

1. $\cos \alpha + \cos 2\alpha + \cos 6\alpha + \cos 7\alpha = 4 \cdot \cos \frac{\alpha}{2} \cdot \cos \frac{5\alpha}{2} \cdot \cos 4\alpha.$
2. $\sin 9\alpha + \sin 10\alpha + \sin 11\alpha + \sin 12\alpha = 4 \cdot \cos \frac{\alpha}{2} \cdot \sin \frac{21\alpha}{2} \cdot \cos \alpha.$
3. $\cos \alpha + \sin \alpha + \cos 3\alpha + \sin 3\alpha = 2\sqrt{2} \cdot \cos \alpha \cdot \sin\left(\frac{\pi}{4} + 2\alpha\right).$
4. $\frac{\sin 2\alpha - \sin 3\alpha + \sin 4\alpha}{\cos 2\alpha - \cos 3\alpha + \cos 4\alpha} = \operatorname{tg} 3\alpha.$
5. $\frac{\cos\left(\frac{5\pi}{2} - 6\alpha\right) + \sin(\pi + 4\alpha) + \sin(3\pi - \alpha)}{\sin\left(\frac{5\pi}{2} + 6\alpha\right) + \cos(-2\pi + 4\alpha) + \cos(2\pi + \alpha)} = \operatorname{tg} \alpha.$
6. $(\cos \alpha - \cos \beta)^2 + (\sin \alpha - \sin \beta)^2 = 4 \cdot \sin^2 \frac{\alpha - \beta}{2}.$
7. $\sin \alpha + \sin\left(\alpha + \frac{14\pi}{3}\right) + \sin\left(\alpha - \frac{8\pi}{3}\right) = 0.$
8. $\frac{\sin 2\alpha + \sin 5\alpha - \sin 3\alpha}{\cos \alpha + 1 - 2\sin^2 2\alpha} = 2 \sin \alpha.$
9. $\sin^6 \alpha + \cos^6 \alpha + 3 \sin^2 \alpha \cdot \cos^2 \alpha = 1.$
10. $\sin^2 \alpha - \sin^2 \beta = \sin(\alpha + \beta) \cdot \sin(\alpha - \beta).$
11. $\cos 4\alpha - \sin 4\alpha \cdot \operatorname{ctg} 2\alpha = \cos 2\alpha - 2 \cos^2 \alpha.$
12. $1 - \frac{1}{4} \cdot \sin^2 2\alpha + \cos 2\alpha = \cos^2 \alpha + \cos^4 \alpha.$
13. $\operatorname{tg} \alpha + \operatorname{ctg} \alpha + \operatorname{tg} 3\alpha + \operatorname{ctg} 3\alpha = 8 \frac{\cos^2 2\alpha}{\sin 6\alpha}.$
14. $\cos 4\alpha \cdot \operatorname{tg} 2\alpha - \sin 4\alpha = 2 \frac{\operatorname{tg} \alpha}{\operatorname{tg}^2 \alpha - 1}.$
15. $\sin^2\left(\frac{15\pi}{8} - 2\alpha\right) - \cos^2\left(\frac{17\pi}{8} - 2\alpha\right) = -\frac{\cos 4\alpha}{\sqrt{2}}.$
16. $(\cos \alpha - \cos \beta)^2 - (\sin \alpha - \sin \beta)^2 = -4 \cdot \sin^2 \frac{\alpha - \beta}{2} \cdot \cos(\alpha + \beta).$
17. $\frac{\sin 7\alpha}{\sin \alpha} - 2(\cos 2\alpha + \cos 4\alpha + \cos 6\alpha) - 1 = 0.$
18. $\frac{\cos 4\alpha + 1}{\operatorname{ctg} \alpha - \operatorname{tg} \alpha} = \frac{1}{2} \sin 4\alpha.$
19. $\operatorname{ctg}(45^\circ + 2\alpha) = \frac{\cos 4\alpha}{1 + \sin 4\alpha}.$
20. $\frac{\cos(3\pi - 2\alpha)}{2 \sin^2\left(\frac{5\pi}{4} + \alpha\right)} = \operatorname{tg}\left(\alpha - \frac{5\pi}{4}\right).$
21. $\frac{\sin 4\alpha}{1 + \cos 4\alpha} \cdot \frac{\cos 2\alpha}{1 + \cos 2\alpha} = \operatorname{ctg}\left(\frac{3\pi}{2} - \alpha\right).$
