



Additional Math with Ali Hashir

Proving Trigonometric Identities

Worksheet 3 — Answers

Each line below gives the key step that collapses the identity; full working is in the solutions document.

Q1. $\sin \theta \cdot \frac{\cos \theta}{\sin \theta} = \cos \theta.$

Q2. $1 - \cos^2 \theta = \sin^2 \theta.$

Q3. $\frac{1}{\sin \theta} \cdot \frac{\sin \theta}{\cos \theta} = \frac{1}{\cos \theta} = \sec \theta.$

Q4. $\sec^2 A - 1 = \tan^2 A.$

Q5. $\frac{\cos \theta}{\sin \theta} + \frac{\sin \theta}{\cos \theta} = \frac{\cos^2 \theta + \sin^2 \theta}{\sin \theta \cos \theta} = \frac{1}{\sin \theta \cos \theta} = \sec \theta \csc \theta.$

Q6. $(\sin^2 A - \cos^2 A)(\sin^2 A + \cos^2 A) = \sin^2 A - \cos^2 A.$

Q7. $\sec^2 \theta \cdot \cos^2 \theta = 1.$

Q8. $\frac{(1 + \cos \theta)^2 + \sin^2 \theta}{\sin \theta(1 + \cos \theta)} = \frac{2}{\sin \theta} = 2 \csc \theta.$

Q9. $\left(\frac{1 - \cos \theta}{\sin \theta} \right)^2 = \frac{(1 - \cos \theta)^2}{1 - \cos^2 \theta} = \frac{1 - \cos \theta}{1 + \cos \theta}.$

Q10. $\sin^2 A(\sec^2 A - 1) = \sin^2 A \tan^2 A.$

Challenge 1. $\frac{1 + \sin \theta}{\cos \theta} \cdot (1 - \sin \theta) = \frac{1 - \sin^2 \theta}{\cos \theta} = \cos \theta.$

Challenge 2. $\frac{(\sin A + \cos A)^2 - 1}{\sin A \cos A} = \frac{2 \sin A \cos A}{\sin A \cos A} = 2.$