Zadatak 15. Zapiši u trigonometrijskom obliku sljedeće kompleksne brojeve:

1) $z = 1 - i$; **2)** $z = -i$;

3) $z = \sqrt{2}$; **4)** $z = \sqrt{3} + i$;

5) $z = -\frac{1}{2} + i\frac{\sqrt{3}}{2}$; **6)** $z = -\frac{\sqrt{2}}{2} - i\frac{\sqrt{2}}{2}$.

Rješenje. **1)** $z = 1 - i \implies a = 1,\ b = -1,\ r = \sqrt{2},\ \operatorname{tg}\varphi = -1 \implies \varphi = \frac{7\pi}{4} \implies z = \sqrt{2}\left(\cos\frac{7\pi}{4} + i\sin\frac{7\pi}{4}\right)$;

2) $z = -i \implies a = 0,\ b = -1,\ r = 1,\ \operatorname{tg}\varphi = \infty \implies \varphi = \frac{3\pi}{2} \implies z = \cos\frac{3\pi}{2} + i\sin\frac{3\pi}{2}$;

3) $z = \sqrt{2} \implies a = \sqrt{2},\ b = 0,\ r = \sqrt{2},\ \operatorname{tg}\varphi = 0 \implies \varphi = 0 \implies z = \sqrt{2}(\cos 0 + i\sin 0)$;

4) $z = \sqrt{3} + i \implies a = \sqrt{3},\ b = 1,\ r = \sqrt{3+1},\ \operatorname{tg}\varphi = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} \implies \varphi = \frac{\pi}{6} \implies z = 2\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$;

5) $z = -\frac{1}{2} + i\frac{\sqrt{3}}{2} \implies a = -\frac{1}{2},\ b = \frac{\sqrt{3}}{2},\ r = \sqrt{\frac{1}{4} + \frac{3}{4}} = 1,$ $\operatorname{tg}\varphi = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = -\sqrt{3} \implies \varphi = \frac{2\pi}{3} \implies z = \cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}$;

6) $z = -\frac{\sqrt{2}}{2} - i\frac{\sqrt{2}}{2} \implies a = -\frac{\sqrt{2}}{2},\ b = -\frac{\sqrt{2}}{2},\ r = \sqrt{\frac{2}{4} + \frac{2}{4}} = 1,$ $\operatorname{tg}\varphi = 1 \implies \varphi = \frac{5\pi}{4} \implies z = \cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4}$.