(a) Express $3\sin x+2\sqrt{2}\cos\left(x+\frac{1}{4}\pi\right)$ in the form $R\sin(x+\alpha)$, where $R>0$ and $0<\alpha<\frac{1}{2}\pi$. State the exact value of R and give α correct to 3 decimal places. [4]

(b) Hence solve the equation

$$6\sin\tfrac{1}{2}\theta+4\sqrt{2}\cos\left(\tfrac{1}{2}\theta+\tfrac{1}{4}\pi\right)=3$$

for $-4\pi<\theta<4\pi$. [5]