

5-2: Verifying Trigonometric Identities WS#1

Prove the stated identity

1. $\sin^2 x(1 + \tan^2 x) = \tan^2 x$

2. $\tan \alpha (\tan \alpha + \cot \alpha) = \sec^2 \alpha$

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

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

5. $\sec^2 x + \csc^2 x = \sec^2 x \csc^2 x$

6. $\tan^2 t - \sin^2 t = \tan^2 t \sin^2 t$

7. $\sec \alpha - \cos \alpha = \sin \alpha \tan \alpha$

8. $\csc \theta - \sin \theta = \cos \theta \cot \theta$

9. $\sin^4 x + \cos^4 x + 2 \sin^2 x \cos^2 x = 1$

10. $\frac{1}{1 - \sin x} - \frac{1}{1 + \sin x} = 2 \tan x \sec x$

11. $\frac{1 - \tan \alpha}{1 + \tan \alpha} = \frac{\cot \alpha - 1}{\cot \alpha + 1}$

12. $\sec t + \csc t = (\tan t + \cot t)(\cos t + \sin t)$

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

14. $\frac{1}{1 + \sin s} + \frac{1}{1 - \sin s} = 2 \sec^2 s$

5-2: Verifying Trigonometric Identities WS#2

Prove the stated identity

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

$$2. \cos^2 x \cot^2 x = \cot^2 x - \cos^2 x$$

$$3. \tan^4 w + 2 \tan^2 w + 1 = \sec^4 w$$

$$4. \sin^2 x (\csc^2 x + \sec^2 x) = \sec^2 x$$

$$5. \frac{\sin x + \cos x}{1 - \sin x} = \frac{1 + \cot x}{\csc x - 1}$$

$$6. \frac{1 - \tan x}{1 + \tan x} = \frac{\cot x - 1}{\cot x + 1}$$

5-2: Verifying Trigonometric Identities WS#3

Prove the stated identity

1. $\cot^2 \theta + \cos^2 \theta + \sin^2 \theta = \csc^2 \theta$

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

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

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

5. Write the trigonometric expression in terms of sine and cosine, and then simplify.

1. $\cos x \tan x$

2. $\sin \theta \cos \theta \csc \theta$

3. $\sec^2 x - \tan^2 x$

4. $\frac{\tan x + \cot x}{\sec x \csc x}$

6. $\cos u + \tan u \sin u$

6. $\cos^2 x (1 + \tan^2 x)$

20. Simplify the trigonometric expression.

8. $\frac{\cos x \sec x}{\cot x}$

8. $\cos^3 x + \sin^2 x \cos x$

9. $\frac{1 + \sin y}{1 + \csc y}$

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

11. $\frac{\sec^2 x - 1}{\sec^2 x}$

12. $\frac{\sec x - \cos x}{\tan x}$

13. $\frac{1 + \csc x}{\cos x + \cot x}$

14. $\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x}$

14. $\frac{1 + \sin u}{\cos u} + \frac{\cos u}{1 + \sin u}$

15. $\tan x \cos x \csc x$

7. $\frac{2 + \tan^2 x}{\sec^2 x} - 1$

18. $\frac{1 + \cot A}{\csc A}$

9. $\tan \theta + \cos(-\theta) + \tan(-\theta)$

10. $\frac{\cos x}{\sec x + \tan x}$

1-82. Verify the identity.

1. $\sin \theta \cot \theta = \cos \theta$

22. $\frac{\tan x}{\sec x} = \sin x$

13. $\frac{\cos u \sec u}{\tan u} = \cot u$

24. $\frac{\cot x \sec x}{\csc x} = 1$

15. $\frac{\tan y}{\csc y} = \sec y - \cos y$

26. $\frac{\cos v}{\sec v \sin v} = \csc v - \sin v$

27. $\sin B + \cos B \cot B = \csc B$

28. $\cos(-x) - \sin(-x) = \cos x + \sin x$

29. $\cot(-\alpha) \cos(-\alpha) + \sin(-\alpha) = -\csc \alpha$

30. $\csc x [\csc x + \sin(-x)] = \cot^2 x$

31. $(1 - \sin x)(1 + \sin x) = \cos^2 x$

32. $(\sin x + \cos x)^2 = 1 + 2 \sin x \cos x$

33. $(1 - \cos \beta)(1 + \cos \beta) = \frac{1}{\csc^2 \beta}$

34. $\frac{\cos x}{\sec x} + \frac{\sin x}{\csc x} = 1$

35. $\frac{(\sin x + \cos x)^2}{\sin^2 x - \cos^2 x} = \frac{\sin^2 x - \cos^2 x}{(\sin x - \cos x)^2}$

36. $(\sin x + \cos x)^4 = (1 + 2 \sin x \cos x)^2$

37. $\frac{\sec t - \cos t}{\sec t} = \sin^2 t$

38. $\frac{1 - \sin x}{1 + \sin x} = (\sec x - \tan x)^2$

39. $\frac{1}{1 - \sin^2 y} = 1 + \tan^2 y$

40. $\csc x - \sin x = \cos x \cot x$

41. $(\cot x - \csc x)(\cos x + 1) = -\sin x$

42. $\sin^4 \theta - \cos^4 \theta = \sin^2 \theta - \cos^2 \theta$

43. $(1 - \cos^2 x)(1 + \cot^2 x) = 1$

44. $\cos^2 x - \sin^2 x = 2 \cos^2 x - 1$

45. $2 \cos^2 x - 1 = 1 - 2 \sin^2 x$

46. $\tan y + \cot y = \sec y \csc y$

47. $\frac{1 - \cos \alpha}{\sin \alpha} = \frac{\sin \alpha}{1 + \cos \alpha}$

48. $\sin^2 \alpha + \cos^2 \alpha + \tan^2 \alpha = \sec^2 \alpha$

49. $\frac{\sin x - 1}{\sin x + 1} = \frac{-\cos^2 x}{(\sin x + 1)^2}$

50. $\frac{\sin w}{\sin w + \cos w} = \frac{\tan w}{1 + \tan w}$

51. $\frac{(\sin t + \cos t)^2}{\sin t \cos t} = 2 + \sec t \csc t$

52. $\sec t \csc t (\tan t + \cot t) = \sec^2 t + \csc^2 t$

53. $\frac{1 + \tan^2 u}{1 - \tan^2 u} = \frac{1}{\cos^2 u - \sin^2 u}$