

Simplify the following.

1. $\sin \theta \tan \theta \sec \theta$

2. $(1 - \sin \theta)(1 + \csc \theta)(\sin \theta)$

1. _____

2. _____

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

4. $\frac{\sin \theta}{\csc \theta} + \frac{\cos \theta}{\sec \theta}$

3. _____

4. _____

5. $\frac{\tan^2 \theta}{1 + \tan^2 \theta} - 1$

6. $\frac{\tan \theta}{1 + \sec \theta} + \frac{1 + \sec \theta}{\tan \theta}$

5. _____

6. _____

7. $\frac{\tan \theta - \sin \theta \cos \theta}{\sin^2 \theta}$

7. _____

Verify the following.

8. $\tan \theta \cos \theta = \sin \theta$

9. $\frac{1}{\tan \theta + \cot \theta} = \sin \theta \cos \theta$

10. $\frac{\sin \theta}{\csc \theta} = 1 - \frac{\cos \theta}{\sec \theta}$

11. $\frac{\csc^2 \theta}{\cot^2 \theta} - 1 = \tan^2 \theta$

12. $\frac{1 - \cos \theta}{\sin \theta} - \frac{\sin \theta}{1 + \cos \theta} = 0$

13. $\frac{1 - \cos \theta}{1 + \cos \theta} = (\csc \theta - \cot \theta)^2$

14. $(\sin \theta - \cos \theta)^2 + 2 \sin \theta \cos \theta = 1$

15. $\sec \theta - \frac{\cos \theta}{1 + \sin \theta} = \tan \theta$

16. $\frac{2}{\sin \theta + 1} - \frac{2}{\sin \theta - 1} = 4 \sec^2 \theta$

Solve for $0\pi \leq \theta < 2\pi$. Round to the nearest hundredth when necessary.

17. $2\tan^2\theta - 3\sec\theta + 3 = 0$

18. $\sin\theta = \sqrt{3} - \sin\theta$

19. $\sin^2\theta + 2\cos\theta = 2$

20. $2\sin^3\theta - \sin^2\theta - 2\sin\theta + 1 = 0$

21. $2\cos^2\theta - \cos\theta = 2 - \sec\theta$

22. $\csc^2\theta - 2\csc\theta = 2 - 4\sin\theta$

23. $1 - \csc^2\theta = -3$

24. $2\sin 2\theta - 1 = 0$

Solve for $0\pi \leq \theta < 2\pi$. Round to the nearest hundredth when necessary.

25. $4 \sin 2\theta - 1 = 0$

26. $\tan^2 2\theta - 1 = 0$

27. $2\sin^2 3\theta - 1 = 0$

Answers:

1. $\tan^2 \theta$

2. $\cos^2 \theta$

3. $-\sin \theta$

4. 1

5. $-\cos^2 \theta$

6. $2 \csc \theta$

7. $\tan \theta$

17. 0π

18. $\frac{\pi}{3}, \frac{2\pi}{3}$

19. 0π

20. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}, \frac{3\pi}{2}$

21. $\frac{\pi}{3}, \frac{5\pi}{3}, 0\pi, \pi$

22. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

23. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

24. $\frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}$

25. 0.125, 1.45, 3.265, 4.59

26. $\frac{\pi}{8}, \frac{3\pi}{8}, \frac{5\pi}{8}, \frac{7\pi}{8}, \frac{9\pi}{8}, \frac{11\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}$

27. $\frac{\pi}{12}, \frac{\pi}{4}, \frac{5\pi}{12}, \frac{7\pi}{12}, \frac{3\pi}{4}, \frac{11\pi}{12}, \frac{13\pi}{12}, \frac{5\pi}{4}, \frac{17\pi}{12}, \frac{19\pi}{12}, \frac{7\pi}{4}, \frac{23\pi}{12}$