Exercise 7B

Question 14:

$$(2\sin\theta + 3\cos\theta) = 2$$

$$(2\sin\theta + 3\cos\theta)^2 + (3\sin\theta - 2\cos\theta)^2$$

$$= 13\left(\sin^2\theta + \cos^2\theta\right) = 13$$

$$(2)^2 + (3\sin\theta - 2\cos\theta)^2 = 13$$

$$(3\sin\theta - 2\cos\theta)^2 = 9$$

$$(3\sin\theta - 2\cos\theta) = \pm 3$$

Question 15:

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

(squaring both side we get)

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

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

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

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

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

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

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

Hence proved.

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