5 (viii) LHS $= (\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2$

$= \sin^2 A + \operatorname{cosec}^2 A + 2\sin A \operatorname{cosec} A + \cos^2 A + \sec^2 A + 2\cos A \sec A$

$\left[\because \operatorname{cosec} A = \frac{1}{\sin A}, \sec A = \frac{1}{\cos A}\right]$

$= \sin^2 A + \cos^2 A + 1 + \cot^2 A + 1 + \tan^2 A + 2 + 2$

$= 1 + 1 + \cot^2 A + 1 + \tan^2 A + 2 + 2$

$= 7 + \tan^2 A + \cot^2 A$

$=$ RHS

5 (vii) $\text{LHS} = \dfrac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta}$

$= \dfrac{\sin\theta(1 - 2\sin^2\theta)}{\cos\theta(2\cos^2\theta - 1)}$

$= \tan\theta\left[\dfrac{\sin^2\theta + \cos^2\theta - 2\sin^2\theta}{2\cos^2\theta - \sin^2\theta - \cos^2\theta}\right]$

$= \tan\theta\left[\dfrac{\cos^2\theta - \sin^2\theta}{\cos^2\theta - \sin^2\theta}\right]$

$= \tan\theta$

$=$ RHS

5 (ix) $(\operatorname{cosec} A - \sin A)(\sec A - \cos A)$

$= \left(\frac{1}{\sin A} - \sin A\right)\left(\frac{1}{\cos A} - \cos A\right)$

$= \dfrac{1 - \sin^2 A}{\sin A} \times \dfrac{1 - \cos^2 A}{\cos A}$

$= \dfrac{\cos^2 A \times \sin^2 A}{\sin A \cos A}$

$= \sin A \cos A$

$= \dfrac{1}{\frac{1}{\sin A \cos A}}$

$= \dfrac{1}{\frac{\sin^2 A + \cos^2 A}{\sin A \cos A}}$

$= \dfrac{1}{\frac{\sin^2 A}{\sin A \cos A} + \frac{\cos^2 A}{\sin A \cos A}}$

$= \dfrac{1}{\tan A + \cot A}$

$=$ RHS