Zadatak 5. Skrati razlomke:

1) $\dfrac{1-4\sin^2\alpha}{4\cos^2\alpha-3}$;

2) $\dfrac{1-4\cos^2\alpha}{\frac{1}{2}-\cos\alpha}$;

3) $\dfrac{4\cos^2\alpha-3}{\cos 2\alpha-\frac{1}{2}}$.

Rješenje. **1)**

$$\frac{1-4\sin^2\alpha}{4\cos^2\alpha-3}=\frac{4\left(\frac{1}{4}-\sin^2\alpha\right)}{4\left(\cos^2\alpha-\frac{3}{4}\right)}=\frac{\left(\frac{1}{2}-\sin\alpha\right)\left(\frac{1}{2}+\sin\alpha\right)}{\left(\cos\alpha-\frac{\sqrt{3}}{2}\right)\left(\cos\alpha+\frac{\sqrt{3}}{2}\right)}$$

$$=\frac{\left(\sin\frac{\pi}{6}-\sin\alpha\right)\left(\sin\frac{\pi}{6}+\sin\alpha\right)}{\left(\cos\alpha-\cos\frac{\pi}{6}\right)\left(\cos\alpha+\cos\frac{\pi}{6}\right)}$$

$$=\frac{2\cos\frac{\frac{\pi}{6}+\alpha}{2}\sin\frac{\frac{\pi}{6}-\alpha}{2}\cdot 2\sin\frac{\frac{\pi}{6}+\alpha}{2}\cos\frac{\frac{\pi}{6}-\alpha}{2}}{-2\sin\frac{\alpha+\frac{\pi}{6}}{2}\sin\frac{\alpha-\frac{\pi}{6}}{2}\cdot 2\cos\frac{\frac{\pi}{6}+\alpha}{2}\cos\frac{\alpha-\frac{\pi}{6}}{2}}$$

$$=\frac{-\sin\frac{\frac{\pi}{6}-\alpha}{2}}{\sin\frac{\alpha-\frac{\pi}{6}}{2}}=\frac{-\sin\frac{\frac{\pi}{6}-\alpha}{2}}{-\sin\frac{\frac{\pi}{6}-\alpha}{2}}=1$$

2)

$$\frac{1-4\cos^2\alpha}{\frac{1}{2}-\cos\alpha}=\frac{4\left(\frac{1}{4}-\cos^2\alpha\right)}{\frac{1}{2}-\cos\alpha}=\frac{4\left(\frac{1}{2}-\cos\alpha\right)\left(\frac{1}{2}+\cos\alpha\right)}{\frac{1}{2}-\cos\alpha}=4\left(\frac{1}{2}+\cos\alpha\right)$$

$$=4\left(\cos\frac{\pi}{3}+\cos\alpha\right)=4\cdot 2\cos\frac{\frac{\pi}{3}+\alpha}{2}\cos\frac{\frac{\pi}{3}-\alpha}{2}$$

$$=8\cos\left(\frac{\pi}{6}+\frac{\alpha}{2}\right)\cos\left(\frac{\pi}{6}-\frac{\alpha}{2}\right)=4\left(\cos\frac{\pi}{3}+\cos\alpha\right)$$

$$=4\left(\frac{1}{2}+\cos\alpha\right)=2(1+2\cos\alpha)$$

$2(1+2\cos\alpha)$;

3)

$$\frac{4\cos^2\alpha-3}{\cos 2\alpha-\frac{1}{2}}=\frac{4\cos^2\alpha-3}{\cos^2\alpha-\sin^2\alpha-\frac{1}{2}}=\frac{4\cos^2\alpha-3}{\cos^2\alpha-1+\cos^2\alpha-\frac{1}{2}}$$

$$=\frac{2\left(2\cos^2\alpha-\frac{3}{2}\right)}{2\cos^2\alpha-\frac{3}{2}}=2$$