# 5-1 Trigonometric Identities

**Simplify each expression.**

22. $\csc x \sec x - \tan x$

23. $\csc x - \cos x \cot x$

24. $\sec x \cot x - \sin x$

25. $\dfrac{\tan x + \sin x \sec x}{\csc x \tan x}$

26. $\dfrac{1 - \sin^2 x}{\csc^2 x - 1}$

27. $\dfrac{\csc x \cos x + \cot x}{\sec x \cot x}$

28. $\dfrac{\sec x \csc x - \tan x}{\sec x \csc x}$

29. $\dfrac{\sec^2 x}{\cot^2 x + 1}$

30. $\cot x - \csc^2 x \cot x$

31. $\cot x - \cos^3 x \csc x$

**Simplify each expression.**

32. $\dfrac{\cos x}{\sec x + 1} + \dfrac{\cos x}{\sec x - 1}$

33. $\dfrac{1 - \cos x}{\tan x} + \dfrac{\sin x}{1 + \cos x}$

34. $\dfrac{1}{\sec x + 1} + \dfrac{1}{\sec x - 1}$

35. $\dfrac{\cos x \cot x}{\sec x + \tan x} + \dfrac{\sin x}{\sec x - \tan x}$

36. $\dfrac{\sin x}{\csc x + 1} + \dfrac{\sin x}{\csc x - 1}$

**Rewrite as an expression that does not involve a fraction.**

38. $\dfrac{\sin x}{\csc x - \cot x}$

39. $\dfrac{\csc x}{1 - \sin x}$

40. $\dfrac{\cot x}{\sec x - \tan x}$

41. $\dfrac{\cot x}{1 + \sin x}$

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42. $\dfrac{3\tan x}{1 - \cos x}$

43. $\dfrac{2\sin x}{\cot x + \csc x}$

44. $\dfrac{\sin x}{1 - \sec x}$

45. $\dfrac{\cot^2 x \cos x}{\csc x - 1}$

46. $\dfrac{5}{\sec x + 1}$

47. $\dfrac{\sin x \tan x}{\cos x + 1}$

**Write each expression in terms of a single trigonometric function.**

51. $\tan x - \csc x \sec x$

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

53. $\csc x \tan^2 x - \sec^2 x \csc x$

54. $\sec x \csc x - \cos x \csc x$