

1. $\sin x \tan x = \sec x - \cos x$
2. $\cos^4 x - \sin^4 x = 1 - 2\sin^2 x$
3. $\csc^2 x + \sec^2 x = \csc^2 x \sec^2 x$
4. $\sec^2 x - \sec^2 y = \tan^2 x - \tan^2 y$
5. $\frac{\tan x + \tan y}{\cot x + \cot y} = (\tan x)(\tan y)$
6. $(\sec x - \cos x)(\csc x - \sin x) = \frac{\tan x}{1 + \tan^2 x}$
7. $\cos^6 x + \sin^6 x = 1 - 3\sin^2 x + 3\sin^4 x$
8. $\sec^6 x - \tan^6 x = 1 + 3\tan^2 x \sec^2 x$
9. $1 + \cot x \tan y = \frac{\sin(x+y)}{\sin x \cos y}$
10. $\cos(x+y)\cos y + \sin(x+y)\sin y = \cos x$
11. $\sin x - \tan y \cos x = \frac{\sin(x-y)}{\cos y}$
12. $\cos\left(\frac{3\pi}{4} + x\right) + \sin\left(\frac{3\pi}{4} - x\right) = 0$
13. $\frac{\tan\left(\frac{\pi}{4} + x\right) - \tan\left(\frac{\pi}{4} - x\right)}{\tan\left(\frac{\pi}{4} + x\right) + \tan\left(\frac{\pi}{4} - x\right)} = 2 \sin x \cos x$
14. $\sin(x+y)\sin(x-y) = \cos^2 y - \cos^2 x$
15. $\tan(x+y)\tan(x-y) = \frac{\sin^2 x - \sin^2 y}{\cos^2 x - \sin^2 y}$
16. $\frac{\tan(x-y) + \tan y}{1 - \tan(x-y)\tan y} = \tan x$
17. $\sin\left(\frac{\pi}{2} - x\right)\cot\left(\frac{\pi}{2} + x\right) = -\sin x$
18. $\cos(-x) + \cos(\pi - x) = \cos(\pi + x) + \cos x$
19. $\frac{\sin(\pi - x)}{\tan(\pi + x)} \frac{\cot\left(\frac{\pi}{2} - x\right)}{\tan\left(\frac{\pi}{2} + x\right)} \frac{\cos(2\pi - x)}{\sin(-x)} = \sin x$
24. $\frac{\cos\left(\frac{\pi}{2} + x\right)\sec(-x)\tan(\pi - x)}{\sec(2\pi + x)\sin(\pi + x)\cot\left(\frac{\pi}{2} - x\right)} = -1$
25. $\frac{\sin 2x}{1 + \cos 2x} = \tan x$
26. $\frac{1 + \cos x}{\sin x} = \cot \frac{x}{2}$
27. $\frac{\cos 2x}{1 + \sin 2x} = \tan\left(\frac{\pi}{4} - x\right)$
28. $\frac{\cos x - \sin x}{\cos x + \sin x} = \sec 2x - \tan 2x$
29. $\frac{1 - \cos 2x + \sin 2x}{1 + \cos 2x + \sin 2x} = \tan x$
30. $\cos^6 x - \sin^6 x = \cos 2x\left(1 - \frac{1}{4}\sin^2 2x\right)$
31. $4(\cos^6 x + \sin^6 x) = 1 + 3\cos^2 2x$
32. $\sec x - \tan x = \tan\left(\frac{\pi}{4} - \frac{x}{2}\right)$
33. $\frac{\sin 2x}{1 + \cos 2x} \frac{\cos x}{1 + \cos x} = \tan \frac{x}{2}$
34. $\sin^2 x + \cos^4 x = \cos^2 x + \sin^4 x$
35. $\tan x - \cot x = (\tan x - 1)(\cot x + 1)$
36. $\frac{1 - \sin 2x}{\cos 2x} = \frac{\cos 2x}{1 + \sin 2x}$
37. $\cos x = \sin x \tan^2 x \cot^3 x$
38. $\tan\left(\frac{\pi}{4} + x\right) + \tan\left(\frac{\pi}{4} - x\right) = 2 \sec 2x$
39. $\csc^2\left(\frac{\pi}{2} - x\right) = 1 + \sin^2 x \csc^2\left(\frac{\pi}{2} - x\right)$
40. $(\sin x + \cos x)(\tan x + \cot x) = \sec x + \csc x$
41. $\sin^4 x + \cos^4 x = \sin^2 x (\csc^2 x - 2 \cos^2 x)$
42. $\frac{\sin 4x}{1 - \cos 4x} \times \frac{1 - \cos 2x}{\cos 2x} = \tan x$
43. $\sin^3 x + \cos^3 x = (1 - \sin x \cos x)(\sin x + \cos x)$
44. $\sin 8x = 8 \sin x \cos x \cos 2x \cos 4x$

