

Преобразование тригонометрических выражений

**(вывод тригонометрических
формул)**

I-b. Формулы приведения

| α | $\pi / 2 - \alpha$ | $\pi / 2 + \alpha$ | $\pi - \alpha$ | $\pi + \alpha$ | $3\pi / 2 - \alpha$ | $3\pi / 2 + \alpha$ | $2\pi - \alpha$ | $2\pi + \alpha$ |
|------------|----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|
| sin | $\cos\alpha$ | $\cos\alpha$ | $\sin\alpha$ | $-\sin\alpha$ | $-\cos\alpha$ | $-\cos\alpha$ | $-\sin\alpha$ | $\sin\alpha$ |
| cos | $-\sin\alpha$ | $-\sin\alpha$ | $-\cos\alpha$ | $-\cos\alpha$ | $\sin\alpha$ | $\sin\alpha$ | $\cos\alpha$ | $\cos\alpha$ |
| tg | $\operatorname{ctg}\alpha$ | $-\operatorname{ctg}\alpha$ | $-\operatorname{tg}\alpha$ | $\operatorname{tg}\alpha$ | $\operatorname{ctg}\alpha$ | $-\operatorname{ctg}\alpha$ | $-\operatorname{tg}\alpha$ | $\operatorname{tg}\alpha$ |
| ctg | $\operatorname{tg}\alpha$ | $-\operatorname{tg}\alpha$ | $-\operatorname{ctg}\alpha$ | $\operatorname{ctg}\alpha$ | $\operatorname{tg}\alpha$ | $-\operatorname{tg}\alpha$ | $-\operatorname{ctg}\alpha$ | $\operatorname{ctg}\alpha$ |

$$1) \operatorname{tg} \frac{5\pi}{4} = \operatorname{tg} \left(\pi + \frac{\pi}{4} \right) = \operatorname{tg} \frac{\pi}{4} = 1; \quad 2) \sin \frac{7\pi}{6} = \sin \left(\pi + \frac{\pi}{6} \right) = -\sin \frac{\pi}{6} = -\frac{1}{2};$$

$$3) \cos \frac{5\pi}{3} = \cos \left(2\pi - \frac{\pi}{3} \right) = \cos \frac{\pi}{3} = \frac{1}{2}; \quad 4) \operatorname{ctg} \frac{5\pi}{3} = \operatorname{ctg} \left(2\pi - \frac{\pi}{3} \right) = -\operatorname{ctg} \frac{\pi}{3} = -\frac{1}{\sqrt{3}};$$

$$5) \sin \left(-\frac{13\pi}{6} \right) = \sin \left(-2\pi - \frac{\pi}{6} \right) = -\sin \frac{\pi}{6} = -\frac{1}{2};$$

$$6) \cos \left(-\frac{7\pi}{3} \right) = \cos \left(-2\pi - \frac{\pi}{3} \right) = \cos \frac{\pi}{3} = \frac{1}{2};$$

$$7) \operatorname{tg} \left(-\frac{2\pi}{3} \right) = \operatorname{tg} \left(-\pi + \frac{\pi}{3} \right) = \operatorname{tg} \frac{\pi}{3} = \sqrt{3};$$

$$8) \operatorname{ctg} \left(-\frac{7\pi}{4} \right) = \operatorname{ctg} \left(-2\pi + \frac{\pi}{4} \right) = \operatorname{ctg} \frac{\pi}{4} = 1.$$

Практические примеры:

$$\sin 150^\circ = \sin(180^\circ - 30^\circ) = \sin 30^\circ = 0,5$$

$$\sin 300^\circ = \sin(270^\circ + 30^\circ) = -\cos 30^\circ = -\frac{\sqrt{3}}{2}$$

$$\cos 225^\circ = \cos(180^\circ + 45^\circ) = -\cos 45^\circ = -\frac{\sqrt{2}}{2}$$

$$\operatorname{tg} 315^\circ = \operatorname{tg}(270^\circ + 45^\circ) = -\operatorname{ctg} 45^\circ = -1$$

$$\operatorname{ctg} 330^\circ = \operatorname{ctg}(360^\circ - 30^\circ) = -\operatorname{ctg} 30^\circ = -\sqrt{3}$$

Домашнее задание на тему «Формулы приведения»

Упростить с помощью формул приведения:

$$1) \sin\left(\frac{\pi}{2} + \alpha\right) =$$

$$2) \cos(\pi - \alpha) =$$

$$3) \operatorname{tg}\left(\frac{3\pi}{2} + \alpha\right) =$$

$$4) \operatorname{ctg}(2\pi + \alpha) =$$

$$5) \sin(\pi + \alpha) =$$

$$6) \cos\left(\frac{3\pi}{2} + \alpha\right) =$$

$$7) \operatorname{tg}(2\pi - \alpha) =$$

$$8) \operatorname{ctg}\left(\frac{\pi}{2} - \alpha\right) =$$

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Вычислите: $2\cos(2\pi + t) + \sin\left(\frac{\pi}{2} + t\right) :$

$$\sin^2(\pi + t) + \cos^2(\pi - t) :$$