

**Zadatak 18.** Izračunaj:

$$1) \left( \cos \frac{\pi}{8} + i \sin \frac{\pi}{8} \right) \left( \cos \frac{\pi}{12} + i \sin \frac{\pi}{12} \right);$$

$$2) \sqrt{3} \left( \cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right) \cdot \sqrt{6} \left( \cos \frac{5\pi}{6} + i \sin \frac{5\pi}{6} \right);$$

$$3) \frac{\sqrt{3}}{2} \left( \cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right) \cdot \frac{\sqrt{3}}{3} \left( \cos \frac{5\pi}{4} + i \sin \frac{5\pi}{4} \right);$$

$$4) \sqrt{2} \left( \cos \frac{\pi}{2} + i \sin \frac{\pi}{2} \right) \cdot \sqrt{3} \left( \cos \pi + i \sin \pi \right);$$

$$5) \sqrt{2} \left( \cos \frac{11\pi}{4} + i \sin \frac{11\pi}{4} \right) \cdot \sqrt{8} \left( \cos \frac{3\pi}{8} + i \sin \frac{3\pi}{8} \right).$$

*Rješenje.*

$$1) \left( \cos \frac{\pi}{8} + i \sin \frac{\pi}{8} \right) \left( \cos \frac{\pi}{12} + i \sin \frac{\pi}{12} \right) = \cos \frac{\pi}{8} \cos \frac{\pi}{12} - \sin \frac{\pi}{8} \sin \frac{\pi}{12} + \left( \sin \frac{\pi}{8} \cos \frac{\pi}{12} + \cos \frac{\pi}{8} \sin \frac{\pi}{12} \right) i = \cos \left( \frac{\pi}{8} + \frac{\pi}{12} \right) + i \sin \left( \frac{\pi}{8} + \frac{\pi}{12} \right) = \cos \frac{5\pi}{24} + i \sin \frac{5\pi}{24};$$

$$2) \sqrt{3} \left( \cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right) \sqrt{6} \left( \cos \frac{5\pi}{6} + i \sin \frac{5\pi}{6} \right) = 3\sqrt{2} \left[ \left( \cos \frac{\pi}{3} \cos \frac{5\pi}{6} - \sin \frac{\pi}{3} \sin \frac{5\pi}{6} \right) + \left( \sin \frac{\pi}{3} \cos \frac{5\pi}{6} + \cos \frac{\pi}{3} \sin \frac{5\pi}{6} \right) i \right] = 3\sqrt{2} \left( \cos \left( \frac{\pi}{3} + \frac{5\pi}{6} \right) + i \sin \left( \frac{\pi}{3} + \frac{5\pi}{6} \right) \right) = 3\sqrt{2} \left( \cos \frac{7\pi}{6} + i \sin \frac{7\pi}{6} \right);$$

$$3) \frac{\sqrt{3}}{2} \left( \cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right) \frac{\sqrt{3}}{3} \left( \cos \frac{5\pi}{4} + i \sin \frac{5\pi}{4} \right) = \frac{1}{2} \left[ \left( \cos \frac{3\pi}{4} \cos \frac{5\pi}{4} - \sin \frac{3\pi}{4} \sin \frac{5\pi}{4} \right) + \left( \sin \frac{3\pi}{4} \cos \frac{5\pi}{4} + \sin \frac{5\pi}{4} \cos \frac{3\pi}{4} \right) i \right] = \frac{1}{2} \left( \cos \left( \frac{3\pi}{4} + \frac{5\pi}{4} \right) + i \sin \left( \frac{3\pi}{4} + \frac{5\pi}{4} \right) \right) = \frac{1}{2} \left( \cos 2\pi + i \sin 2\pi \right) = \frac{1}{2} \left( \cos 0 + i \sin 0 \right) = \frac{1}{2};$$

$$4) \sqrt{2} \left( \cos \frac{\pi}{2} + i \sin \frac{\pi}{2} \right) \sqrt{3} \left( \cos \pi + i \sin \pi \right) = \sqrt{6} \left( \cos \frac{3\pi}{2} + i \sin \frac{3\pi}{2} \right) = -i\sqrt{6};$$

$$5) \sqrt{2} \left( \cos \frac{11\pi}{4} + i \sin \frac{11\pi}{4} \right) \sqrt{8} \left( \cos \frac{3\pi}{8} + i \sin \frac{3\pi}{8} \right) = 4 \left( \cos \left( \frac{3\pi}{4} + \frac{3\pi}{8} \right) + i \sin \left( \frac{3\pi}{4} + \frac{3\pi}{8} \right) \right) = \sqrt{16} \left( \cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right) \left( \cos \frac{3\pi}{8} + i \sin \frac{3\pi}{8} \right) = 4 \left( \cos \frac{9\pi}{8} + i \sin \frac{9\pi}{8} \right).$$