PROBLEME UZUALE DE TRIGONOMETRIE

IX.63

Calculați:

1) $\sin 30° - \cos 45° + \sin 60° + \operatorname{tg} 40°$

2) $\sin \frac{7\pi}{4} + \cos \frac{4\pi}{3} + \sin \frac{5\pi}{6} + \cos \frac{\pi}{12}$

3) $\sin(-165°) + \cos 30° - \operatorname{ctg}(-120°)$

4) $\cos(-105°) + \sin(-135°) + \operatorname{tg} 225° + \operatorname{ctg} 60°$

5) $\cos\left(\frac{2145\pi}{3}\right) + \operatorname{tg}\left(\frac{2291\pi}{3}\right)$

6) $\sin\left(\frac{2174\pi}{6}\right) - \operatorname{ctg}\left(\frac{4314\pi}{6}\right)$

7) $\cos\frac{114\pi}{12} - \operatorname{tg}\left(-\frac{\pi}{12}\right) + \sin\frac{54\pi}{6} - \cos\left(-\frac{74\pi}{6}\right)$

8) $\cos 165° + \sin 135° + \operatorname{tg} 225° + \operatorname{ctg} 120°$

9) $\sin 120° + \cos 135° + \operatorname{tg} 210° + \operatorname{ctg} 30°$

10) $\sin\left(\frac{4184\pi}{3}\right) - \cos\left(-\frac{2474\pi}{6}\right) + \operatorname{tg}\left(\frac{8151\pi}{6}\right)$

Prof. Ovidiu Bădescu

Calculați:

$$\cos\frac{214\pi}{3}+\operatorname{tg}\frac{229\pi}{3}$$

E1) folosim $\cos(x+2k\pi)=\cos x$,

$\operatorname{tg}(x+k\pi)=\operatorname{tg}x$

E2) $214 \mid 3$, $21 \quad 71$, $=4$, 3, 1 $\Rightarrow \frac{214\pi}{3}=71\pi+\frac{\pi}{3}$

$$\Rightarrow \cos\frac{214\pi}{3}=\cos\left(71\pi+\frac{\pi}{3}\right)=\cos\left(70\pi+\pi+\frac{\pi}{3}\right)=$$

perioad $\cos\left(\pi+\frac{\pi}{3}\right)=\cos\pi\cos\frac{\pi}{3}-\sin\pi\sin\frac{\pi}{3}=$

$$=-1\cdot\frac{1}{2}-0\cdot\frac{\sqrt{3}}{2}=-\frac{1}{2}$$

E3) $229 \mid 3$, $21 \quad 76$, $=19$, 18, $=1$ $\Rightarrow \frac{229\pi}{3}=76\pi+\frac{\pi}{3}$

$$\Rightarrow \operatorname{tg}\frac{229\pi}{3}=\operatorname{tg}\left(76\pi+\frac{\pi}{3}\right)=\operatorname{tg}\frac{\pi}{3}=\sqrt{3}$$

E4) $\cos\frac{214\pi}{3}+\operatorname{tg}\frac{229\pi}{3}=-\frac{1}{2}+\sqrt{3}$

Prof. Ovidiu Badescu

Calculați:

$$\sin\frac{418\pi}{3} - \cos\left(-\frac{247\pi}{6}\right) + \operatorname{tg}\left(\frac{815\pi}{6}\right)$$

E1) $\sin\frac{418\pi}{3} = ?$

$418 \mid 3$, 3, 11, 9, $=28$, 27, $=1$ $\quad\Rightarrow \frac{418\pi}{3} = 139\pi + \frac{\pi}{3}$

$$\Rightarrow \sin\frac{418\pi}{3} = \sin\left(139\pi + \frac{\pi}{3}\right) = \sin\left(138\pi + \pi + \frac{\pi}{3}\right)$$

sin periodică $\quad \sin\left(\pi + \frac{\pi}{3}\right) =$

$$= \underbrace{\sin\pi}_{0}\cos\frac{\pi}{3} + \underbrace{\cos\pi}_{-1}\sin\frac{\pi}{3} = 0\cdot\frac{1}{2} - 1\cdot\frac{\sqrt{3}}{2} = -\frac{\sqrt{3}}{2}$$

E2) $\cos\left(-\frac{247\pi}{6}\right)$ cos pară $\cos\frac{247\pi}{6}$

$247 \mid 6$, 24, $=7$, 6, 1 $\quad\Rightarrow \frac{247\pi}{6} = 41\pi + \frac{\pi}{6}$

$$\Rightarrow \cos\frac{247\pi}{6} = \cos\left(41\pi + \frac{\pi}{6}\right) = \cos\left(40\pi + \pi + \frac{\pi}{6}\right) =$$

cos perioadă $\quad \cos\left(\pi + \frac{\pi}{6}\right) = \underbrace{\cos\pi}_{-1}\cos\frac{\pi}{6} - \underbrace{\sin\pi}_{0}\sin\frac{\pi}{6} = -\frac{\sqrt{3}}{2}$

E3) $\operatorname{tg}\frac{815\pi}{6} = ?,$ $\quad 815 \mid 6$, 6, 21, 18, $=35$, 30, 5 $\quad\Rightarrow \frac{815\pi}{6} = 135\pi + \frac{5\pi}{6}$

$$\Rightarrow \operatorname{tg}\left(135\pi + \frac{5\pi}{6}\right) \quad \text{tg periodică} \quad \operatorname{tg}\frac{5\pi}{6} = \operatorname{tg}150^\circ = \operatorname{tg}(180^\circ - 30^\circ) =$$

$$= \frac{\operatorname{tg}180^\circ - \operatorname{tg}30^\circ}{1 + \operatorname{tg}180^\circ\cdot\operatorname{tg}30^\circ} = \frac{0 - \frac{1}{\sqrt{3}}}{1+0} = -\frac{1}{\sqrt{3}}$$

E3) $N = -\frac{\sqrt{3}}{2} - \left(-\frac{\sqrt{3}}{2}\right) + \left(-\frac{1}{\sqrt{3}}\right) \Rightarrow N = -\frac{1}{\sqrt{3}}$

Prof. Ovidiu Bănescu