

**Trigonometrische Gleichungen
mit 1 Unbekannten**

Bestimme jeweils die Lösungsmenge! $\mathbb{G} = [0; 360^\circ[$ oder $[0; 2\pi[$

1. $\sin 2x = -0,5$
2. $\sin\left(x + \frac{\pi}{4}\right) = -0,5$
3. $\cos\left(3x + \frac{\pi}{6}\right) = 0,5$
4. $\cos(\pi \cdot x) = 0,1$
5. $\tan(5x - 2) = 100$
6. $4\cos^2 x - 3 = 0$
7. $\sin x = (\tan x)^{-1}$
8. $\sin 2x = \cos x$
9. $\tan x - \sin x = 0$
10. $\sin x + \cos x = 1$
11. $\cos^2 x - \cos x - 0,5 = 0$
12. $3\sin x = 2\cos^2 x$
13. $2\cos^2 x + 4\sin x = 3$
14. $\sqrt{2} \cdot \sin^2 x + \sin x = 0$
15. $\sin x - x \cdot \sin x = 0$
16. $\sqrt{3} \cdot \cos x - \sin x = 0$
17. $\cos 2x + 3\cos^2 x = 0$
18. $3\sin 2x - 2\cos x = 0$
19. $\tan x - \frac{\sin 2x}{1 + \cos 2x} = 0$
20. $2\tan x - 4\sin 2x = 0$

21. $\tan\left(2x - \frac{\pi}{6}\right) = \frac{1}{3}\sqrt{3}$
22. $(\sin x + 1)(\sin x - 0,5) = 0$
23. $(\tan x + \sqrt{3})(\cot x + 1) = 0$
24. $(\sqrt{3} + \tan x)\left(\sin 2x - \frac{1}{2}\sqrt{2}\right) = 0$
25. $(\sqrt{3} + \tan \beta)\left(\frac{1}{2}\sqrt{2} - \cos 2\beta\right) = 0$
26. $(\sqrt{3} + 2\sin \beta)\left(\cos 2\beta - \frac{1}{2}\sqrt{2}\right) = 0$
27. $\sin^2\left(2x + \frac{\pi}{4}\right) = 0,04$
28. $\sin x \cdot \cos x = -0,25\sqrt{3}$
29. $\sin x + \cos x = 1,5$
30. $1 + \cos 2x = \cos x$
31. $\tan 2x = 3 \cdot \tan x$
32. $\sin 2x = \frac{1}{\tan x}$
33. $\cot x + 2 \cdot \cos x = 0$
34. $\sin^2 x - \frac{\tan^2 x}{1 + \tan^2 x} = 0$
35. $\frac{1}{\sin 3x - 2} = \sin 3x + 3$
36. $2\cos x - 4\sin x - 1 = 0$
37. $\cos\left(\frac{x}{2}\right) - \cos x + 2 = 0$
38. $8\sin^2 x - 6\sin x + 1 = 0$
39. $10\sin^2 x - \cos x + 3,2 = 0$
40. $\tan x \left[\tan\left(2x - \frac{\pi}{3}\right) + \sqrt{3} \right] = 0$

41. $2 \sin^2\left(\frac{x}{2}\right) + \cos 2x = 1$
42. $\sin 2x + 2 \cos^2 x = 2$
43. $\cos^2 \alpha \cdot \tan 2\alpha - 0,25 \tan 2\alpha = 0$
44. $5 \sin^2 \varphi + 3 \cos \varphi = -3$
45. $\cos^2 x \cdot \cos 2x + \frac{1}{4} \cos 2x = 0$
46. $2 \sin^2 x - 3 \cos\left(x - \frac{\pi}{2}\right) + 1 = 0$
47. $\sin\left(\frac{\pi}{3} + x\right) - \sin x = 0,5$
48. $4 \sin^2 x + 2(1 - \sqrt{3}) \cdot \sin x - \sqrt{3} = 0$
49. $2 \cos^2 x = 1 + \frac{1}{\tan 2x}$
50. $\tan 2x = \cos x$
51. $\tan x + \tan\left(x + \frac{\pi}{4}\right) = 0$
52. $\frac{1}{\tan^2 x} - 4 \cos^2 x = -1$
53. $\sin(\varphi + 30^\circ) + 2 \cos \varphi = 0,5\sqrt{7}$
54. $\tan(\varphi + 30^\circ) + \tan(\varphi - 30^\circ) = \sqrt{3}$
55. $\sin\left(x + \frac{\pi}{6}\right) + \cos\left(x - \frac{\pi}{6}\right) = \frac{1}{2}$
56. $\sin(x + 2) + 2 \sin(x - 3) - 1 = 0$
57. $\cos(45^\circ + \varphi) + \cos(45^\circ - \varphi) + \cos(90^\circ + \varphi) = 1 - \frac{1}{2}\sqrt{2}$
58. $\sin(\alpha - 45^\circ) + \cos(\alpha + 135^\circ) = \sqrt{2} \cdot \tan \alpha$

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Lösungen ohne Lösungsweg

Aufg.:

