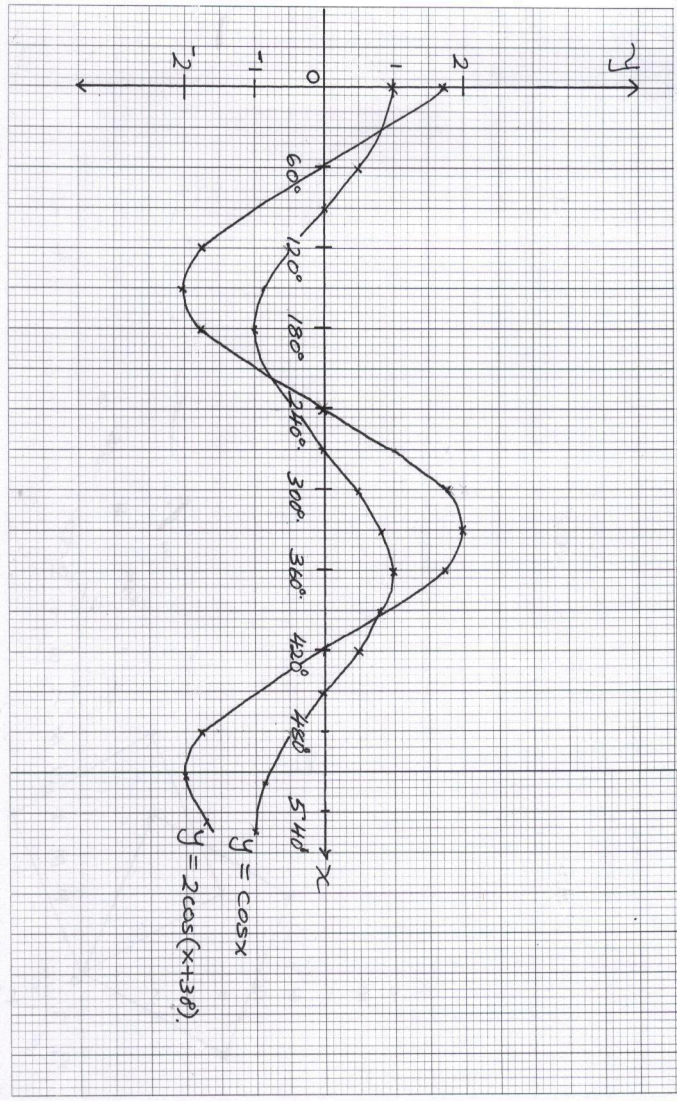
2. *Trigometry 2*

<table>
<tr>
<td>1</td>
<td>$Sin\ 5/2\ x = -1/2$

$\frac{5}{2}x = 210^0, 330^0, 390^0$
$x = 84^0, 132^0, 156^0$</td>
<td>B_1

B_1</td>
<td>Allow for any 2 ✔angles</td>
</tr>
<tr>
<td>2</td>
<td>a)
<table>
<tr><td>X^0</td><td>60^0</td><td>120^0</td><td>180^0</td><td>240^0</td><td>300^0</td><td>360^0</td><td>420^0</td><td>480^0</td><td>540^0</td></tr>
<tr><td>cosX</td><td>0.50</td><td>-0.50</td><td></td><td>-0.5</td><td></td><td>1.00</td><td>0.50</td><td>-0.5</td><td>-1.0</td></tr>
<tr><td>2cos(x+30)</td><td>0.00</td><td></td><td>-1.73</td><td></td><td>1.73</td><td>1.73</td><td>0.00</td><td>-1.73</td><td>-1.73</td></tr>
</table>
b)
i) Period = 3600
ii) Phase angle = 300</td>
<td>B2

B1
B1</td>
<td>allow B1 for 7✔values
✔values to 2 d.p.
apply ow-1 if given to other d.p</td>
</tr>
</table>



S_1

P_1 for all values ly Plotted

C_1 smooth curve $y = \cos x$

C_1 smooth curve $y = 2\cos(x+30^0)$

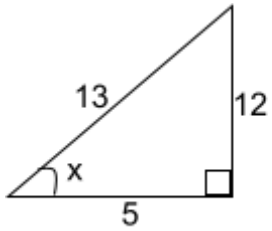
	c) $37.5^0 \le x \le 217.5^0$ $397.5^0 \le x \le 540^0$	B_1 B_1	Allow $\pm$ 0.5
		10	

