

Exponentialgleichungen - Teil 2

Klasse 10

Bestimme jeweils die Lösungsmenge: $G = \mathbb{R}$

1. $2^x - 2^{\frac{1}{x}} = 0$

2. $(5^x)^{x-3} = 1$

3. $48 = 5^{x+1} - 5^{x-1}$

4. $27^{\frac{5}{3}x-1} + 9^{2,5x-1} + 3^{5x-3} = 3645$

5. $4^{1-x} = (\sqrt[3]{2})^{x-4}$

6. $4 \cdot 2^{\sqrt{x}} = 0,5^{-x}$

7. $(3^{2x})^{x-2} = \frac{(3^{2x-5})^x}{3^3}$

8. $5^{\frac{3x}{4}-3} = \sqrt[5]{5^{x+1}}$

9. $3^{15} \cdot 3^{(x-1)(5x-1)} = 3^{x-8} \cdot 3^{(x-2)(5x-7)}$

10. $7(7^{4x})^{5x-2} = 7^{5-9x} \cdot (7^{5x})^{4x}$

11. $3^{2x^2-7x-6} = 27$

12. $7^{x^2-8x-9} = 1$

13. $2^{x+3} + 2^x = 144$

14. $4^{2x-1} + 4^{2x+1} = 4^3 + 4^5$

15. $2^x - 2^{x-3} - 2^{x-4} + 2^{x-5} + 2^{x-6} = \frac{55}{64}$

16. $5^{2x+1} + 25^{x+1} = 5^{2x-1} + 149$

17. $3^x + 3^{x+1} + 3^{x+2} = 5^{x+2} - 2 \cdot 5^{x+1} - 2 \cdot 5^x$

18. $\frac{1}{2} \cdot 6^{x+1} + 3 \cdot 4^x = \frac{1}{3} \cdot 6^{x+2} - 6 \cdot 4^{x+1}$

19. $\left(\frac{1}{2}\right)^{x-1} \cdot (8^{x+1} - 4^5) = 16(4^x - 8)$

20. $8 \cdot 2^x = 81 \cdot 3^{x-1}$

21. $3^{x+1} + 7^x = 3^x + 3 \cdot 7^x$

22. $2^{3x-2} - 2^{3x-3} - 2^{3x-4} = 4$

23. $3^{3x} \cdot 3^{1-2x} = 40$

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24. $5^{2x} \cdot 3^{3x+1} = 2025$

25. $4 \cdot 3^{x-2} - 20 \cdot 5^x = 2 \cdot 5^x - 6 \cdot 3^{x-1}$

26. $3^x + 4 \cdot 3^{-x} - 5 = 0$

27. $25^x - 5^{x+1} + 4 = 0$

28. $5^{x+2} - \left(\frac{1}{5}\right)^{x-1} = -124$

29. $3^{2x} \cdot 5^{4x-1} = 20$

30. $3^{2x+1} + 9 = 28 \cdot 3^x$

31. $9^x + 3^x = \sqrt{3}(\sqrt{3} + 1)$

32. $9 \cdot \left(\frac{2}{3}\right)^{2x+1} + 54 \cdot \left(\frac{2}{3}\right)^{x-1} - 42 = 0$

33. $6 \cdot 3^x - 15 \cdot 5^x + 9 \cdot 3^x = 6 \cdot 5^x$

34. $10 + 5^x = 5^{x+1}$

35. $2^x + 2^{x+1} + 2^{x+2} = 3^x + 3^{x+1} + 3^{x+2}$

36. $9^x - 5 \cdot 4^{x+1} = 2 \cdot 2^{2x} - 4 \cdot 3^{2x}$

37. $3^{2x} - 7^{x+1} = 7^{x-1} - 9^{x+1}$

38. $3 \cdot 13^{3x+2} - 5 \cdot 12^{4x+3} + 3 \cdot 13^{3x+4} + 3 \cdot 12^{4x-1} = 4 \cdot 13^{3x+3} + 12^{4x+5} - 13^{3x+1}$

39. $27^{x^2+x-1} = \left(\frac{1}{\sqrt{3}}\right)^{4x^2+2}$

40. $(\sqrt{5})^x \cdot (\sqrt{2})^{x+3} = 3 \cdot 19^{4-x}$

41. $\left(\frac{1}{2}\right)^{2+\lg x} = 2^{1+\lg x}$

42. $3^{\log_5 x} = 5^{\log_3 x}$

43. $2^{\ln(3x)} = 3^{\ln(2x)}$

44. $e^x + e^{-x} = 2\sqrt{2}$

45. $\frac{e^x - e^{-x}}{2} = 2,5$

46. $\frac{e^{\frac{x}{4}} - e^{-\frac{x}{4}}}{e^{\frac{x}{4}} + e^{-\frac{x}{4}}} = -\frac{4}{5}$

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Ergebnisse

(ausführliche Lösungen in GM_LU048)

1. $\{-1, 1\}$
2. $\{0, 3\}$
3. $\{1,43067\dots\}$
4. $\{1,8\}$
5. $\left\{\frac{10}{7}\right\}$
6. $\{4\}$
7. $\{-3\}$
8. $\left\{\frac{64}{11}\right\}$
9. $\{-1\}$
10. $\{4\}$
11. $\{-1; 4,5\}$
12. $\{-1; 9\}$
13. $\{4\}$
14. $\{2\}$
15. $\{0\}$
16. $\{0,5\}$
17. $\{0\}$
18. $\{2,709511\dots\}$
19. $\{4\}$
20. $\{-3\}$
21. $\{0\}$
22. $\{2\}$
23. $\{2,35776\dots\}$
24. $\{1\}$
25. $\{-4,30132\dots\}$
26. $\{0; 1,2618595\dots\}$
27. $\{0; 0,861353\dots\}$
28. $\{-2\}$
29. $\{0,5333159\dots\}$
30. $\{-1; 2\}$
31. $\{0,5\}$
32. $\{1,7095\dots\}$
33. $\{-0,658683\dots\}$
34. $\{0,569323\dots\}$
35. $\{0,47326\dots\}$
36. $\{1,8270432\dots\}$
37. $\{-1,3388496\dots\}$
38. $\{-0,535344\dots\}$
39. $\{-1; 0,4\}$
40. $\{8,04\dots\}$
41. $\{10^{-1,5}\}$
42. $\{1\}$
43. $\{1\}$
44. $\{0,88137\dots; -0,88137\dots\}$
45. $\{1,64723\dots\}$
46. $\{-4,394449\dots\}$