

Математика ЕГЭ

Тригонометрические вычисления и простейшие преобразования

Упражнение 1. Вычислить :

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| 1) $\cos \frac{\pi}{3} + \sin \frac{\pi}{6}$; | 11) $\cos \frac{\pi}{6} \cdot \sin \left(-\frac{\pi}{3}\right) + \operatorname{tg} \left(-\frac{\pi}{4}\right)$; | 22) $2 \cos \left(-\frac{\pi}{6}\right) \cdot \sin \left(-\frac{\pi}{6}\right) + \operatorname{tg} \left(-\frac{\pi}{3}\right) + \sin^2 \left(-\frac{\pi}{4}\right)$; |
| 2) $\cos \left(-\frac{\pi}{6}\right) \cdot \sin \frac{\pi}{3}$; | 12) $2 \sin \left(-\frac{\pi}{6}\right) \cdot \cos \frac{5\pi}{6} + \operatorname{tg} \left(-\frac{\pi}{3}\right)$; | 23) $\sin \left(-\frac{\pi}{4}\right) \cdot \cos \left(-\frac{\pi}{4}\right) - \sin \left(-\frac{\pi}{3}\right) \cdot \cos \left(-\frac{\pi}{6}\right)$; |
| 3) $\sqrt{2} \sin \frac{7\pi}{4} + 1$; | 13) $7 \sin(-\pi) \cdot \cos \frac{5\pi}{8}$; | 24) $\left(\operatorname{tg} \frac{\pi}{4} - \operatorname{ctg} \frac{\pi}{3}\right) \left(\operatorname{ctg} \frac{\pi}{4} + \operatorname{tg} \frac{\pi}{6}\right)$; |
| 4) $\operatorname{tg} \frac{\pi}{4} \cdot \operatorname{tg} \frac{7\pi}{4}$; | 14) $6\sqrt{6} \cos \frac{7\pi}{6} \cdot \sin \frac{3\pi}{4}$; | 25) $\sqrt{3} \sin \left(-\frac{\pi}{3}\right) - 2 \operatorname{ctg} \left(-\frac{\pi}{4}\right) + 4 \cos \left(-\frac{3\pi}{2}\right)$. |
| 5) $2 \cos^2 \frac{\pi}{6}$; | 15) $-8 \operatorname{tg} \frac{7\pi}{3} \cdot \operatorname{tg} \frac{11\pi}{6}$; | |
| 6) $9 \operatorname{tg}^2 \frac{\pi}{3} \cdot \operatorname{ctg} \frac{3\pi}{4}$; | 16) $\sqrt{12} \operatorname{ctg}(-300^\circ)$; | |
| 7) $\frac{1}{3} \operatorname{tg}^2 \frac{\pi}{3} + \frac{2}{3} \operatorname{tg}^2 \frac{\pi}{6}$; | 17) $4 \cos 360^\circ + \sin(-330^\circ)$; | |
| 8) $\cos \frac{2\pi}{3} + \sin \left(-\frac{13\pi}{6}\right)$; | 18) $\sqrt{3} \cos 240^\circ \cdot \sin 120^\circ$; | |
| 9) $\sqrt{3} \cos \frac{11\pi}{6} \cdot \sin \frac{11\pi}{6}$; | 19) $\operatorname{tg} 720^\circ + 7 \sin 45^\circ \cdot \cos 315^\circ$; | |
| 10) $2 \cos \frac{\pi}{6} \cdot \sin \frac{\pi}{6}$; | 20) $7,5 \operatorname{tg}(-\pi) + \frac{1}{8} \cos \frac{3\pi}{2}$; | |
| | 21) $6\sqrt{3} \cos(-390^\circ) \cdot \sin(-2\pi)$; | |

Упражнение 2. Упростить выражение :

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| 1) $\cos \alpha \cdot \operatorname{tg} \alpha - \sin \alpha$; | 11) $\frac{\sin^2 \alpha}{1 - \cos \alpha}$; | 21) $\frac{1}{1 - \cos \alpha} - \frac{1}{1 + \cos \alpha} - 2 \sin \alpha \cdot \operatorname{ctg}^2 \alpha$; |
| 2) $\cos \alpha - \sin \alpha \cdot \operatorname{ctg} \alpha$; | 12) $\frac{\cos^2 \alpha}{1 - \sin \alpha}$; | 22) $\frac{1}{1 - \sin \alpha} + \frac{1}{1 + \sin \alpha} - 2 \cos \alpha \cdot \operatorname{tg}^2 \alpha$. |
| 3) $1 - \sin^2 \alpha (1 + \operatorname{ctg}^2 \alpha)$; | 13) $\frac{1}{\cos^2 \alpha} - 1$; | |
| 4) $(1 - \cos \alpha)(1 + \cos \alpha)$; | 14) $1 + \operatorname{tg}^2 \alpha + \frac{1}{\sin^2 \alpha}$; | |
| 5) $(1 - \sin \alpha)(1 + \sin \alpha)$; | 15) $\frac{1 + \operatorname{ctg}^2 \alpha}{1 + \operatorname{tg}^2 \alpha}$; | |
| 6) $(1 - \sin^2 \alpha) \operatorname{tg}^2 \alpha$; | 16) $\frac{1}{1 + \operatorname{tg}^2 \alpha} + \frac{1}{1 + \operatorname{ctg}^2 \alpha}$; | |
| 7) $(1 - \cos^2 \alpha) \operatorname{ctg}^2 \alpha$; | 17) $\frac{1}{\cos^2 \alpha} + \frac{1}{\sin^2 \alpha}$; | |
| 8) $(1 + \operatorname{tg}^2 \alpha) \cos^2 \alpha - 1$; | 18) $\frac{1}{\sin^2 \alpha} - \frac{1}{\operatorname{tg}^2 \alpha}$; | |
| 9) $\operatorname{tg} \alpha \operatorname{ctg} \alpha - 1$; | 19) $\frac{1}{\cos^2 \alpha} - \frac{1}{\operatorname{ctg}^2 \alpha}$; | |
| 10) $\operatorname{tg}^2 \alpha + 1$; | 20) $1 + \operatorname{ctg}^2 \alpha + \frac{1}{\cos^2 \alpha}$; | |