MATH 253
QUIZ 6
OCTOBER 21, 2009

NAME: SOLUTIONS

SHOW YOUR WORK FOR FULL CREDIT.

1. Simplify the expression as much as possible.

(a) $\sin\alpha\tan\alpha+\cos\alpha =$ $\sin\alpha\,\dfrac{\sin\alpha}{\cos\alpha}+\dfrac{\cos^2\alpha}{\cos\alpha}$

$=\dfrac{\sin^2\alpha+\cos^2\alpha}{\cos\alpha}=\dfrac{1}{\cos\alpha}=\sec\alpha$

(b) $\dfrac{\cos^2 x-4}{\cos x-2}=\dfrac{(\cos x+2)(\cos x-2)}{\cos x-2}=\cos x+2$

(c) $\dfrac{1}{1+\cos x}+\dfrac{1}{1-\cos x}=\dfrac{(1-\cos x)+(1+\cos x)}{(1-\cos x)(1+\cos x)}=\dfrac{2}{1-\cos^2 x}$

$=\dfrac{2}{\sin^2 x}=2\csc^2 x$

2. Verify the identity.

(a) $\cos^2 x-\sin^2 x=1-2\sin^2 x$

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

(b) $\dfrac{1}{\sec\theta\tan\theta}=\csc\theta-\sin\theta$

$\dfrac{1}{\sec\theta\tan\theta}=\cos\theta\cot\theta=\cos\theta\,\dfrac{\cos\theta}{\sin\theta}$

$=\dfrac{\cos^2\theta}{\sin\theta}=\dfrac{1-\sin^2\theta}{\sin\theta}$

$=\dfrac{1}{\sin\theta}-\sin\theta=\csc\theta-\sin\theta$