Алгебра 11 класс

ТРИГОНОМЕТРИЯ

- $\sin x = a/c$
- $\cos x = b/c$
- $\mathrm{tg}\, x = a/b = \sin x / \cos x$
- $\mathrm{ctg}\, x = b/a = \cos x / \sin x$
- $\sin(\pi - \alpha) = \sin \alpha$
- $\sin(\pi/2 - \alpha) = \cos \alpha$

- $\cos(\pi/2 - \alpha) = \sin\alpha$
- $\cos(\alpha + 2\pi k) = \cos\alpha$
- $\sin(\alpha + 2\pi k) = \sin\alpha$
- $\mathrm{tg}(\alpha + \pi k) = \mathrm{tg}\,\alpha$
- $\mathrm{ctg}(\alpha + \pi k) = \mathrm{ctg}\,\alpha$
- $\sin^2\alpha + \cos^2\alpha = 1$

- $tg\,\alpha = \cos\alpha \,/\, \sin\alpha\,,\ \alpha \neq \pi n,\ n \in Z$
- $tg\alpha \cdot ctg\alpha = 1,\ \alpha \neq (\pi n)/2,\ n \in Z$
- $1 + tg^2\alpha = 1/\cos^2\alpha\,,\ \alpha \neq \pi\,(2n+1)/2$
- $1 + ctg^2\alpha = 1/\sin^2\alpha\,,\ \alpha \neq \pi n$

Формулы сложения:

- $\sin(x+y) = \sin x \cos y + \cos x \sin y$
- $\sin(x-y) = \sin x \cos y - \cos x \sin y$
- $\cos(x+y) = \cos x \cos y - \sin x \sin y$
- $\cos(x-y) = \cos x \cos y + \sin x \sin y$
- $\mathrm{tg}(x+y) = (\mathrm{tg}\, x + \mathrm{tg}\, y)/(1-\mathrm{tg}\, x\, \mathrm{tg}\, y)$

- $x, y, \quad x + y \neq \pi/2 + \pi n$
- $tg(x-y) = (tg\, x - tg\, y)/\,(1+tg\, x\, tg\, y)$
- $x, y, \quad x - y \neq \pi/2 + \pi n$

Формулы двойного аргумента.

- $\sin 2\alpha = 2\sin \alpha \cos \alpha$
- $\cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha = 2\cos^2 \alpha - 1 =$

$= 1 - 2\sin^2 \alpha$

- $\mathrm{tg}\, 2\alpha = (2\,\mathrm{tg}\alpha)/(1 - \mathrm{tg}^2 \alpha)$
- $1 + \cos \alpha = 2\cos^2 \alpha/2$
- $1 - \cos\alpha = 2\sin^2 \alpha/2$
- $\mathrm{tg}\alpha = (2\,\mathrm{tg}\,(\alpha/2))/(1 - \mathrm{tg}^2\,(\alpha/2))$

Ф-лы половинного аргумента.

- $\sin^2 \alpha/2 = (1 - \cos \alpha)/2$
- $\cos^2\alpha/2 = (1 + \cos\alpha)/2$
- $\mathrm{tg}\, \alpha/2 = \sin\alpha/(1 + \cos\alpha) = (1-\cos \alpha)/\sin \alpha$
- $\alpha \neq \pi + 2\pi n,\ n \in Z$

Ф-лы преобразования суммы в произв.

- $\sin x + \sin y = 2 \sin((x+y)/2) \cos((x-y)/2)$
- $\sin x - \sin y = 2 \cos((x+y)/2) \sin((x-y)/2)$
- $\cos x + \cos y = 2\cos (x+y)/2 \cos (x-y)/2$
- $\cos x - \cos y = -2\sin (x+y)/2 \sin (x-y)/2$

$$\operatorname{tg} x + \operatorname{tg} y = \frac{\sin(x+y)}{\cos x \cos y}$$

$$\operatorname{tg} x - \operatorname{tg} y = \frac{\sin(x-y)}{\cos x \cos y}$$

Формулы преобр. произв. в сумму

$$\sin x \sin y = \tfrac{1}{2}(\cos(x-y) - \cos(x+y))$$

$$\cos x \cos y = \tfrac{1}{2}(\cos(x-y) + \cos(x+y))$$

$$\sin x \cos y = \tfrac{1}{2}(\sin(x-y) + \sin(x+y))$$

Соотнош. между ф-ями

$$\sin x = \frac{2\ \mathrm{tg}\ x/2}{1 + \mathrm{tg}^2\ x/2}$$

$$\cos x = \frac{1 - \mathrm{tg}\ 2/x}{1 + \mathrm{tg}^2\ x/2}$$

<u>Тригонометрические уравнения</u>

<u>$\sin x = m$</u> ; $|m| <= 1$

<u>$x = (-1)^n \arcsin m + \pi k$</u>, $k \in Z$

$\sin x = 1$ $\quad\quad$ $\sin x = 0$

$x = \pi/2 + 2\pi k$ $\quad\quad$ $x = \pi k$

$\sin x = -1$

$x = -\pi/2 + 2\pi k$

<u>$\cos x = m$</u>; $|m| <= 1$

<u>$x = \pm \arccos m + 2\pi k$</u>

$\cos x = 1$ $\quad\quad$ $\cos x = 0$

$x = 2\pi k$ $\quad\quad$ $x = \pi/2 + \pi k$

$\cos x = -1$

$x = \pi + 2\pi k$

$\underline{\mathrm{tg}\, x = m}$

$x = \mathrm{arctg}\, m + \pi k$

$\underline{\mathrm{ctg}\, x = m}$

$x = \mathrm{arcctg}\, m + \pi k$

$\sin x/2 = 2t/(1+t^2)$; t - tg

$\cos x/2 = (1-t^2)/(1+t^2)$