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Problem: Prove that $\sin(A+B)\sin(A-B)=\sin^2 A-\sin^2 B.$

Solution: LHS = $\sin(A+B)\sin(A-B)=(\sin A\cos B+\cos A\sin B)(\sin A\cos B-\cos A\sin B)$

= $(\sin A\cos B)^2-(\cos A\sin B)^2=\sin^2 A(1-\sin^2 B)-(1-\sin^2 A)\sin^2 B=\sin^2 A-\sin^2 B$

= RHS