Verifying Identities Worksheet: 5.1 – 5.2 **Name:** Key

Practice I

1. $cos^2\theta(1+tan^2\theta)=1$

$\cos^2\theta(\sec^2\theta)$

$\cos^2\theta \cdot \frac{1}{\cos^2\theta}$ $1=1$

2. $\sec\theta-\cos\theta-\sin\theta\tan\theta=0$

$\frac{1}{\cos\theta}-\frac{\cos\theta}{1}\frac{\cos\theta}{\cos\theta}-\frac{\sin\theta\sin\theta}{\cos\theta}$

$\frac{1}{\cos\theta}-\frac{\cos^2\theta}{\cos\theta}-\frac{\sin^2\theta}{\cos\theta}$

$\frac{1-\cos^2\theta-\sin^2\theta}{\cos\theta}$

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

$\frac{1-1}{\cos\theta}=\frac{0}{\cos\theta}=0=0$

3. $1+\tan^2 x\cos^2 x+\cos^2 x=2$

$1+\frac{\sin^2x\cancel{\cos^2x}}{\cancel{\cos^2x}}+\cos^2x=2$

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

$1+1=2$

$2=2$

4. $\frac{\cos\theta+\cot\theta\sin\theta}{\cot\theta}=2\sin\theta$

(4) $\frac{\cos\theta+\frac{\cos\theta\sin\theta}{\sin\theta}}{\frac{\cos\theta}{\sin\theta}}$

$\frac{\cos\theta+\cos\theta}{\frac{\cos\theta}{\sin\theta}}$

$\frac{2\cos\theta}{\frac{\cos\theta}{\sin\theta}}=2\cancel{\cos\theta}*\frac{\sin\theta}{\cancel{\cos\theta}}=2\sin\theta$

5. $\sin\theta\csc\theta-\cos^2\theta=\sin^2\theta$

$\cancel{\sin\theta}\cdot\frac{1}{\cancel{\sin\theta}}-\cos^2\theta=$

$1-\cos^2\theta=$

$\sin^2\theta=\sin^2\theta$

6. $\tan(-x)\cos x=-\sin x$

$-\tan x\cos x$

$-\frac{\sin x}{\cancel{\cos x}}\cancel{\cos x}$

$-\sin x=-\sin x$

7. $(\sin x+\cos x)^2+(\sin x-\cos x)^2=2$

$\sin^2 x+\cancel{2\sin x\cos x}+\cos^2 x+\sin^2 x-\cancel{2\sin x\cos x}+\cos^2 x$

$\underbrace{\sin^2+\cos^2 x}_{1}+\underbrace{\sin^2 x+\cos^2 x}_{1}$

$2=2$

8. $\sin^2 x(1+\cot^2 x)=1$

$\sin^2 x(\csc^2 x)$

$\cancel{\sin^2 x}\left(\frac{1}{\cancel{\sin^2 x}}\right)$

$1=1$

9. $(\sec x+1)(\sec x-1)=\tan^2 x$

$\sec^2 x-1=\tan^2 x$

$\tan^2 x=\tan^2 x$ ✓

10. $\frac{\tan^2\alpha}{\sec\alpha}=\sec\alpha-\cos\alpha$

$\frac{\sec^2\alpha-1}{\sec\alpha}$

$\frac{\sec^2\alpha}{\sec\alpha}-\frac{1}{\sec\alpha}$

$\sec\alpha-\cos\alpha=\sec\alpha-\cos\alpha$ ✓

Right side

$(\cancel{\cos\alpha}\cos\beta)\quad (\cos\alpha\,\cancel{\cos\beta})$

$\frac{\sin\alpha}{\cancel{\cos\alpha}}+\frac{\sin\beta}{\cancel{\cos\beta}}$

$(\cancel{\cos\alpha}\cos\beta)\quad (\cos\alpha\,\cancel{\cos\beta})$

$\frac{\sin\alpha}{\cancel{\cos\alpha}}-\frac{\sin\beta}{\cancel{\cos\beta}}$

$\frac{\sin\alpha\cos\beta+\cos\alpha\sin\beta}{\sin\alpha\cos\beta-\cos\alpha\sin\beta}$

11. $\frac{\sin(\alpha+\beta)}{\sin(\alpha-\beta)}=\frac{\tan\alpha+\tan\beta}{\tan\alpha-\tan\beta}$

$\frac{\sin\alpha\cos\beta+\cos\alpha\sin\beta}{\sin\alpha\cos\beta-\cos\alpha\sin\beta}=\frac{\sin\alpha\cos\beta+\cos\alpha\sin\beta}{\sin\alpha\cos\beta-\cos\alpha\sin\beta}$

12. $\sin(\alpha+\beta)\sin(\alpha-\beta)=\cos^2\beta-\cos^2\alpha$

$(\sin\alpha\cos\beta+\cos\alpha\sin\beta)(\sin\alpha\cos\beta-\cos\alpha\sin\beta)$

$\sin^2\alpha\cos^2\beta-\cos^2\alpha\sin^2\beta$

$(1-\cos^2\alpha)\cos^2\beta-\cos^2\alpha(1-\cos^2\beta)$

$\cos^2\beta-\cancel{\cos^2\alpha\cos^2\beta}-\cos^2\alpha+\cancel{\cos^2\alpha\cos^2\beta}$

$\cos^2\beta-\cos^2\alpha=\cos^2\beta-\cos^2\alpha$ ✓