Rješenja zadataka 2.4

Zadatak 1. Pojednostavni:

1) $1-\cos^2 x$;
2) $\sin^2 x-1$;
3) $2\sin^2 x+\cos^2 x-2$;
4) $\sin^4 x-\cos^4 x+\cos^2 x$;
5) $2-\sin^2 x-\cos^2 x$;
6) $\operatorname{tg}^2 x-\sin^2 x=\operatorname{tg}^2 x\cdot\sin^2 x$;
7) $\operatorname{ctg}^2 x-\cos^2 x=\operatorname{ctg}^2 x\cdot\cos^2 x$;
8) $(1-\sin x)(1+\sin x)$;

Rješenje. **1)** $1-\cos^2 x=\sin^2 x+\cos^2 x-\sin^2 x=\cos^2 x$;
2) $\sin^2 x-1=-(1-\sin^2 x)=-\cos^2 x$;
3) $2\sin^2 x+\cos^2 x-2=\sin^2 x+\sin^2 x+\cos^2 x-2=\sin^2 x+1-2=\sin^2 x-1=-(1-\sin^2 x)=-\cos^2 x$;
4) $\sin^4 x-\cos^4 x+\cos^2 x=(\sin^2 x-\cos^2 x)\cdot(\underbrace{\sin^2 x+\cos^2 x}_{1})+\cos^2 x=$
$\sin^2 x-\cos^2 x+\cos^2 x=\sin^2 x$;
5) $2-\sin^2 x-\cos^2 x=2-(\underbrace{\sin^2 x+\cos^2 x}_{1})=2-1=1$;
6) $\operatorname{tg}^2 x-\sin^2 x=\dfrac{\sin^2 x}{\cos^2 x}-\sin^2 x=\dfrac{\sin^2 x-\sin^2 x\cdot\cos^2 x}{\cos^2 x}=\dfrac{\sin^2 x\cdot(1-\cos^2 x)}{\cos^2 x}=$
$\dfrac{\sin^2 x\cdot\sin^2 x}{\cos^2 x}=\operatorname{tg}^2 x\cdot\sin^2 x$;
7) $\operatorname{ctg}^2 x-\cos^2 x=\dfrac{\cos^2 x}{\sin^2 x}-\cos^2 x=\dfrac{\cos^2 x-\sin^2\cdot\cos^2 x}{\sin^2 x}=\dfrac{\cos^2 x\cdot(1-\sin^2 x)}{\sin^2 x}=$
$\dfrac{\cos^2 x\cdot\cos^2 x}{\sin^2 x}=\operatorname{ctg}^2 x\cdot\cos^2 x$;
8) $(1-\sin x)(1+\sin x)=1-\sin^2 x=\cos^2 x$;