Trigonometrische Gleichungen
mit 1 Unbekannten

Bestimme jeweils die Lösungsmenge! $\mathbb{G}$ = [0; 360°[oder [0; 2π[

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. $2\tan x - 4\sin 2x = 0$

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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. $(\sqrt{3}+\tan x)(\sin 2x-\frac{1}{2}\sqrt{2})=0$

25. $(\sqrt{3}+\tan\beta)(\frac{1}{2}\sqrt{2}-\cos 2\beta)=0$

26. $(\sqrt{3}+2\sin\beta)(\cos 2\beta-\frac{1}{2}\sqrt{2})=0$

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. $\tan x\left[\tan\left(2x-\frac{\pi}{3}\right)+\sqrt{3}\right]=0$

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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. $\sin(\varphi+30°)+2\cos\varphi=0{,}5\sqrt{7}$

54. $\tan(\varphi+30°)+\tan(\varphi-30°)=\sqrt{3}$

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. $\cos(45°+\varphi)+\cos(45°-\varphi)+\cos(90°+\varphi)=1-\frac{1}{2}\sqrt{2}$

58. $\sin(\alpha-45°)+\cos(\alpha+135°)=\sqrt{2}\cdot\tan\alpha$

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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. $0;\ \pi$

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. $0;\ 1;\ \pi$

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. $\{\ \}$

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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°

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