Основные формулы тригонометрии

1. $\cos^2\alpha+\sin^2\alpha=1$

2. $tg\alpha=\dfrac{\sin\alpha}{\cos\alpha}$

3. $ctg\alpha=\dfrac{\cos\alpha}{\sin\alpha}$

4. $tg\alpha\cdot ctg\alpha=1$

5. $tg\alpha=\dfrac{1}{ctg\alpha}$

6. $ctg\alpha=\dfrac{1}{tg\alpha}$

7. $1+tg^2\alpha=\dfrac{1}{\cos^2\alpha}$

8. $1+ctg^2\alpha=\dfrac{1}{\sin^2\alpha}$

9. $\sin(\alpha+\beta)=\sin\alpha\cdot\cos\beta+\cos\alpha\cdot\sin\beta$

10. $\sin(\alpha-\beta)=\sin\alpha\cdot\cos\beta-\cos\alpha\cdot\sin\beta$

11. $\cos(\alpha+\beta)=\cos\alpha\cdot\cos\beta-\sin\alpha\cdot\sin\beta$

12. $\cos(\alpha-\beta)=\cos\alpha\cdot\cos\beta+\sin\alpha\cdot\sin\beta$

13. $tg(\alpha+\beta)=\dfrac{tg\alpha+tg\beta}{1-tg\alpha\cdot tg\beta}$

14. $tg(\alpha-\beta)=\dfrac{tg\alpha-tg\beta}{1+tg\alpha\cdot tg\beta}$

15. $ctg(\alpha+\beta)=\dfrac{ctg\alpha\cdot ctg\beta-1}{ctg\beta+ctg\alpha}$

16. $ctg(\alpha-\beta)=\dfrac{ctg\alpha\cdot ctg\beta+1}{ctg\beta-ctg\alpha}$

17. $\sin2\alpha=2\sin\alpha\cdot\cos\alpha$

18. $\cos2\alpha=\cos^2\alpha-\sin^2\alpha$

19. $\cos2\alpha=2\cos^2\alpha-1$

20. $\cos2\alpha=1-2\sin^2\alpha$

21. $tg2\alpha=\dfrac{2tg\alpha}{1-tg^2\alpha}$

22. $ctg2\alpha=\dfrac{ctg^2\alpha-1}{2ctg\alpha}$

23. $\left|\sin\dfrac{\alpha}{2}\right|=\sqrt{\dfrac{1-\cos\alpha}{2}}$

24. $\left|\cos\dfrac{\alpha}{2}\right|=\sqrt{\dfrac{1+\cos\alpha}{2}}$

25. $tg\dfrac{\alpha}{2}=\dfrac{\sin\alpha}{1+\cos\alpha}=\dfrac{1-\cos\alpha}{\sin\alpha}$

26. $ctg\dfrac{\alpha}{2}=\dfrac{\sin\alpha}{1-\cos\alpha}=\dfrac{1+\cos\alpha}{\sin\alpha}$

27. $\sin\alpha+\sin\beta=2\sin\dfrac{\alpha+\beta}{2}\cdot\cos\dfrac{\alpha-\beta}{2}$

28. $\sin\alpha-\sin\beta=2\sin\dfrac{\alpha-\beta}{2}\cdot\cos\dfrac{\alpha+\beta}{2}$

29. $\cos\alpha+\cos\beta=2\cos\dfrac{\alpha+\beta}{2}\cdot\cos\dfrac{\alpha-\beta}{2}$

30. $\cos\alpha-\cos\beta=-2\sin\dfrac{\alpha+\beta}{2}\cdot\sin\dfrac{\alpha-\beta}{2}$

31. $tg\alpha+tg\beta=\dfrac{\sin(\alpha+\beta)}{\cos\alpha\cdot\cos\beta}$

32. $tg\alpha-tg\beta=\dfrac{\sin(\alpha-\beta)}{\cos\alpha\cdot\cos\beta}$

33. $\sin^2\alpha=\dfrac{1}{2}(1-\cos2\alpha)$

34. $\cos^2\alpha=\dfrac{1}{2}(1+\cos2\alpha)$

35. $\sin\alpha\cdot\cos\alpha=\dfrac{1}{2}\sin2\alpha$

36. $(\sin\alpha+\cos\alpha)^2=1+\sin2\alpha$

37. $\sin\alpha\cdot\cos\beta=\dfrac{1}{2}(\sin(\alpha+\beta)+\sin(\alpha-\beta))$

38. $\cos\alpha\cdot\cos\beta=\dfrac{1}{2}(\cos(\alpha+\beta)+\cos(\alpha-\beta))$

39. $\sin\alpha\cdot\sin\beta=\dfrac{1}{2}(\cos(\alpha-\beta)-\cos(\alpha+\beta))$

40. $\sin x=a;\ |a|\le1$
$x=(-1)^n\,arcsin\,a+\pi n,\ n\in Z$

41. $\cos x=a;\ |a|\le1$
$x=\pm arccos\,a+2\pi n,\ n\in Z$

42. $tg\ x=a$
$x=arctg\ a+\pi n,\ n\in Z$

43. $ctg\ x=a$
$x=arcctg\ a+\pi n,\ n\in Z$

44. $\sin x=0$
$x=\pi n,\ n\in Z$

45. $\cos x=0$
$x=\dfrac{\pi}{2}+\pi n,\ n\in Z$

46. $\sin x=1$
$x=\dfrac{\pi}{2}+2\pi n,\ n\in Z$

47. $\cos x=1$
$x=2\pi n,\ n\in Z$

48. $\sin x=-1$
$x=-\dfrac{\pi}{2}+2\pi n,\ n\in Z$

49. $\cos x=-1$
$x=\pi+2\pi n,\ n\in Z$

50. $\cos(-x)=\cos x$ $\qquad tg(-x)=-tg\ x$
$\sin(-x)=-\sin x$ $\qquad ctg(-x)=-ctg\ x$