

Trigonometric Identities

Chapter 8: Introduction to Trigonometry · Topic 2

Key Concept

These identities are used to simplify complex trigonometric expressions, prove other trigonometric statements, and solve trigonometric equations without needing to know the specific angle's value. For example, given $\sin \theta = 3/5$, the identity $\sin^2\theta + \cos^2\theta = 1$ can be rearranged to find $\cos \theta = \sqrt{1 - \sin^2\theta} = \sqrt{1 - 9/25} = \sqrt{16/25} = 4/5$, demonstrating how one ratio can be found from another using identities.

Quick Revision Notes

- Fundamental identity: $\sin^2\theta + \cos^2\theta = 1$ (from the Pythagoras theorem).
- Other identities: $1 + \tan^2\theta = \sec^2\theta$ and $1 + \cot^2\theta = \operatorname{cosec}^2\theta$.
- Identities help simplify expressions and find one ratio from another.
- Example: given $\sin \theta = 3/5$, identity gives $\cos \theta = 4/5$.

Practice Questions

- 1 Prove that $1 + \tan^2\theta = \sec^2\theta$ using a right triangle.
- 2 Given $\sin \theta = 3/5$, find $\cos \theta$ using the fundamental identity.
- 3 Simplify the expression $\sin^2\theta + \cos^2\theta + \tan^2\theta - \sec^2\theta$.