Trig II Review B

1. Prove:

$\frac{\cos x}{1-\sin x}+\frac{1+\sin x}{\cos x}$	$\frac{2\cos x}{1-\sin x}$
$\left(\frac{1+\sin x}{1+\sin x}\right)\left(\frac{\cos x}{1-\sin x}\right)+\frac{1+\sin x}{\cos x}$	$\frac{2\cos x}{1-\sin x}\left(\frac{1+\sin x}{1+\sin x}\right)$
$\frac{(1+\sin x)(\cos x)}{1-\sin^2 x}+\frac{1+\sin x}{\cos x}$	$\frac{2\cos x(1+\sin x)}{1-\sin^2 x}$
$\frac{(1+\sin x)(\cos x)}{\cos^2 x}+\frac{1+\sin x}{\cos x}$	$\frac{2\cos x(1+\sin x)}{\cos^2 x}$
$\frac{2(1+\sin x)}{\cos x}$	$=\quad \frac{2(1+\sin x)}{\cos x}$

2. Prove

$\frac{1+\cos 2x}{\sin 2x}$	$\cot x$
$\frac{1+(2\cos^2 x-1)}{2\sin x\cos x}$	
$\frac{2\cos^2 x}{2\sin x\cos x}$	
$\frac{\cos x}{\sin x}$	$=\quad \frac{\cos x}{\sin x}$

3. Prove

$(\sin x+\cos x)^2$	$1+\sin 2x$
$\sin^2 x+2\sin x\cos x+\cos^2 x$	
$1+2\sin x\cos x$	
$1+\sin 2x$	$=$

4. a) Solve $6sin^2(2x) + \sin(2x) - 1 = 0$ for $0 < x \leq 2\pi$

$(3\sin(2x)-1)(2\sin(2x)+1)=0$

Case 1: $\sin 2x = \frac{1}{3}$ Case 2: $\sin 2x = \frac{-1}{2}$

Case 1: $\sin A = \frac{1}{3}$

$A_R = 0.34$

$A_1 = 0.34$

$A_2 = \pi - 0.34 = 2.80$

Period $= \frac{2\pi}{2} = \pi$

$2x_1 = 0.34$, $x_1 = 0.17$

$2x_2 = 2.80$, $x_2 = 1.40$

$x_3 = 0.17 + \pi = 3.31$

$x_4 = 1.4 + \pi = 4.54$

Case 2:

$\sin A = \frac{1}{2}$

$A_R = \frac{\pi}{6}$

$A_1 = \pi + \frac{\pi}{6} = \frac{7\pi}{6}$

$A_2 = 2\pi - \frac{\pi}{6} = \frac{11\pi}{6}$

Period $= \frac{2\pi}{2} = \pi$

$2x_1 = \frac{7\pi}{6}$, $x_1 = \frac{7\pi}{12}$

$2x_2 = \frac{11\pi}{6}$, $x_2 = \frac{11\pi}{12}$

$x_3 = \frac{7\pi}{12} + \pi = \frac{19\pi}{12}$

$x_4 = \frac{11\pi}{12} + \pi = \frac{23\pi}{12}$

b) Write the general solutions for a)

Case 1: $0.17 + \pi n$, $1.40 + \pi n$ $n \in \mathbb{Z}$

Case 2: $\frac{7\pi}{12} + \pi n$, $\frac{11\pi}{12} + \pi n$ $n \in \mathbb{Z}$

5. If $\tan\theta = -\frac{2}{3}$ and $\cos\theta < 0$, what is the value of $\sin 2\theta$?

both $\tan\theta$ & $\cos\theta < 0$ ∴ Q2

$h = \sqrt{3^2+2^2} = \sqrt{13}$

$\sin 2\theta = 2\sin\theta\cos\theta$

$= 2\left(\frac{2}{\sqrt{13}}\right)\left(\frac{-3}{\sqrt{13}}\right)$

$= \frac{-12}{13}$

6. Determine the exact value of $2 - 4sin^2\left(\frac{7\pi}{12}\right)$

$2 - 4\sin^2\left(\frac{7\pi}{12}\right)$

$= 2\left(1 - 2\sin^2\left(\frac{7\pi}{12}\right)\right)$

$= 2\cos\left(2 \cdot \frac{7\pi}{12}\right)$

$= 2\cos\frac{7\pi}{6}$

$= 2\left(\frac{-\sqrt{3}}{2}\right)$

$= -\sqrt{3}$