Zadatak 5. Izračunaj:

1) $(i-\sqrt{3})^{13}$; **2)** $(1-i)^{11}$;

3) $\left(-\frac{\sqrt{2}}{2}-i\frac{\sqrt{2}}{2}\right)^{50}$.

Rješenje. **1)** $(i-\sqrt{3})^{13}$, $a=-\sqrt{3}$, $b=1$, $|z|=\sqrt{1+3}=2$, $\operatorname{tg}\varphi=-\frac{1}{\sqrt{3}}=-\frac{\sqrt{3}}{3} \Longrightarrow \varphi=\frac{5\pi}{6}$,

$\left[2\left(\cos\frac{5\pi}{6}+i\sin\frac{5\pi}{6}\right)\right]^{13}=2^{13}\left(\cos\frac{65\pi}{6}+i\sin\frac{65\pi}{6}\right)=2^{13}\left(\cos\frac{5\pi}{6}+i\sin\frac{5\pi}{6}\right)=2^{13}\left(-\frac{\sqrt{3}}{2}+\frac{1}{2}i\right)$;

2) $(1-i)^{11}$, $a=1$, $b=-1$, $|z|=\sqrt{2}$, $\operatorname{tg}\varphi=-1 \Longrightarrow \varphi=\frac{7\pi}{4}$,

$\left[\sqrt{2}\left(\cos\frac{7\pi}{4}+i\sin\frac{7\pi}{4}\right)\right]^{11}=32\sqrt{2}\left(\cos\frac{5\pi}{4}+i\sin\frac{5\pi}{4}\right)=-32(1+i)$;

3) $\left(-\frac{\sqrt{2}}{2}-i\frac{\sqrt{2}}{2}\right)^{50}$, $a=-\frac{\sqrt{2}}{2}$, $b=-\frac{\sqrt{2}}{2}$, $|z|=1$, $\operatorname{tg}\varphi=1 \Longrightarrow \varphi=\frac{5\pi}{4}$, $\left(\cos\frac{5\pi}{4}+i\sin\frac{5\pi}{4}\right)^{50}=\cos\frac{\pi}{2}+i\sin\frac{\pi}{2}=i$.