(1) Solve $\sec 3x = -\frac{2}{3}$ $\quad x \in [0, 2\pi]$

$$\frac{1}{\cos 3x} = -\frac{2}{3}$$

$$\therefore \cos 3x = -\frac{3}{2} = -1.5 \Longrightarrow \text{impossible!}$$

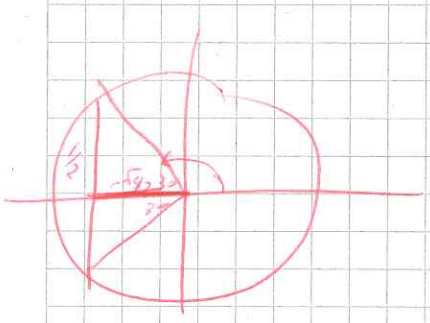
leave out?!

(2) Solve $\sqrt{3}\sec(3x) = -2$ $\quad x \in [0, 2\pi]$

$$\sec(3x) = \frac{-2}{\sqrt{3}} \qquad 0 \le x \le \frac{36\pi}{18}$$

$$\frac{1}{\cos(3x)} = \frac{-2}{\sqrt{3}}$$

$$\cos(\overset{\theta}{3x}) = -\frac{\sqrt{3}}{2}$$



$$\therefore \theta = \begin{cases} 150^\circ \\ 210^\circ \end{cases} = \begin{cases} 5\pi/6 \\ 7\pi/6 \end{cases} + 2\pi k$$

$\therefore 3x =$ that

$$\therefore x = \begin{cases} 5\pi/18 \\ 7\pi/18 \end{cases} + \frac{2\pi}{3}k$$

	$k=-1$	$k=0$	$k=1$	$k=2$	$k=3$
(1)	$\frac{5\pi}{18} - \frac{2\pi}{3}$	$5\pi/18$ →	$\frac{17\pi}{18}$ →	$\frac{29\pi}{18}$ →	$\cancel{\frac{41\pi}{18}}$
	$\frac{5\pi}{18} - \frac{12\pi}{18}$ $\cancel{-\frac{7\pi}{18}}$	$7\pi/18$ →	$\frac{19\pi}{18}$ →	$\frac{31\pi}{18}$ →	

(2) $\frac{7\pi}{18} - \frac{12\pi}{18}$

$$P = \frac{2\pi}{3}$$

6 solutions!

(3) Simplify $\dfrac{\cos^2\beta - \sin^2\beta}{\cos\beta - \sin\beta}$

$$= \frac{\cancel{(\cos\beta - \sin\beta)}(\cos\beta + \sin\beta)}{\cancel{(\cos\beta - \sin\beta)}}$$

$$= \cos\beta + \sin\beta$$

(4) Prove $\dfrac{\sin\theta}{1+\cos\theta} + \dfrac{1+\cos\theta}{\sin\theta} = 2\csc\theta = \left(\dfrac{2}{\sin\theta}\right)$

$$= \frac{\sin^2\theta}{(1+\cos\theta)\sin\theta} + \frac{(1+\cos\theta)^2}{\sin\theta(1+\cos\theta)}$$

$$= \frac{\sin^2\theta + 1 + 2\cos\theta + \cos^2\theta}{(1+\cos\theta)\sin\theta}$$

$$= \frac{(\sin^2\theta + \cos^2\theta) + 1 + 2\cos\theta}{(1+\cos\theta)\sin\theta}$$

$$= \frac{2 + 2\cos\theta}{(1+\cos\theta)\sin\theta}$$

$$= \frac{2\cancel{(1+\cos\theta)}}{\cancel{(1+\cos\theta)}\sin\theta}$$

$$= \frac{2}{\sin\theta}$$

$$= 2\csc\theta$$

$\square$

(5) Prove $\dfrac{\sin(A+B)}{\cos A \cos B} \equiv \tan A + \tan B$

$$= \frac{\sin A \cos B + \cos A \sin B}{\cos A \cos B}$$

$$= \frac{\sin A \cancel{\cos B}}{\cos A \cancel{\cos B}} + \frac{\cancel{\cos A} \sin B}{\cancel{\cos A} \cos B}$$

$$= \tan A + \tan B$$

$\square$

$\Rightarrow$ More for HW.

12K "Double" Angle Formula

From compound formula: (see booklet)

(1) $\sin(A+\cancel{B}) = \sin A \cos \cancel{B} + \cos A \sin \cancel{B}$

$$\boxed{\sin(2A) = 2\sin A \cos A}$$

(2) $\cos(A+\cancel{B}) = \cos A \cos \cancel{B} - \sin A \sin \cancel{B}$

a) $\boxed{\cos(2A) = \cos^2 A - \sin^2 A}$

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

b) $\boxed{\cos 2A = 1 - 2\sin^2 A}$ $\qquad$ c) $\boxed{\cos 2A = 2\cos^2\theta - 1}$

(3) $\tan(A+\cancel{B}) = \dfrac{\tan A + \tan \cancel{B}}{1 - \tan A \tan \cancel{B}}$

$$\boxed{\tan(2A) = \frac{2\tan A}{1-\tan^2 A}}$$