$$20. \frac{\sin(-x)}{\sin(\pi+x)} - \frac{\tan(\frac{\pi}{2}+x)}{\cot x} + \frac{\cos x}{\sin(\frac{\pi}{2}+x)} = 3$$

$$21. \frac{\csc(\pi-x)}{\sec(\pi+x)} \frac{\cos(-x)}{\cos(\frac{\pi}{2}+x)} = \cot^2 x$$

$$22. 2 \csc 2x = \sec x \csc x$$

$$23. 2 \cot 2x = \cot x - \tan x$$

$$49. \tan\left(\frac{\pi}{2}-x\right) - \cot\left(\frac{3\pi}{2}-x\right) + \tan(2\pi-x) - \cot(\pi-x) = \frac{4-2\sec^2 x}{\tan x}$$

$$50. \tan(x+y+z) = \frac{\tan x + \tan y + \tan z - \tan x \tan y \tan z}{1 - \tan x \tan y - \tan x \tan z - \tan y \tan z}$$

$$51. \tan(x-y) + \tan(y-z) = \frac{\sec^2 y (\tan x - \tan z)}{(1 + \tan x \tan y)(1 + \tan y \tan z)}$$

$$52. \sin 5x = \sin x (\cos^2 2x - \sin^2 2x) + 2 \cos x \cos 2x \sin 2x$$

$$53. \frac{\sin(\pi-x) \cos(\pi+x) \tan(2\pi-x)}{\sec(\frac{\pi}{2}+x) \csc(\frac{3\pi}{2}-x) \cot(\frac{3\pi}{2}+x)} = \sin^4 x - \sin^2 x$$

$$54. \cos^2 x \cos^2 y + \sin^2 x \sin^2 y + \sin^2 x \cos^2 y + \sin^2 y \cos^2 x = 1$$

$$55. \cos\left(\frac{\pi}{12}-x\right) \sec \frac{\pi}{12} - \sin\left(\frac{\pi}{12}-x\right) \csc \frac{\pi}{12} = 4 \sin x$$

$$56. \sin\left(\frac{\pi}{2}+x\right) \cos(\pi-x) \cot\left(\frac{3\pi}{2}+x\right) = \sin\left(\frac{\pi}{2}-x\right) \sin\left(\frac{3\pi}{2}-x\right) \cot\left(\frac{\pi}{2}+x\right)$$

$$45. \sin x = 1 - 2 \sin^2\left(\frac{\pi}{4} - \frac{x}{2}\right)$$

$$46. \sin(x+y) + \sin(x-y) = 2 \sin x \cos y$$

$$47. \frac{\sin(x-y)}{\sin x \sin y} + \frac{\sin(y-z)}{\sin y \sin z} + \frac{\sin(z-x)}{\sin z \sin x} = 0$$

$$48. \tan x + \tan(\pi-x) + \cot\left(\frac{\pi}{2}+x\right) = \tan(2\pi-x)$$