ex 8.4

④ $1+\sin^2\theta = 3\sin\theta\cos\theta$

$\Rightarrow \sin^2\theta+\cos^2\theta+\sin^2\theta = 3\sin\theta\cos\theta$

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

$\Rightarrow 2\sin^2\theta-2\sin\theta\cos\theta-\sin\theta\cos\theta+\cos^2\theta=0$

$\Rightarrow 2\sin\theta(\sin\theta-\cos\theta)-\cos\theta(\sin\theta-\cos\theta)=0$

$\Rightarrow (\sin\theta-\cos\theta)(2\sin\theta-\cos\theta)=0$

$\Rightarrow \sin\theta-\cos\theta=0$, $2\sin\theta-\cos\theta=0$

$\Rightarrow \sin\theta=\cos\theta$, $2\sin\theta=\cos\theta$

$\Rightarrow \frac{\sin\theta}{\cos\theta}=1$ $\Rightarrow 2\frac{\sin\theta}{\cos\theta}=1$

$\Rightarrow \tan\theta=1$ $\Rightarrow 2\tan\theta=1$

$\Rightarrow \tan\theta=\frac{1}{2}$

NCERT Exemplar Solutions by Dev Anoop (Bathinda)

$\therefore \tan\theta = 1 \text{ or } \frac{1}{2}$

⑤ if $\sin\theta+2\cos\theta=1$ prove $2\sin\theta-\cos\theta=2$

given^2 + (To prove)^2.

$=(\sin\theta+2\cos\theta)^2+(2\sin\theta-\cos\theta)^2$

$=\sin^2\theta+4\cos^2\theta+4\sin\theta\cos\theta+4\sin^2\theta+\cos^2\theta-4\sin\theta\cos\theta$

$=5(\sin^2\theta+\cos^2\theta)$

$=5\times1$

$=5$

$\therefore (\sin\theta+2\cos\theta)^2+(2\sin\theta-\cos\theta)^2=5$

$1^2+(2\sin\theta-\cos\theta)^2=5$

$\Rightarrow (2\sin\theta-\cos\theta)^2=4$

$\Rightarrow 2\sin\theta-\cos\theta=\pm2$

$=2$ (+ve value)