Zadatak 29. Dokaži:

1) $\sin 3x = 3\sin x - 4\sin^3 x$;

2) $\cos 3x = 4\cos^3 x - 3\cos x$.

Rješenje. **1)**

$$\begin{aligned}
\sin 3x &= 3\sin x - 4\sin^3 x\\
\sin 2x\cos x + \cos 2x\sin x &= 3\sin x - 4\sin^3 x\\
2\sin x\cos^2 x + (\cos^2 x - \sin^2 x)\sin x &= 3\sin x - 4\sin^3 x\\
\sin x(2\cos^2 x + \cos^2 x - \sin^2 x) &= 3\sin x - 4\sin^3 x\\
\sin x(3\cos^2 x - \sin^2 x) &= 3\sin x - 4\sin^3 x\\
\sin x(3 - 3\sin^2 x - \sin^2 x) &= \sin x(3 - 4\sin^2 x)\\
\sin x(3 - 4\sin^2 x) &= \sin x(3 - 4\sin^2 x)
\end{aligned}$$

2)

$$\begin{aligned}
\cos 3x &= 4\cos^3 x - 3\cos x\\
\cos 2x\cos x - \sin 2x\sin x &= \cos x(4\cos^2 x - 3)\\
(\cos^2 x - \sin^2 x)\cos x - 2\sin^2 x\cos x &= \cos x(4\cos^2 x - 3)\\
(2\cos^2 x - 1)\cos x - 2(1 - \cos^2 x)\cos x &= \cos x(4\cos^2 x - 3)\\
\cos x(2\cos^2 x - 1 - 2 + 2\cos^2 x) &= \cos x(4\cos^2 x - 3)\\
\cos x(4\cos^2 x - 3) &= \cos x(4\cos^2 x - 3)
\end{aligned}$$