Zadatak 16. Ako je $\alpha+\beta=\frac{3\pi}{4}$; $\cos\beta=\frac{3\sqrt{7}}{8}$, $\frac{\pi}{2}<\alpha<\pi$, koliko je $\sin\alpha$?

Rješenje.

$$\sin\beta=\sqrt{1-\cos^2\beta}=\sqrt{1-\frac{63}{64}}=\frac{1}{8}$$

$$\sin(\alpha+\beta)=\sin\frac{3\pi}{4}=\frac{\sqrt{2}}{2}$$

$$\cos(\alpha+\beta)=\cos\frac{3\pi}{4}=-\frac{\sqrt{2}}{2}$$

$$\sin(\alpha+\beta)=\sin\alpha\cos\beta+\cos\alpha\sin\beta=\frac{\sqrt{2}}{2}$$

$$\cos(\alpha+\beta)=\cos\alpha\cos\beta-\sin\alpha\sin\beta=-\frac{\sqrt{2}}{2}$$

$$\sin\alpha\cdot\frac{3\sqrt{7}}{8}+\frac{1}{8}\cdot\cos\alpha=\frac{\sqrt{2}}{2}\quad /\cdot 8$$

$$\cos\alpha\cdot\frac{3\sqrt{7}}{8}-\frac{1}{8}\cdot\sin\alpha=-\frac{\sqrt{2}}{2}\quad /\cdot 8$$

$$3\sqrt{7}\sin\alpha+\cos\alpha=4\sqrt{2}\quad /\cdot(-3\sqrt{7})$$

$$-\sin\alpha+3\sqrt{7}\cos\alpha=-4\sqrt{2}$$

$$\left.\begin{aligned}-63\sin\alpha-3\sqrt{7}\cos\alpha&=-21\sqrt{14}\\-\sin\alpha+3\sqrt{7}\cos\alpha&=-4\sqrt{2}\end{aligned}\right\}+$$

$$-64\sin\alpha=-4\sqrt{2}(1+3\sqrt{7})\quad /:(-64)$$

$$\sin\alpha=\frac{-4\sqrt{2}(1+3\sqrt{7})}{-64}=\frac{\sqrt{2}(1+3\sqrt{7})}{16}$$