

14-3 Exercises

California Standards
Preview of Trig 3.0, 3.1, and 3.2

KEYWORD: MB7 Parent

GUIDED PRACTICE

SEE EXAMPLE 1
p. 1008

1. Prove each trigonometric identity.

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

2. $\cot(-\theta) = -\cot \theta$

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

SEE EXAMPLE 2
p. 1009

2. Rewrite each expression in terms of $\cos \theta$, and simplify.

4. $\csc \theta \tan \theta$

5. $(1 + \sec^2 \theta)(1 - \sin^2 \theta)$

6. $\sin^2 \theta + \cos^2 \theta + \tan^2 \theta$

SEE EXAMPLE 3
p. 1010

7. **Physics** Use the equation $mg \sin \theta = \mu mg \cos \theta$ to determine the angle at which a glass-top table can be tilted before a glass plate on the table begins to slide. Assume $\mu = 0.94$.

PRACTICE AND PROBLEM SOLVING

Prove each trigonometric identity.

8. $\sec \theta \cot \theta = \csc \theta$

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

10. $\tan \theta \sin \theta = \sec \theta - \cos \theta$

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

Rewrite each expression in terms of $\sin \theta$, and simplify.

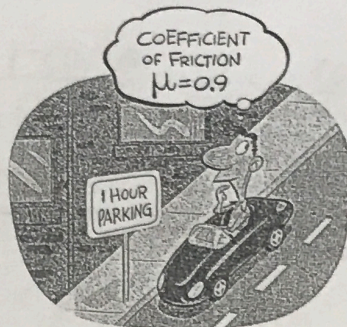
12. $\frac{\cos^2 \theta}{1 + \sin \theta}$

13. $\frac{\tan \theta}{\cot \theta}$

14. $\cos \theta \cot \theta + \sin \theta$

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

16. **Physics** Use the equation $mg \sin \theta = \mu mg \cos \theta$ to determine the steepest slope of the street shown on which a car with rubber tires can park without sliding.



Multi-Step Rewrite each expression in terms of a single trigonometric function.

17. $\tan \theta \cot \theta$

18. $\sin \theta \cot \theta \tan \theta$

19. $\cos \theta + \sin \theta \tan \theta$

20. $\sin \theta \csc \theta - \cos^2 \theta$

21. $\cos^2 \theta \sec \theta \csc \theta$

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

23. $\csc \theta (1 - \cos^2 \theta)$

24. $\csc \theta \cos \theta \tan \theta$

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

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

27. $\frac{\tan \theta}{\sin \theta \sec \theta}$

28. $\frac{\cos \theta}{\sin \theta \cot \theta}$

29. $\tan \theta (\tan \theta + \cot \theta)$

30. $\sin^2 \theta + \cos^2 \theta + \cot^2 \theta$

31. $\sin^2 \theta \sec \theta \csc \theta$

Verify each identity.

32. $\frac{\cos \theta - 1}{\cos^2 \theta} = \sec \theta - \sec^2 \theta$

33. $\sin^2 \theta (\csc^2 \theta - 1) = \cos^2 \theta$

34. $\tan \theta + \cot \theta = \sec \theta \csc \theta$

35. $\frac{\cos \theta}{1 - \sin^2 \theta} = \sec \theta$

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

37. $\frac{\csc^2 \theta}{1 + \tan^2 \theta} = \cot^2 \theta$

Prove each fundamental identity without using any of the other fundamental identities. (*Hint:* Use the trigonometric ratios with x , y , and r .)

38. $\tan \theta = \frac{\sin \theta}{\cos \theta}$

39. $\cot \theta = \frac{\cos \theta}{\sin \theta}$

40. $1 + \cot^2 \theta = \csc^2 \theta$

41. $\csc \theta = \frac{1}{\sin \theta}$

42. $\sec \theta = \frac{1}{\cos \theta}$

43. $1 + \tan^2 \theta = \sec^2 \theta$

Independent Practice

For Exercises	See Example
8-11	1
12-15	2
16	3

Extra Practice

Skills Practice p. S31
Application Practice p. S45