iii) $33^o \leq x \leq 213^o$

9.

x	*0*	*90*	*180*	*270*	*360*	*450*	*540*	*630*	*720*	*810*
sin ½x	*0*	*0.71*	*1*	*0.71*	*0*	*-0.71*	*-1*	*-0.71*	*0*	*0.71*
3Sin (½x + 60)	*2.6*	*2.9*	*1.5*	*-0.78*	*-2.6*	*2.9*	*-1.5*	*0.78*	*2.6*	*2.9*

10.

x	*0^o*	*30^o*	*60^o*	*90^o*	*120^o*	*150^o*	*180^o*
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. $Sin\ (x + 30) = 0.5$

$x + 30 = 30^o$

$x = 0$

$0, 180, 360$

12. (c) $10\sin x = {}^{-1}/_{50} + 5$

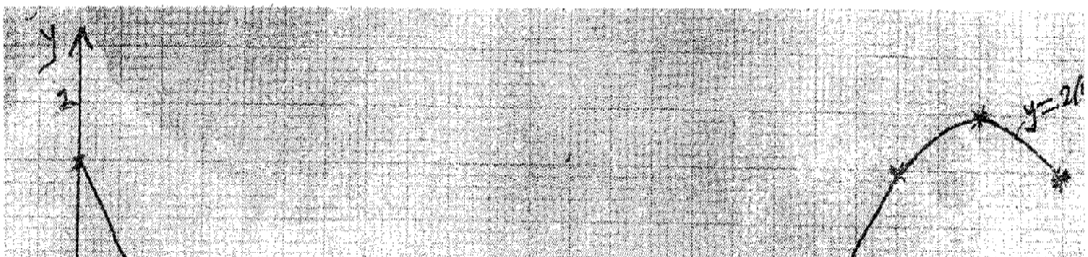
$Y = {}^{-1}/_{50} + 5$

X	0	50
y	5	4

$X_1 = 28^o \pm 1$

$X_2 = 70^o \pm 1$

12.



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

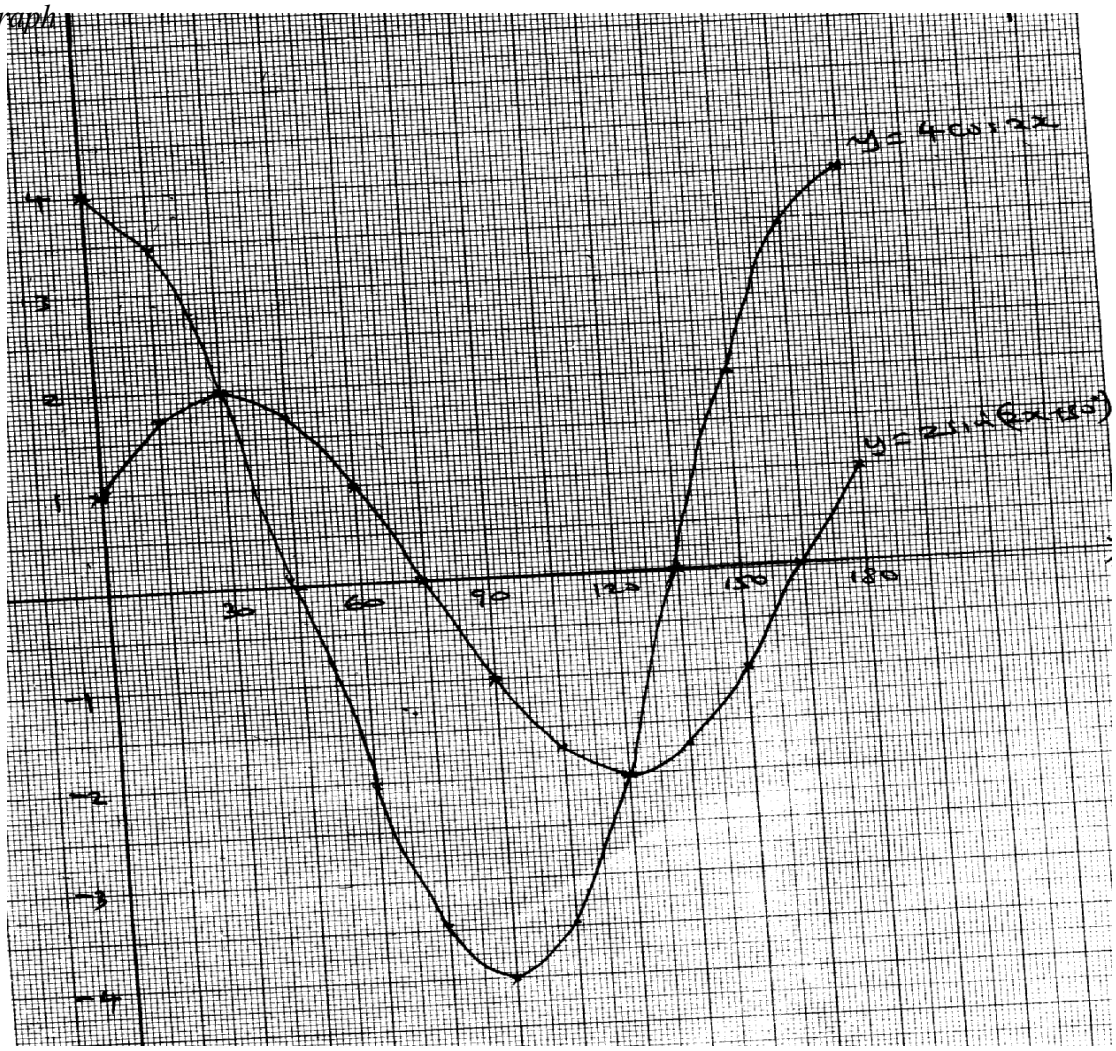
13. $2\theta + 10 = 210^o, 330^o, 570^o, 690^o$
$2\theta = 200, 320, 560, 680$
$= 100^o, 160^o, 280^o, 340^o$
$= \frac{5\pi^c}{90}, \frac{8\pi^c}{9}, \frac{14\pi^c}{9}, \frac{17\pi^c}{9}$

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

15.

x	15^o	60^o	150^o	165^o
$4\ Cos\ 2x$	3.46			3.46
$2Sin\ (2x + 30^o)$		1.00	-1.00	

(b) graph



(c)(i) Amplitude = 4
(ii) period = 180º

(d) x = 30º, 120º