Chapter 5 Cumulative Worksheet

1. Simplify: $1-2\sin^2 x+\sin^4 x$ $\cos^4 x$

2. Simplify: $\sec^2 x\tan^2 x+\sec^2 x$ $\sec^4 x$

3. Verify the identity:

$$\frac{\tan\theta}{1+\sec\theta}+\frac{1+\sec\theta}{\tan\theta}=2\csc\theta$$

put over common denominator

4. Verify the identity:

$$\sec^2 y-\cot^2\left(\frac{\pi}{2}-y\right)=1$$

$\cot^2\left(\frac{\pi}{2}-y\right)$ is $\tan^2 y$

5. Solve in the interval $[0,2\pi)$:

$2\sin x\cos x=\cos x$ $\frac{\pi}{2},\frac{3\pi}{2},\frac{\pi}{6},\frac{5\pi}{6}$

6. Solve in the interval $[0,2\pi)$:

$\cos x+1=\sin x$ $\frac{\pi}{2},\pi;\ \frac{3\pi}{2}$ is extraneous

7. Solve in the interval $[0,2\pi)$:

$\sin 2x+\cos x=0$ $\frac{\pi}{2},\frac{3\pi}{2},\frac{7\pi}{6},\frac{11\pi}{6}$

8. Solve in the interval $[0,2\pi)$:

$2\cos^2 x+3\sin x-3=0$ $\frac{\pi}{2},\frac{\pi}{6},\frac{5\pi}{6}$

9. Find $\tan\left(\frac{11\pi}{12}\right)$ $-2+\sqrt{3}$

10. Find $\tan\left(-\frac{19\pi}{12}\right)$ $2+\sqrt{3}$

11. Verify the identity:

$$\sin(x+y)\sin(x-y)=\sin^2 x-\sin^2 y$$

12. Solve in the interval $[0^o,360^o)$:

$\cos\left(x+\frac{\pi}{6}\right)-\cos\left(x-\frac{\pi}{6}\right)=1$ 270^o

13. Use half angle formulas to determine the exact values of sine, cosine, and tangent of 165^o.

$\sin\theta=\frac{\sqrt{2-\sqrt{3}}}{2};\ \cos\theta=-\frac{\sqrt{2+\sqrt{3}}}{2};\ \tan\theta=\sqrt{3}-2$

14. Use half angle formulas to determine the exact values of sine, cosine, and tangent of $\frac{\pi}{12}$.

$\sin\theta=\frac{\sqrt{2-\sqrt{3}}}{2};\ \cos\theta=\frac{\sqrt{2+\sqrt{3}}}{2};\ \tan\theta=2-\sqrt{3}$

15. Find the exact value of the trigonometric expression when $\sin u=\frac{5}{13}$ where $\frac{\pi}{2}<u<\pi$ and $\cos v=-\frac{3}{5}$ where $\pi<v<\frac{3\pi}{2}$.

a) $\tan(u+v)=$ $\frac{33}{56}$

b) $\sin(u-v)=$ $-\frac{63}{65}$

16. Find the exact value of the trigonometric expression when $\cos u=-\frac{2}{3}$ where $\frac{\pi}{2}<u<\pi$.

a) $\sin 2u=$ $-\frac{4\sqrt{5}}{9}$

b) $\cos 2u=$ $-\frac{1}{9}$

c) $\tan 2u=$ $4\sqrt{5}$

17. Find the exact value of the trigonometric expression when $\tan u=-\frac{5}{12}$ where $\frac{3\pi}{2}<u<2\pi$.

a) $\sin\left(\frac{u}{2}\right)=$ $\frac{\sqrt{26}}{26}$ The sign of the

b) $\cos\left(\frac{u}{2}\right)=$ $-\frac{5\sqrt{26}}{26}$ final answer

c) $\tan\left(\frac{u}{2}\right)=$ $-\frac{1}{5}$ depends on u/2

4th Quad u divided by 2 puts the $\measuredangle$ in Quad 2

18. Rewrite the expression in terms of the first powers of cosine.

a) $\cos^4 x$ $\frac{1}{8}(3+4\cos 2x+\cos 4x)$

b) $\sin^2 x\cos^2 x$ $\frac{1}{8}(1-\cos 4x)$