WORK∫HEET

Prove the following trigonometric identities

1. $\sin x \equiv \dfrac{\sin x + \tan x}{1 + \sec x}$
2. $\sin x \equiv 1 - \dfrac{\cos^x}{1 + \sin x}$
3. $\sin^2 x \equiv (1 - \sin^2 x)(\sec^2 x - 1)$
4. $\sin^2 x \equiv \dfrac{\tan^2 x}{\tan^2 x + 1}$
5. $\sin^2 x \equiv \dfrac{\sec x \sin x}{\tan x + \cot x}$
6. $\dfrac{\sin x}{\cos x} \equiv \dfrac{1 - \cos x}{\sin x}$
7. $\dfrac{\sin^2 x}{1 + \cos^2 x} \equiv \dfrac{\sec x - \cos x}{\sec x + \cos x}$
8. $\sin^3 x \equiv \sin x - \sin x \cos^2 x$
9. $(\sin x + \cos x)^2 \equiv 1 + \sin 2x$
10. $(3 + \cos x)(3 - \cos x) \equiv 8 + \sin^2 x$
11. $1 - (\sin x - \cos x)^2 \equiv (\sin x + \cos x)^2 - 1$
12. $\dfrac{1}{\sin x} \equiv \dfrac{\sin x}{1 + \cos x} + \dfrac{1}{\tan x}$
13. $\dfrac{2}{\sin x} \equiv \dfrac{\sin x}{1 - \cos x} + \dfrac{1 - \cos x}{\sin x}$
14. $\dfrac{2}{\sin x} \equiv \dfrac{1 + \cos x}{\sin x} + \dfrac{\sin x}{1 + \cos x}$
15. $\dfrac{\sin x}{\cos x + 1} \equiv \dfrac{1 - \cos x}{\sin x}$
16. $\sin x + \cos x \equiv \dfrac{\tan x}{\sec x} + \dfrac{\cot x}{\csc x}$
17. $\csc^2 x \equiv 1 + \cot^2 x$
18. $\csc^2 x \equiv \dfrac{\sec^2 x}{\sec^2 x - 1}$
19. $2 \csc x \equiv \dfrac{1 - \cos x}{\sin x} + \dfrac{\sin x}{1 - \cos x}$
20. $\sin^4 x - \cos^4 x \equiv 1 - 2 \cos^2 x$
21. $\csc^4 x - \cot^4 x \equiv \csc^2 x + \cot^2 x$
22. $\csc x - \sin x \equiv \dfrac{\csc x - \sin x}{\sin x \csc x}$
23. $\csc x + \sec x \equiv (\sin x + \cos x)(\tan x + \cot x)$
24. $\dfrac{\csc x}{1 - \cos x} \equiv \dfrac{\cos x + 1}{\sin^3 x}$
25. $\cos x \equiv \tan x(\csc x - \sin x)$
26. $\dfrac{1}{\cos x} \equiv \tan x + \dfrac{\cos x}{1 + \sin x}$
27. $\dfrac{1}{\cos x} \equiv \dfrac{\tan^2 x}{1 - \cos x} - \dfrac{1}{\cos^2 x}$
28. $\dfrac{1}{\cos x} \equiv \dfrac{1 + \tan x}{\sin x + \cos x}$
29. $\dfrac{1}{\cos x + \cos^2 x} \equiv \dfrac{\tan x - \sin x}{\sin^3 x}$
30. $\dfrac{\sec x - 1}{\sec x + 1} \equiv \dfrac{1 - \cos x}{1 + \cos x}$
31. $\dfrac{\cos x}{1 - \sin x} \equiv \dfrac{1 + \sin x}{\cos x}$
32. $\cos^2 x \equiv \csc x \sin x - \sin^2 x$
33. $\cos^2 x \equiv \dfrac{\csc^2 x - 1}{\csc^2 x}$
34. $\cos^2 x \equiv \dfrac{\csc x \cos x}{\tan x + \cot x}$
35. $\cos^2 x - \sin^2 x \equiv 1 - 2 \sin^2 x$
36. $\cos^2 x - \sin^2 x \equiv \cos^4 x - \sin^4 x$
37. $\cos^2 x \equiv \dfrac{\cos^2 x - \sin^2 x}{1 - \tan^2 x}$
38. $\cos 2x \equiv \dfrac{1 - \tan^2 x}{1 + \tan^2 x}$
39. $\cos 3x \equiv 4\ \cos^3 x - 3 \cos x$
40. $2 \cos x \cos y \equiv \cos(x + y) + \cos(x - y)$
41. $2 \cos x \sin y \equiv \sin(x + y) - \sin(x - y)$
42. $\sec x \equiv \cos x + \sin x \tan x$
43. $\sec x \equiv \tan x \csc x$
44. $\sec x \equiv \sin x(\cot x + \tan x)$
45. $\sec x \equiv \dfrac{\cos x}{1 - \sin x} - \tan x$
46. $\sec^2 x \equiv \tan^2 x + 1$
47. $\sec^2 x \equiv \tan^2 x(1 + \cot^2 x)$
48. $\sec x \csc x \equiv \tan x + \cot x$
49. $\dfrac{1}{\sec x} \equiv \sec x - \tan x \sin x$
50. $\dfrac{1}{1 + \sin x} \equiv \dfrac{1 - \sin x}{\cos^2 x}$
51. $\dfrac{1 + \cos x}{\sin x} = \csc x + \cot x$
52. $\dfrac{1 + \sin x}{\cos^2 x} \equiv \tan^2 x + 1 \tan x \sec x$

