

$$5 \text{ (x)} \quad \frac{1 + \tan^2 A}{1 + \cot^2 A}$$

$$= \frac{\sec^2 A}{\operatorname{cosec}^2 A}$$

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

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

$$= \tan^2 A$$

$$\left(\frac{1 - \tan A}{1 - \cot A} \right)^2$$

$$= \left(\frac{1 - \tan A}{1 - \frac{1}{\tan A}} \right)^2$$

$$= \left(\frac{1 - \tan A}{\frac{\tan A - 1}{\tan A}} \right)^2$$

$$= \frac{\cancel{(1 - \tan A)}^2 \tan^2 A}{(\cancel{\tan A - 1})^2}$$

$$= \tan^2 A$$

$$\therefore \frac{1 + \tan^2 A}{1 + \cot^2 A} = \left(\frac{1 - \tan A}{1 - \cot A} \right)^2 = \tan^2 A$$