1. $5 \sin x + \cos x$

$= 5\left[\ \right] - \frac{5}{13}$

$= \frac{60}{13} - \frac{5}{13} = \frac{55}{13}$

$= \frac{1}{13}$



2. $\frac{2\cos 3\theta}{2} = \frac{1}{2}$

$\cos 3\theta = 0.5$

$3\theta = \cos^{-1} 0.5$

$3\theta = 60^o, 300^o, 420^o, 66^a, 78^a, 102^a$

✓ *Identification of exact number of quadrants to satisfy the equation.*
✓ *Values of at least 4 soln. of θ*

$3 \quad 3 \quad 3 \quad 3 \quad 3 \quad 3 \quad 3$

$\therefore \theta = 20^o, 100^o, 140^o, 220^o, 260^o, 340^o$

3.. $\frac{\frac{1}{2} \; X \; \frac{\sqrt{3}}{2}}{\frac{\sqrt{3}}{2} X \frac{1}{\sqrt{2}}}$

$$\frac{\frac{\sqrt{3}}{4}}{\frac{\sqrt{3}}{2} - \frac{1}{\sqrt{2}}} X \frac{\frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}}}{\frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}}}$$

$$\frac{\frac{3}{8} + \frac{\sqrt{3}}{4\sqrt{2}}}{\frac{3}{4} - \frac{1}{2}} = \frac{\frac{3}{8} + \frac{\sqrt{3}}{4\sqrt{2}}}{\frac{1}{4}}$$

$$= \frac{3}{2} + \frac{\sqrt{3}}{\sqrt{2}}$$

4. a) $b^2 = a^2 + c^2 - 2ac \cos B$

$b^2 = 7^2 + 5^2 - 2.5..\ 7 \cos 100$

$= 74 - 70(-0.173648)$

$= 74 + 12.15537$

$b^2 = 86.15537$

$b = 9.28199$

$AC = 9.3$ km

b) $\frac{9.3}{\sin 100} = \frac{5}{\sin \theta}$

$\sin \theta = \frac{5 \sin 100}{9.3} = 0.529466$

$\theta = 31.9694$

$\theta \simeq 32^0$

$32 - 20 = 12^0$

Bearing $= 360^0 - 12^0 = 348^0$

c) 020^0

5.

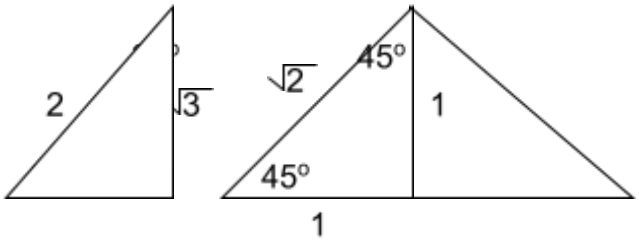
$\sin \overline{60} = \sqrt{\frac{3}{2}} \qquad \frac{1}{\sin \overline{45}} = \frac{1}{\frac{\sqrt{3}}{2} - \frac{1}{\sqrt{2}}}$

$= \frac{1}{\frac{\sqrt{3}}{2\sqrt{2}} - \frac{1}{\sqrt{2}}}$

$= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{2}$

$= \frac{\sqrt{6} - 2\sqrt{2}}{4}$

6.



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

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

$$\frac{1}{1} + \frac{2\sqrt{6}}{4}$$

$$\frac{4 + 2\sqrt{6}}{4}$$

7. $$\frac{\sqrt{5}(2\sqrt{2} + \sqrt{5}) + \sqrt{2}(2\sqrt{2} - \sqrt{5})}{(2\sqrt{2})2 - (\sqrt{5})^2}$$

$$\frac{2\sqrt{10} + 5 + 4 - \sqrt{10}}{8 - 5}$$

$$\frac{9 + \sqrt{10}}{3}$$

$$3 + {}^{1}/_{3}\sqrt{10}$$

8. a) $b^2 = a^2 + c^2 - 2ac \cos B$

$b^2 = 7^2 + 5^2 - 2.5..\ 7 \cos 100$

$= 74 - 70(-0.173648)$

$= 74 + 12.15537$

$b^2 = 86.15537$

$b = 9.28199$

$AC = 9.3$ km

b) $\frac{9.3}{\sin 100} = \frac{5}{\sin \theta}$

$\sin \theta = \frac{5 \sin 100}{9.3} = 0.529466$

$\theta = 31.9694$

$\theta \simeq 32^0$

$32 - 20 = 12^0$

Bearing $= 360^0 - 12^0$

$= 348^0$

c) 020^0