PS Pre-Calculus Review 1
mplifying/Solving/Multiple Angles

Name ______________________
Period _____ Date ______________

Simplify each expression.

1. $\sec^2\theta(1-\cos^2\theta)$

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

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

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

$\boxed{\tan^2\theta}$

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

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

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

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

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

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

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

3. $\cos\theta(\sec\theta-\cos\theta)$

$\cos\theta\left(\frac{1}{\cos\theta}-\cos\theta\right)$

$1-\cos^2\theta$

$\boxed{\sin^2\theta}$

4. $\frac{\sin^2\theta+\tan^2\theta+\cos^2\theta}{\sec\theta}$

$\frac{\sin^2\theta+\cos^2\theta+\tan^2\theta}{\sec\theta}$

$\frac{1+\tan^2\theta}{\sec\theta}$

$\frac{\sec^2\theta}{\sec\theta}$

$\boxed{\sec\theta}$

5. $\frac{\sec(-x)}{\tan(-x)}$

$\frac{\sec x}{-\tan x}$

$\frac{\frac{1}{\cancel{\cos x}}}{-\frac{\sin x}{\cancel{\cos x}}}$

$\frac{1}{-\sin x}$

$\boxed{-\csc x}$

6. $\frac{\csc^2\theta-1}{\csc^2\theta}+\frac{\sec^2\theta-1}{\sec^2\theta}$

$\frac{\cot^2\theta}{\csc^2\theta}+\frac{\tan^2\theta}{\sec^2\theta}$

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

$\cos^2\theta+\sin^2\theta$

$\boxed{1}$

II. Solve each equation on the interval [0, 2π).

7. $4\sin x+1=2\sin x$

$-2\sin x \quad -2\sin x$

$2\sin x+1=0$

$2\sin x=-1$

$\sin x=-\frac{1}{2}$

$\boxed{x=\frac{7\pi}{6}, \frac{11\pi}{6}}$

8. $\tan^2\theta-3=0$

$\sqrt{\tan^2\theta}=\sqrt{3}$

$\tan\theta=\pm\sqrt{3}$

$\boxed{\theta=\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}}$

9. $3\sec^2\theta-4=0$

$3\sec^2\theta=4$

$\sec^2\theta=\frac{4}{3}$

$\sqrt{\cos^2\theta}=\sqrt{\frac{3}{4}}$

$\cos\theta=\pm\frac{\sqrt{3}}{2}$

$\boxed{\theta=\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}}$

10. $6\cos^2\theta-6=0$

$6\cos^2\theta=6$

$\sqrt{\cos^2\theta}=\sqrt{1}$

$\cos\theta=\pm1$

$\boxed{\theta=0\pi, \pi}$

11. $3\sin^2\theta+2\sin\theta=1$

$3\sin^2\theta+2\sin\theta-1=0$

-3, 3, -1, 2

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

$3\sin\theta(\sin\theta+1)-1(\sin\theta+1)=0$

$(\sin\theta+1)(3\sin\theta-1)=0$

$\sin\theta+1=0 \qquad 3\sin\theta-1=0$

$\sin\theta=-1 \qquad 3\sin\theta=1$

$\cancel{\sin\theta=\frac{1}{3}}$

$\boxed{\theta=\frac{3\pi}{2}}$

12. $2\sin\beta\cos\beta=\sin\beta$

$2\sin\beta\cos\beta-\sin\beta=0$

$\sin\beta(2\cos\beta-1)=0$

$\sin\beta=0 \qquad 2\cos\beta-1=0$

$2\cos\beta=1$

$\cos\beta=\frac{1}{2}$

$\boxed{\beta=0\pi, \pi, \frac{\pi}{3}, \frac{5\pi}{3}}$

13. $\sec^2\theta+\tan^2\theta=1$

$\tan^2\theta+1+\tan^2\theta=1$

$2\tan^2\theta+1=1$

$2\tan^2\theta=0$

$\sqrt{\tan^2\theta}=\sqrt{0}$

$\tan\theta=0$

$\boxed{\theta=0\pi, \pi}$

14. $\sin^2 x-3\cos^2 x=0$

$1-\cos^2 x-3\cos^2 x=0$

$-4\cos^2 x+1=0$

$-4\cos^2 x=-1$

$\sqrt{\cos^2 x}=\sqrt{\frac{1}{4}}$

$\cos x=\pm\frac{1}{2}$

$\boxed{x=\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}}$

15. $\sqrt{3}\tan 3x=1$

$0\le 3x<6\pi$

$\tan 3x=\frac{1}{\sqrt{3}}$

Add $\frac{12\pi}{6}$

$\tan 3x=\frac{\sqrt{3}}{3}$

$\frac{3x}{3}=\frac{\frac{\pi}{6}, \frac{7\pi}{6}, \frac{13\pi}{6}, \frac{19\pi}{6}, \frac{25\pi}{6}, \frac{31\pi}{6}}{3}$

$\boxed{x=\frac{\pi}{18}, \frac{7\pi}{18}, \frac{13\pi}{18}, \frac{19\pi}{18}, \frac{25\pi}{18}, \frac{31\pi}{18}}$