5-1 Trigonometric Identities

Simplify each expression.

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

ANSWER:

$\cot x$

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

ANSWER:

$\sin x$

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

ANSWER:

$\cos x \cot x$

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

ANSWER:

$2 \sin x$

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

ANSWER:

$\sin^2 x$

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

ANSWER:

$2 \cos x$

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

ANSWER:

$\cos^2 x$

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

ANSWER:

$\tan^2 x$

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

ANSWER:

$-\cot^3 x$

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

ANSWER:

$\sin x \cos x$

Simplify each expression.

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

ANSWER:

$2 \cot^2 x$

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

ANSWER:

$\sin x$

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

ANSWER:

$2 \cot x \csc x$

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

ANSWER:

$\cot x - \cos x + \tan x + \sin x \tan x$

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

ANSWER:

$2 \tan^2 x$

Rewrite as an expression that does not involve a fraction.

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

ANSWER:

$1 + \cos x$

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

ANSWER:

$\sec^2 x\ (\csc x + 1)$

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

ANSWER:

$\csc x + 1$

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

ANSWER:

$\sec x\ (\csc x - 1)$

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

ANSWER:

$3 \csc x\ (\sec x + 1)$

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

ANSWER:

$2 - 2 \cos x$

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

ANSWER:

$-\cot x\ (\cos x + 1)$

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

ANSWER:

$\cos x\ (\csc x + 1)$

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

ANSWER:

$5 \cot^2 x\ (\sec x - 1)$

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

ANSWER:

$\sec x - 1$

Write each expression in terms of a single trigonometric function.

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

ANSWER:

$-\cot x$

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

ANSWER:

$\sec x$

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

ANSWER:

$-\csc x$

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

ANSWER:

$\tan x$