9. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

(a) Show that

$$\left(\cos\theta + \sin\theta\right)\left(\text{cosec}\,\theta - \sec\theta\right) \equiv k\cot 2\theta \qquad \theta \neq \left(90n\right)^\circ \quad n \in \mathbb{Z}$$

where k is an integer to be found.

(3)

(b) Hence solve, for $-90° < x < 90°$, the equation

$$5\left(\cos x + \sin x\right)\left(\text{cosec}\,x - \sec x\right) = 4\,\text{cosec}^2 2x$$

Give each answer, in degrees, to one decimal place.

(5)