# TRIGONOMETRY

1. (i) $5\sin 3\theta = 2\cos 3\theta$

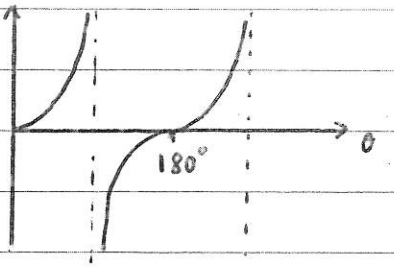
$\Rightarrow 5\tan 3\theta = 2$

$\Rightarrow \tan 3\theta = 0.4$

(ii) $3\theta = \tan^{-1}(0.4)$

$= 21.8, 201.8, 381.8, \ldots$

$\Rightarrow \theta = 7.3^\circ, 67.3^\circ, 127.3^\circ$




2. (i) $3\cos^2\theta - 2\sin\theta \equiv 3(1-\sin^2\theta) - 2\sin\theta$

$\equiv 3 - 3\sin^2\theta - 2\sin\theta$

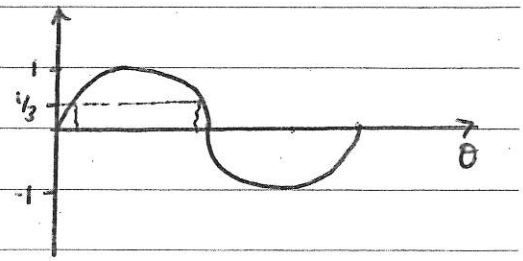
(ii) $3 - 3\sin^2\theta - 2\sin\theta = 2$

$\Rightarrow 3\sin^2\theta + 2\sin\theta - 1 = 0$

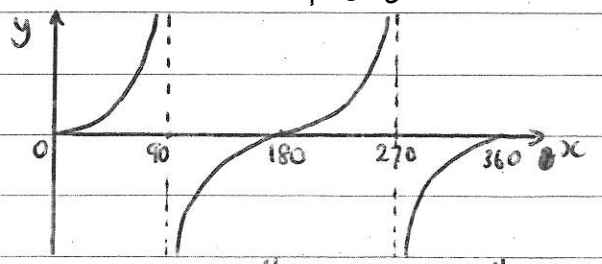
$\Rightarrow (3\sin\theta - 1)(\sin\theta + 1) = 0$

$\Rightarrow \sin\theta = \frac{1}{3}$ or $-1$

$\Rightarrow \theta = 19.5^\circ, 160.5^\circ, 270^\circ$




3. (i)

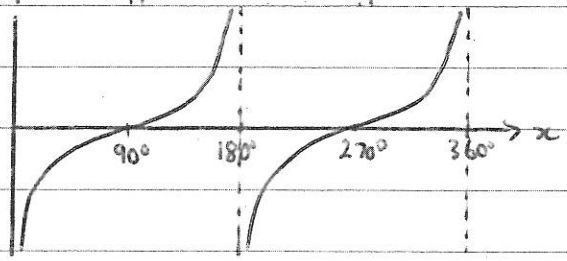



$y = \tan x$

translate 90° to right.

$y = \tan(x - 90)$

(ii)




(iii) $\tan(x-90) = 1$

$x - 90 = 45^\circ, 225^\circ$

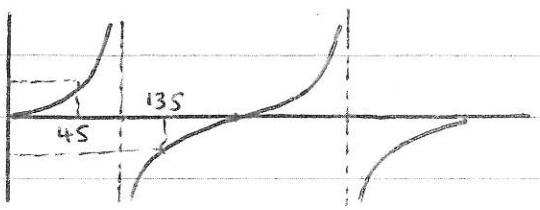
$\Rightarrow x = 135^\circ, 315^\circ$

4. (i) $\dfrac{\sin^2\theta}{1-\sin^2\theta} \equiv \dfrac{\sin^2\theta}{\cos^2\theta} \equiv \tan^2\theta$

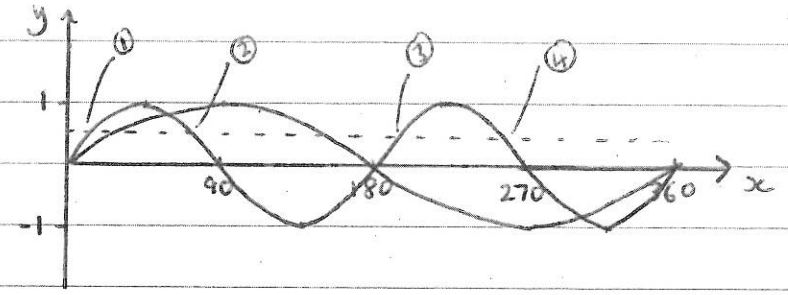
(ii) $\tan^2\theta = 1$

$\Rightarrow \tan\theta = \pm 1$

$\Rightarrow \theta = 45^\circ, 135^\circ, 225^\circ, 315^\circ$



5. (i)




(ii) $\sin 2x = c$, $0 < c < 1$, $0° \leq x \leq 360°$

4 solutions (see ..... line)

6. (i) $\sin x$ has a period of $360°$

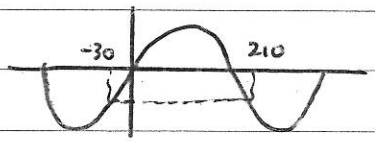
$\sin 6x$ has a period of $60°$

(ii) $\sin 6x = 0.5$

$\Rightarrow 6x = 30°, 150°, 390°, 510°$

$\Rightarrow x = 5°, 25°, 65°, 85°$

(iii) $\sin 6x = -0.5$




$\Rightarrow 6x = -30, 210°$

$\Rightarrow x = 35°$