Trigonometry

Trigonometric ratios of acute angle

1. $\sin\theta = \frac{\text{opp. side of angle }\theta}{\text{hypotenuse}}$

2. $\cos\theta = \frac{\text{adjacent side of angle }\theta}{\text{hypotenuse}}$

3. $\tan\theta = \frac{\text{opp. side of angle }\theta}{\text{adjacent side of angle }\theta}$

4. $\csc\theta = \frac{\text{hypotenuse}}{\text{opp. side of angle }\theta}$

5. $\cos\theta = \frac{\text{hypotenuse}}{\text{adjacent side of angle }\theta}$

6. $\tan\theta = \frac{\text{adjacent side of angle }\theta}{\text{opp. side of angle }\theta}$

Trigonometric Formulas

1. $\cot\theta = \dfrac{\cos\theta}{\sin\theta} = \dfrac{1}{\tan\theta} \Rightarrow \tan\theta = \dfrac{\sin\theta}{\cos\theta} = \dfrac{1}{\cot\theta}$

2. $\sec\theta = \dfrac{1}{\cos\theta} \Rightarrow \cos\theta = \dfrac{1}{\sec\theta}$

3. $\csc\theta = \dfrac{1}{\sin\theta} \Rightarrow \sin\theta = \dfrac{1}{\csc\theta}$

4. $\sin^2\theta + \cos^2\theta = 1$

5. $1 + \tan^2\theta = \sec^2\theta$

6. $1 + \cot^2\theta = \csc^2\theta$

7. $\sin(-\theta) = -\sin\theta$

8. $\cos(-\theta) = \cos\theta$

9. $\tan(-\theta) = -\tan\theta$

10. $\sin(A + B) = \sin A\cos B + \sin B\cos A$

11. $\sin(A - B) = \sin A\cos B - \sin B\cos A$

12. $\cos(A + B) = \cos A\cos B - \sin A\sin B$

13. $\cos(A - B) = \cos A\cos B + \sin A\sin B$

14. $\sin 2\theta = 2\sin\theta\cos\theta$

15. $\cos 2\theta = \cos^2\theta - \sin^2\theta \Rightarrow 2\cos^2\theta - 1 = 1 - 2\sin^2\theta \qquad (\because\ \sin^2\theta + \cos^2\theta = 1)$

Ratios of Complementary Angles

1. $\sin(90 - \theta) = \cos\theta \Rightarrow \sin(\frac{\pi}{2} - \theta) = \cos\theta$

2. $\cos(90 - \theta) = \sin\theta \Rightarrow \cos(\frac{\pi}{2} - \theta) = \sin\theta$

3. $\tan(90 - \theta) = \cot\theta \Rightarrow \tan(\frac{\pi}{2} - \theta) = \cot\theta$

4. $\csc(90 - \theta) = \sec\theta \Rightarrow \csc(\frac{\pi}{2} - \theta) = \sec\theta$

5. $\sec(90 - \theta) = \csc\theta \Rightarrow \sec(\frac{\pi}{2} - \theta) = \csc\theta$

6. $\cot(90 - \theta) = \cot\theta \Rightarrow \cot(\frac{\pi}{2} - \theta) = \tan\theta$

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