

ex 8.3

LHS

$$\begin{aligned} \textcircled{9} &= (\sin \alpha + \cos \alpha) (\tan \alpha + \cot \alpha) \\ &= (\sin \alpha + \cos \alpha) \left(\frac{\sin \alpha}{\cos \alpha} + \frac{\cos \alpha}{\sin \alpha} \right) \\ &= (\sin \alpha + \cos \alpha) \left(\frac{\sin^2 \alpha + \cos^2 \alpha}{\sin \alpha \cos \alpha} \right) \\ &= (\sin \alpha + \cos \alpha) \frac{1}{\sin \alpha \cos \alpha} \\ &= \frac{\cancel{\sin \alpha}}{\cancel{\sin \alpha} \cos \alpha} + \frac{\cancel{\cos \alpha}}{\sin \alpha \cancel{\cos \alpha}} \\ &= \sec \alpha + \operatorname{cosec} \alpha \\ &= \text{RHS} \end{aligned}$$

$$\begin{aligned} \textcircled{5} \text{ LHS} &= (\sqrt{3} + 1) (3 - \cot 30^\circ) \\ &= (\sqrt{3} + 1) (3 - \sqrt{3}) \\ &= \sqrt{3} (\sqrt{3} + 1) (\sqrt{3} - 1) \\ &= \sqrt{3} [(\sqrt{3})^2 - 1^2] \\ &= \sqrt{3} (3 - 1) \\ &= 2\sqrt{3} \\ \text{RHS} &= \tan^3 60^\circ - 2 \sin 60^\circ \\ &= (\sqrt{3})^3 - \cancel{2} \times \frac{\sqrt{3}}{\cancel{2}} \\ &= 3\sqrt{3} - \sqrt{3} \\ &= 2\sqrt{3} \end{aligned}$$

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