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8-Mavzu: Ikkilangan argumentning trigonometrik funksiyalari

- $cos(\alpha+\beta)=cos\alpha cos\beta-sin\alpha sin\beta$
- $sin(\alpha+\beta)=sin\alpha cos\beta+cos\alpha sin\beta$ da $\alpha=\beta\rightarrow$
- $cos2\alpha=cos^2\alpha-sin^2\alpha$ (1)
- $sin2\alpha=2sin\alpha cos\alpha$ (2)
- $cos2\alpha=2cos^2\alpha-1$
- $sin2\alpha=1-2sin^2\alpha$ agar $cos2\alpha$ ma`lum bo`lsa
- $sin^2\alpha=\frac{1-cos2\alpha}{2}$ (3)
- $cos^2\alpha=\frac{1+cos2\alpha}{2}$ (4)
- $tg2\alpha=\frac{2tg\alpha}{1-tg^2\alpha}$ (5) bunda yig`indining tangensi formulasida $\alpha=\beta$ deb olingan, $\alpha\neq\frac{\pi}{4}+\frac{\pi}{2}k$ va $\alpha\neq\frac{\pi}{2}+\pi n, k,n\ni Z$

Misollar

Hisoblang: $2sin15cos15$

Yechish: $2sin15cos15 = \sin(2 * 15°) = sin30° = \frac{1}{2}$

Hisoblang: $1 - 2sin^2 \frac{\pi}{12}$

Yechish: $1 - 2sin^2 \frac{\pi}{12} = cos\left(2 * \frac{\pi}{12}\right) = cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$

Agar $tg\alpha = 0,6$ **bo`lsa,** $tg2\alpha$ **ni hisoblang:**

Yechish: $tg2\alpha = \frac{2tg\alpha}{1-tg^2\alpha} = \frac{2*0,6}{1-0,6^2} = \frac{1,20}{0,64} = \frac{120}{64} = \frac{30}{16} = \frac{15}{8}$

Yarim burchak argumentining trigonometrik funksiyalari

(3) va (4) formulalarida α ni $\frac{\alpha}{2}$ ga almashtirsak,

$sin^2\alpha\frac{\alpha}{2}=\frac{1-cos\alpha}{2}, cos^2\alpha\frac{\alpha}{2}=\frac{1+cos\alpha}{2}$ bundan esa,

$$sin\frac{\alpha}{2}=\pm\sqrt{\frac{1-cos\alpha}{2}}, cos\frac{\alpha}{2}=\pm\sqrt{\frac{1+cos\alpha}{2}}, tg\frac{\alpha}{2}=\pm\sqrt{\frac{1-cos\alpha}{1+cos\alpha}}$$

(+) yoki (-) ishora $\frac{\alpha}{2}$ qaysi chorakdaligiga qaraladi.

Misollar

Hisoblang: $sin15°$

Yechish: $sin15° = \sqrt{\frac{1-cos30°}{2}} = \sqrt{\frac{1-\frac{\sqrt{3}}{2}}{2}} = \frac{1}{2}\sqrt{2-\sqrt{3}}$

Hisoblang: $tg112°30`$

Yechish: $tg112°30` = -\sqrt{\frac{1-cos225°}{1+cos225°}} = -\sqrt{\frac{1+cos45°}{1-cos45°}} = \sqrt{\frac{2+\sqrt{2}}{2-\sqrt{2}}} =$

$-\sqrt{3+2\sqrt{2}} = -1-\sqrt{2}$