22. $\operatorname{tg} 4\alpha + \cos^{-1} 4\alpha = \frac{\cos 2\alpha + \sin 2\alpha}{\cos 2\alpha - \sin 2\alpha}.$
23. $\frac{\sin^4 \alpha + \cos^4 \alpha - 1}{\sin^6 \alpha + \cos^6 \alpha - 1} = \frac{2}{3}.$
24. $\frac{\cos 6\alpha - \cos 7\alpha - \cos 8\alpha + \cos 9\alpha}{\sin 6\alpha - \sin 7\alpha - \sin 8\alpha + \sin 9\alpha} = \operatorname{ctg} \frac{15\alpha}{2}.$
25. $(\sin \alpha - \sin \beta)(\cos \alpha - \cos \beta) = \sin(\alpha - \beta) \cdot \sin(\alpha + \beta).$
26. $\cos^8 \alpha - \sin^8 \alpha = \frac{\cos 2\alpha \cdot (3 + \cos 4\alpha)}{4}.$
27. $\frac{3 - 4 \cos 2\alpha + \cos 4\alpha}{3 + 4 \cos 2\alpha + \cos 4\alpha} = \operatorname{tg}^4 \alpha.$
28. $\frac{1 + \cos(2\alpha - 2\pi) + \cos(4\alpha + 2\pi) - \cos(6\alpha - \pi)}{\cos(2\alpha - 2\pi) + 2 \cos^2(2\alpha + \pi)} = 2 \cos 2\alpha.$
29. $\sin 10^\circ \cdot \sin 30^\circ \cdot \sin 50^\circ \cdot \sin 70^\circ = \frac{1}{16}.$
30. $\sin 20^\circ \cdot \sin 40^\circ \cdot \sin 60^\circ \cdot \sin 80^\circ = \frac{3}{16}.$
31. $\sin\left(\frac{3\pi}{10}\right) - \sin\left(\frac{\pi}{10}\right) = \frac{1}{2}.$
32. $\operatorname{ctg} 60^\circ + \operatorname{tg} 60^\circ + \operatorname{ctg} 50^\circ + \operatorname{tg} 50^\circ = \frac{8}{\sqrt{3}} \cdot \cos 20^\circ.$
33. $8 \cdot \cos\left(\frac{4\pi}{9}\right) \cdot \cos\left(\frac{2\pi}{9}\right) \cdot \cos\left(\frac{\pi}{9}\right) = 1.$
34. $\operatorname{tg} 9^\circ + \operatorname{tg} 15^\circ - \operatorname{tg} 27^\circ - \operatorname{ctg} 27^\circ + \operatorname{ctg} 9^\circ + \operatorname{ctg} 15^\circ = 8.$
35. $\cos\left(\frac{\pi}{33}\right) \cdot \cos\left(\frac{2\pi}{33}\right) \cdot \cos\left(\frac{4\pi}{33}\right) \cdot \cos\left(\frac{8\pi}{33}\right) \cdot \cos\left(\frac{16\pi}{33}\right) = \frac{1}{32}.$
36. $\sin 10^\circ + \sin 20^\circ + \sin 30^\circ + \sin 40^\circ + \sin 50^\circ = 0,5 \cdot \sin 25^\circ \cdot \sin^{-1} 5^\circ.$
37. $\operatorname{ctg} 70^\circ + 4 \cos 70^\circ = \sqrt{3}.$
38. $\sin 18^\circ \cdot \sin 54^\circ = \frac{1}{4}.$
39. $\cos\left(\frac{2\pi}{7}\right) + \cos\left(\frac{4\pi}{7}\right) + \cos\left(\frac{6\pi}{7}\right) = -\frac{1}{2}.$
40. $\cos\left(\frac{\pi}{7}\right) \cdot \cos\left(\frac{2\pi}{7}\right) \cdot \cos\left(\frac{4\pi}{7}\right) = -\frac{1}{8}.$
41. $\sin\left(\frac{\pi}{3}\right) + \sin\left(\frac{2\pi}{3}\right) + \dots + \sin\left(\frac{\pi n}{3}\right) = 2 \sin\left(\frac{\pi n}{6}\right) \cdot \sin\left(\frac{(n+1)\pi}{6}\right).$