

**Zadatak 22.**

Izračunaj:

$$1) \frac{\operatorname{tg} \frac{16\pi}{15} + \operatorname{tg} \frac{4\pi}{15}}{1 + \operatorname{tg} \frac{14\pi}{15} \cdot \operatorname{tg} \frac{34\pi}{15}};$$

$$2) \frac{\operatorname{tg} \frac{10\pi}{9} + \operatorname{tg} \frac{5\pi}{36}}{1 - \operatorname{tg} \frac{8\pi}{9} \cdot \operatorname{tg} \frac{31\pi}{36}};$$

$$3) \frac{\operatorname{tg} 65^\circ \cdot \operatorname{ctg} 35^\circ - 1}{\operatorname{ctg} 35^\circ + \operatorname{tg} 65^\circ};$$

$$4) \frac{\operatorname{ctg} \frac{4\pi}{3} \cdot \operatorname{ctg} \frac{7\pi}{6} + 1}{\operatorname{ctg} \frac{7\pi}{6} - \operatorname{ctg} \frac{4\pi}{3}}.$$

**Rješenje.**

$$1) \frac{\operatorname{tg} \frac{16\pi}{15} + \operatorname{tg} \frac{4\pi}{15}}{1 + \operatorname{tg} \frac{14\pi}{15} \cdot \operatorname{tg} \frac{34\pi}{15}} = \frac{\operatorname{tg} \frac{16\pi}{15} + \operatorname{tg} \frac{4\pi}{15}}{1 + \left(-\operatorname{tg}\left(2\pi - \frac{14\pi}{15}\right)\right) \cdot \operatorname{tg}\left(2\pi + \frac{4\pi}{15}\right)} = \frac{\operatorname{tg} \frac{16\pi}{15} + \operatorname{tg} \frac{4\pi}{15}}{1 - \operatorname{tg} \frac{16\pi}{15} \cdot \operatorname{tg} \frac{4\pi}{15}} =$$

$$\operatorname{tg}\left(\frac{16\pi}{15} + \frac{4\pi}{15}\right) = \operatorname{tg} \frac{20\pi}{15} = \operatorname{tg} \frac{4\pi}{3} = \sqrt{3};$$

$$2) \frac{\operatorname{tg} \frac{10\pi}{9} + \operatorname{tg} \frac{5\pi}{36}}{1 - \operatorname{tg} \frac{8\pi}{9} \cdot \operatorname{tg} \frac{31\pi}{36}} = \frac{\operatorname{tg} \frac{10\pi}{9} + \operatorname{tg} \frac{5\pi}{36}}{1 - \left(-\operatorname{tg}\left(2\pi - \frac{10\pi}{9}\right)\right) \cdot \left(-\operatorname{tg}\left(2\pi - \frac{5\pi}{36}\right)\right)} =$$

$$\frac{\operatorname{tg} \frac{10\pi}{9} + \operatorname{tg} \frac{5\pi}{36}}{1 - \operatorname{tg} \frac{10\pi}{9} \cdot \operatorname{tg} \frac{5\pi}{36}} = \operatorname{tg}\left(\frac{10\pi}{9} + \frac{5\pi}{36}\right) = \operatorname{tg} \frac{45\pi}{36} = \operatorname{tg} \frac{5\pi}{4} = 1;$$

$$3) \frac{\operatorname{tg} 65^\circ \cdot \operatorname{ctg} 35^\circ - 1}{\operatorname{ctg} 35^\circ + \operatorname{tg} 65^\circ} = \frac{\operatorname{tg} 65^\circ \cdot \frac{1}{\operatorname{tg} 35^\circ} - 1}{\frac{1}{\operatorname{tg} 35^\circ} + \operatorname{tg} 65^\circ} = \frac{\frac{\operatorname{tg} 65^\circ - \operatorname{tg} 35^\circ}{\operatorname{tg} 35^\circ}}{\frac{1 + \operatorname{tg} 65^\circ \cdot \operatorname{tg} 35^\circ}{\operatorname{tg} 35^\circ}} = \frac{\operatorname{tg} 65^\circ - \operatorname{tg} 35^\circ}{1 + \operatorname{tg} 65^\circ \cdot \operatorname{tg} 35^\circ} =$$

$$\operatorname{tg}(65^\circ - 35^\circ) = \operatorname{tg} 30^\circ = \frac{\sqrt{3}}{3};$$

$$4) \frac{\operatorname{ctg} \frac{4\pi}{3} \cdot \operatorname{ctg} \frac{7\pi}{6} + 1}{\operatorname{ctg} \frac{7\pi}{6} - \operatorname{ctg} \frac{4\pi}{3}} = \operatorname{ctg}\left(\frac{4\pi}{3} - \frac{7\pi}{6}\right) = \operatorname{ctg} \frac{\pi}{6} = \sqrt{3}.$$