TRIG IDENTITY TOOLKIT – Updated June 2023

Reciprocal Identities

1. $sec\ \theta = \frac{1}{cos\,\theta}$
2. $csc\ \theta = \frac{1}{sin\,\theta}$
3. $cot\ \theta = \frac{1}{tan\,\theta}$
4. $tan\ \theta = \frac{1}{cot\,\theta}$
5. $cos\ \theta = \frac{1}{sec\,\theta}$
6. $sin\ \theta = \frac{1}{csc\ \theta}$

Quotient Identities

7. $tan\ \theta = \frac{sin\,\theta}{cos\,\theta}$
8. $cot\ \theta = \frac{cos\,\theta}{sin\,\theta}$

Pythagorean Identities

9. $\cos^2\theta + \sin^2\theta = 1$
10. $1 + \tan^2\theta = \sec^2\theta$
11. $1 + \cot^2\theta = \csc^2\theta$
12. $\sin^{-1}x = \cos^{-1}\sqrt{1-x^2}$

Even Function Identities

13. $cos\ \theta = cos\ (-\theta)$
14. $sec\ \theta = sec\ (-\theta)$

Odd Function Identities

15. $sin\ \theta = -\ sin\ (-\theta)$ OR $-sin\ \theta = sin\ (-\theta)$
16. $csc\ \theta = -\ csc\ (-\theta)$ OR $-csc\ \theta = -csc\ (-\theta)$
17. $tan\ \theta = -\ tan\ (-\theta)$ OR $-tan\ \theta = tan\ (-\theta)$
18. $cot\ \theta = -\ cot\ (-\theta)$ OR $-cot\ \theta = cot\ (-\theta)$

Sum / Difference Identities

18. $cos\ (A \pm B) = cos\ A\ cos\ B \pm sin\ A\ sin\ B$
19. $sin\ (A + B) = sin\ A\ cos\ B \mp cos\ A\ sin\ B$

Double Angle Identities

20. $sin\ (2\theta) = 2\ cos\ \theta\ sin\ \theta$
21. $cos\ (2\theta) = \begin{cases} \cos^2\theta - \sin^2\theta \\ 2\cos^2\theta - 1 \\ 1 - 2\sin^2\theta \end{cases}$

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