



Exercise 7A

Question 34

(i)

$$\begin{aligned} \text{LHS} &= \sqrt{\frac{(1-\cos\theta)}{(1+\cos\theta)} \times \frac{(1+\cos\theta)}{(1+\cos\theta)}} = \sqrt{\frac{(1-\cos^2\theta)}{(1+\cos\theta)^2}} \\ &= \sqrt{\frac{\sin^2\theta}{(1+\cos\theta)^2}} = \frac{\sin\theta}{1+\cos\theta} = \text{RHS} \end{aligned}$$

$\therefore \text{LHS} = \text{RHS}$

(ii)

$$\begin{aligned} \text{LHS} &= \sqrt{\frac{(1+\sin\theta)}{(1-\sin\theta)} \times \frac{(1-\sin\theta)}{(1-\sin\theta)}} = \sqrt{\frac{1-\sin^2\theta}{(1-\sin\theta)^2}} \\ &= \sqrt{\frac{\cos^2\theta}{(1-\sin\theta)^2}} = \frac{\cos\theta}{1-\sin\theta} = \text{RHS} \end{aligned}$$

$\therefore \text{LHS} = \text{RHS}$

(iii)

$$\begin{aligned} \text{LHS} &= \sqrt{\frac{1+\cos\theta}{1-\cos\theta}} + \sqrt{\frac{1-\cos\theta}{1+\cos\theta}} \\ &= \sqrt{\frac{(1+\cos\theta) \times (1-\cos\theta)}{(1-\cos\theta) \times (1-\cos\theta)}} + \sqrt{\frac{(1-\cos\theta) \times (1+\cos\theta)}{(1+\cos\theta) \times (1+\cos\theta)}} \\ &= \sqrt{\frac{(1-\cos^2\theta)}{(1-\cos\theta)^2}} + \sqrt{\frac{(1-\cos^2\theta)}{(1+\cos\theta)^2}} \\ &= \sqrt{\frac{\sin^2\theta}{(1-\cos\theta)^2}} + \sqrt{\frac{\sin^2\theta}{(1+\cos\theta)^2}} = \frac{\sin\theta}{1-\cos\theta} + \frac{\sin\theta}{1+\cos\theta} \\ &= \frac{\sin\theta(1+\cos\theta) + \sin\theta(1-\cos\theta)}{1-\cos^2\theta} \\ &= \frac{\sin\theta + \cos\theta\sin\theta + \sin\theta - \sin\theta\cos\theta}{\sin^2\theta} \\ &= \frac{2\sin\theta}{\sin^2\theta} = \frac{2}{\sin\theta} = 2\operatorname{cosec}\theta \quad \text{RHS} \end{aligned}$$

$\therefore \text{LHS} = \text{RHS}$

Question 35

$$\begin{aligned}
\text{LHS} &= \frac{\sin A - \sin B}{\cos A + \cos B} + \frac{\cos A - \cos B}{\sin A + \sin B} \\
&= \frac{(\sin A + \sin B)(\sin A - \sin B) + (\cos A + \cos B)(\cos A - \cos B)}{(\cos A + \cos B)(\sin A + \sin B)} \\
&= \frac{\sin^2 A - \sin^2 B + \cos^2 A - \cos^2 B}{(\cos A + \cos B)(\sin A + \sin B)} \\
&= \frac{(\sin^2 A + \cos^2 A) - (\sin^2 B + \cos^2 B)}{(\cos A + \cos B)(\sin A + \sin B)} \\
&= \frac{1 - 1}{(\cos A + \cos B)(\sin A + \sin B)} = 0 = \text{RHS}
\end{aligned}$$

∴ LHS = RHS

***** END *****