

Unit 8 Test Review Sheet

Simplify the following expressions completely.

1. $\sec^2 x(1 - \sin^2 x)$

2. $2\cos^2\theta - 1$

3. $\cot x \sin x \sec x$

4. $\cos x + \sin x \tan x$

5. $\sin^2 x + \tan^2 x + \cos^2 x$

6. $\frac{\sin^2 x + \cos^2 x}{\cos^2 x}$

Prove the following by changing **ONE** side of the equation to equal the other side. Do not work both sides!!

7. $\sin(x - \pi) = -\sin x$

8. $\tan^2 x - \cot^2 x = \sec^2 x - \csc^2 x$

9. $\cos 2x = 1 - 2\sin^2 x$ (use sum/difference formulas to prove)

10. $1 - \frac{\sin^2 \theta}{\tan^2 \theta} = \sin^2 \theta$

$$11. \frac{\sin x \cos x}{1 - \cos^2 x} = \cot x$$

$$12. \frac{\sec \theta + \csc \theta}{1 + \tan \theta} = \csc \theta$$

$$13. \frac{\cot \theta - \tan \theta}{\sin \theta \cos \theta} = \csc^2 \theta - \sec^2 \theta$$

$$14. \frac{1 - \sin^2 \theta}{1 + \cot^2 \theta} = \sin^2 \theta \cos^2 \theta$$

Answers should be simplified and rationalized.

15. Find the exact value of $\cos \left(\frac{\pi}{12} \right)$.

16. Find the exact value of $\sin 195^\circ$.

17. Find $\sin 2x$, $\cos 2x$, and $\tan 2x$ given that $\sin x = \frac{-12}{13}$ and $\cos x > 0$.

18. Find $\sin (x+y)$, $\cos (x+y)$, $\sin (x-y)$, $\cos (x-y)$ and $\tan (x+y)$ given that

$$\tan x = \frac{4}{3} \quad \text{and} \quad \cos y = \frac{-8}{17} \quad \text{and} \quad 0 < x < \frac{\pi}{2} < y < \pi.$$

19. Use the sum and difference formulas to prove that

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

20. Solve without a calculator:

a. $\cos 95^\circ \cos 55^\circ - \sin 95^\circ \sin 55^\circ$

b. $\frac{2 \tan 67.5^\circ}{1 - \tan^2 67.5^\circ}$

c. $\cos^2 \frac{\pi}{12} - \sin^2 \frac{\pi}{12}$

d. $\sin \frac{\pi}{8} \cos \frac{3\pi}{8} + \cos \frac{\pi}{8} \sin \frac{3\pi}{8}$

21. Use the sum, difference, and double-angle identities to solve the following questions. Give EXACT values as your final answers.

a. $\cos \frac{5\pi}{12}$

b. $\tan \frac{\pi}{12}$

c. $\sin(165)$

d. $\cos(285)$

22. Use the power-reducing formulas to rewrite the following expressions without powers of trig functions greater than one.

a. $\sin^2 2x$

b. $\sin^3 x$