1. $\frac{7}{12}\pi; \frac{11}{12}\pi; \frac{19}{12}\pi; \frac{23}{12}\pi$
2. $\frac{11}{12}\pi; \frac{19}{12}\pi$
3. $\frac{\pi}{18}; \frac{\pi}{2}; \frac{13}{18}\pi; \frac{7}{6}\pi; \frac{25}{18}\pi; \frac{11}{16}\pi$
4. 0,4681...; 1,5319...; 2,4681...;
3,5319...; 4,4681...; 5,5319...
5. 0,71216...; 1,3405...; 1,9688...;
2,5971...; 3,2254...; 3,8537...;
4,482...; 5,1104...; 5,7387...
6. $\frac{\pi}{6}; \frac{5}{6}\pi; \frac{7}{6}\pi; \frac{11}{6}\pi$
7. 0,9045...; 5,3786...
8. $\frac{\pi}{6}; \frac{\pi}{2}; \frac{5}{6}\pi; \frac{3}{2}\pi$
9. 0; π
10. 0; $\frac{\pi}{2}$
11. 1,945...; 4,337...
12. $\frac{\pi}{6}; \frac{5}{6}\pi$
13. 0,29725...; 2,8443...
14. 0; $\pi; \frac{5}{4}\pi; \frac{7}{4}\pi$
15. 0; 1; π
16. $\frac{\pi}{3}; \frac{4}{3}\pi$
17. 1,1071...; 2,0344...; 4,2487...;
5,176...
18. $\frac{\pi}{2}; \frac{3}{2}\pi; 0,3398...; 2,8017...$

Aufg.:

19. $\mathbb{G} \setminus \left\{ \frac{\pi}{2}; \frac{3}{2}\pi \right\}$
20. $0; \frac{\pi}{3}; \frac{2}{3}\pi; \pi; \frac{4}{3}\pi; \frac{5}{3}\pi$
21. $\frac{\pi}{6}; \frac{2}{3}\pi; \frac{7}{6}\pi; \frac{5}{3}\pi$
22. $\frac{\pi}{6}; \frac{5}{6}\pi; \frac{3}{2}\pi$
23. $\frac{2}{3}\pi; \frac{3}{4}\pi; \frac{5}{3}\pi; \frac{7}{4}\pi$
24. $\frac{\pi}{8}; \frac{3}{8}\pi; \frac{2}{3}\pi; \frac{9}{8}\pi; \frac{11}{8}\pi; \frac{5}{3}\pi$
25. 22,5°; 120°; 157,5°; 202,5°; 300°;
337,5°
26. 22,5°; 157,5°; 202,5°; 240°; 300°;
337,5°
27. 1,077...; 1,278...; 2,648...; 2,849...;
4,219...; 4,420...; 5,789...; 5,991...
28. $\frac{2}{3}\pi; \frac{5}{6}\pi; \frac{5}{3}\pi; \frac{11}{6}\pi$
29. { }
30. $\frac{\pi}{3}; \frac{\pi}{2}; \frac{3}{2}\pi; \frac{5}{3}\pi$
31. $0; \frac{\pi}{6}; \frac{5}{6}\pi; \pi; \frac{7}{6}\pi; \frac{11}{6}\pi$
32. $\frac{\pi}{4}; \frac{3}{4}\pi; \frac{5}{4}\pi; \frac{7}{4}\pi$
33. $\frac{\pi}{2}; \frac{7}{6}\pi; \frac{3}{2}\pi; \frac{11}{6}\pi$
34. $\mathbb{G} \setminus \left\{ \frac{\pi}{2}; \frac{3}{2}\pi \right\}$
35. { }

36. 0,23813...; 3,83075...
37. { }
38. 0,25268...; $\frac{\pi}{6}$; $\frac{5}{6}\pi$; 2,88891...
39. { }
40. 0; π
41. 0; $\frac{2}{3}\pi$; $\frac{4}{3}\pi$;
42. 0; $\frac{\pi}{4}$; π ; $\frac{5}{4}\pi$
43. 0; 60°; 90°; 120°; 180°; 240°;
270°; 300°
44. 180°
45. $\frac{\pi}{4}$; $\frac{3}{4}\pi$; $\frac{5}{4}\pi$; $\frac{7}{4}\pi$
46. $\frac{\pi}{6}$; $\frac{\pi}{2}$; $\frac{5}{6}\pi$
47. $\frac{\pi}{6}$; $\frac{3}{2}\pi$
48. $\frac{\pi}{3}$; $\frac{2}{3}\pi$; $\frac{7}{6}\pi$; $\frac{11}{6}\pi$
49. { }
50. 0,37473...; $\frac{\pi}{2}$; 2,76685...; $\frac{3}{2}\pi$
51. 1,1781...; 2,7489...; 4,3197...;
5,8905...
52. $\frac{\pi}{4}$; $\frac{3}{4}\pi$; $\frac{5}{4}\pi$; $\frac{7}{4}\pi$
53. 79,1066°; 319,1066°
54. 30°; 100,89°; 210°; 280,89°
55. $\frac{2}{3}\pi$; $\frac{11}{6}\pi$
56. 3,81315...; 6,1236...
57. 45°; 244,47°...
58. 218,17°; 321,83°