Exercise 7B

Question 16:

$$\cos\theta + \sin\theta = \sqrt{2}\sin\theta$$

(squaring both side we get)

$$\Rightarrow (\cos\theta\sin\theta)^2 = \left(\sqrt{2}\sin\theta\right)^2$$

$$\Rightarrow \cos^2\theta + \sin^2\theta + 2\cos\theta\sin\theta = 2\sin^2\theta$$

$$\sin^2\theta = 2\cos\theta\sin\theta + \cos^2$$

$$\sin^2\theta - \cos^2\theta = 2\cos\theta\sin\theta$$

$$(\sin\theta + \cos\theta)(\sin\theta - \cos\theta) = 2\sin\theta\cos\theta$$

$$\left(\sqrt{2}\sin\theta\right)(\sin\theta - \cos\theta) = 2\sin\theta\cos\theta$$

$$(\sin\theta\cos\theta) = \sqrt{2}\cos\theta$$

Hence, $(\sin\theta - \cos\theta) = \sqrt{2}\cos\theta$

Question 17:

$$\text{LHS} = \frac{a\sin\theta - b\cos\theta}{a\sin\theta + b\cos\theta}$$

$$\text{LHS} = \frac{a\tan\theta - b}{a\tan\theta + b}$$

$$= \frac{a \times \frac{a}{b} - b}{a \times \frac{a}{b} + b} = \frac{\left(\frac{a^2 - b^2}{b}\right)}{\left(\frac{a^2 + b^2}{b}\right)} = \frac{a^2 - b^2}{a^2 + b^2} = \text{RHS}$$

$\therefore$ LHS = RHS

********** END **********