53. $\dfrac{1-\sin x}{1+\sin x} \equiv (\sec x - \tan x)^2$

54. $\dfrac{3+\sin x}{1-\sin x} \equiv \dfrac{\sin^2 x + 4\sin x + 3}{\cos^2 x}$

55. $\dfrac{\cos x}{1-\sin x} \equiv \sec x + \tan x$

56. $\dfrac{\cos x}{1+\sin x} \equiv \dfrac{1-\sin x}{\cos x}$

57. $2\sec x \equiv \dfrac{\cos x}{1+\sin x} + \dfrac{1+\sin x}{\cos x}$

58. $2\sec^2 x \equiv \dfrac{1}{1-\sin x} + \dfrac{1}{1+\sin x}$

59. $2\sec^2 x \equiv \dfrac{1}{\csc x + 1} + \dfrac{1}{\csc x - 1}$

60. $(\sin x + \cos x)(\tan x + \cot x) \equiv \sec x + \csc x$

61. $(\sin x - \tan x)(\cos x - \cot x) \equiv (\sin x - 1)(\cos x - 1)$

62. $1 - \sin x \cos x \equiv \dfrac{\sin^3 x + \cos^3 x}{\sin x + \cos x}$

63. $\tan x \equiv \dfrac{\sec^2 x}{\tan x} - \dfrac{1}{\tan x}$

64. $\tan^2 x \equiv \sec^2 x - \cos x \sec x$

65. $\tan^2 x \equiv \dfrac{1-\cos 2x}{1+\cos 2x}$

66. $\tan^2 x \equiv \csc^2 x \tan^2 x - 1$

67. $\tan^2 x \equiv \dfrac{2}{\cos^2 x} - 1$

68. $\tan^2 x \equiv \dfrac{\sin^2 x}{1-\sin^2 x}$

69. $2\tan^2 x \equiv (1+\tan^2 x)(1-\cos 2x)$

70. $2\tan x \equiv \dfrac{\cos x}{1-\sin x} - \dfrac{\cos x}{1+\sin x}$

71. $2\tan x \sec x \equiv \dfrac{1}{1-\sin x} - \dfrac{1}{1+\sin x}$

72. $4\tan x \sec x \equiv \dfrac{1+\sin x}{1-\sin x} - \dfrac{1-\sin x}{1+\sin x}$

73. $\tan^2 x \sin^2 x \equiv \tan^2 x - \sin^2 x$

74. $\dfrac{\tan x}{1-\tan^2 x} \equiv \dfrac{\sin x \cos x}{\cos^2 x - \sin^2 x}$

75. $\dfrac{1-\tan x}{1+\tan x} \equiv \dfrac{\cot x - 1}{\cot x + 1}$

76. $\dfrac{1+\tan^2 x}{1-\tan^2 x} \equiv \dfrac{1}{\cos^2 x - \sin^2 x}$

77. $\dfrac{1-\tan^2 x}{1+\tan^2 x} \equiv 1 - 2\sin^2 x$

78. $\cot x \equiv \cos x \csc x$

79. $\cot x \equiv \dfrac{\sin 2x}{1-\cos 2x}$

80. $\cot^2 x \equiv \csc^2 x - \sin^2 x - \cos^2 x$

81. $\cot^2 x \cos^2 x \equiv \cos^4 x \csc^2 x$

82. $\cot^2 x \equiv \dfrac{1+\cot^2 x}{1+\tan^2 x}$

83. $1 \equiv (1-\sin^2 x)(1+\tan^2 x)$

84. $1 \equiv \dfrac{\csc x}{\sin x} - \dfrac{\cot x}{\tan x}$

85. $1 \equiv \dfrac{\sec x}{\cos x} - \dfrac{\tan x}{\cot x}$

86. $1 \equiv \dfrac{1}{1-\tan^2 x} + \dfrac{1}{1-\cot^2 x}$

87. $1 \equiv (\csc x + \cot x)(\csc x - \cot x)$

88. $1 \equiv \dfrac{\sin^4 x - \cos^4 x}{\sin^2 x - \cos^2 x}$

89. $2 \equiv (1+\tan^2 x)(1+\cos 2x)$

90. $2 \equiv (\sin x + \cos x)^2 + (\sin x - \cos x)^2$