

Zadatak 21. Odredi umnožak i kvocijent brojeva napisanih u trigonometrijskom obliku:

$$1) \quad z_1 = \sqrt{3} \left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right), \\ z_2 = \sqrt{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right);$$

$$2) \quad z_1 = 2 \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right), \\ z_2 = 3 \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right);$$

$$3) \quad z_1 = 3 \left(\cos \frac{\pi}{7} + i \sin \frac{\pi}{7} \right), \\ z_2 = 2 \left(\cos \frac{\pi}{21} + i \sin \frac{\pi}{21} \right).$$

Rješenje.

$$1) \quad z_1 = \sqrt{3} \left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right), \quad z_2 = \sqrt{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right), \\ z_1 \cdot z_2 = \sqrt{6} \left(\cos \left(\frac{\pi}{3} + \frac{\pi}{4} \right) + i \sin \left(\frac{\pi}{3} + \frac{\pi}{4} \right) \right) = \sqrt{6} \left(\cos \frac{7\pi}{12} + i \sin \frac{7\pi}{12} \right), \\ z_1 : z_2 = \frac{\sqrt{6}}{2} \left(\cos \left(\frac{\pi}{3} - \frac{\pi}{4} \right) + i \sin \left(\frac{\pi}{3} - \frac{\pi}{4} \right) \right) = \frac{\sqrt{6}}{2} \left(\cos \frac{\pi}{12} + i \sin \frac{\pi}{12} \right);$$

$$2) \quad z_1 = 2 \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right), \quad z_2 = 3 \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right), \\ z_1 \cdot z_2 = 6 \left(\cos \left(\frac{\pi}{4} + \frac{\pi}{4} \right) + i \sin \left(\frac{\pi}{4} + \frac{\pi}{4} \right) \right) = 6 \left(\cos \frac{\pi}{2} + i \sin \frac{\pi}{2} \right) = 6i, \\ z_1 : z_2 = \frac{2}{3};$$

$$3) \quad z_1 = 3 \left(\cos \frac{\pi}{7} + i \sin \frac{\pi}{7} \right), \quad z_2 = 2 \left(\cos \frac{\pi}{21} + i \sin \frac{\pi}{21} \right), \\ z_1 \cdot z_2 = 6 \left(\cos \left(\frac{\pi}{7} + \frac{\pi}{21} \right) + i \sin \left(\frac{\pi}{7} + \frac{\pi}{21} \right) \right) = 6 \left(\cos \frac{4\pi}{21} + i \sin \frac{4\pi}{21} \right), \\ z_1 : z_2 = \frac{3}{2} \left(\cos \left(\frac{\pi}{7} - \frac{\pi}{21} \right) + i \sin \left(\frac{\pi}{7} - \frac{\pi}{21} \right) \right) = \frac{3}{2} \left(\cos \frac{2\pi}{21} + i \sin \frac{2\pi}{21} \right).$$