Methodisch geordnete Aufgabensammlung

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XXI. (XXII.) Exponentialgleichungen, welche auf Gleichungen des ersten Grades führen

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515. $\frac{1+2\sqrt{4x-7}}{6+5\sqrt{4x-7}} = \frac{3-4\sqrt{4x-7}}{3-10\sqrt{4x-7}}$

516. $\frac{1+2\sqrt{3x-5}}{1+3\sqrt{3x-5}} = \frac{11+2\sqrt{3x-5}}{11+5\sqrt{3x-5}}$

517. $\sqrt{x+9} - \sqrt{x} = 1$ 518. $\sqrt{4x-3} + 2\sqrt{x} = 3$

519. $\sqrt{x+6} + \sqrt{x-3} = 9$ 520. $\sqrt{x+a^2} - \sqrt{x} = b$

521. $\sqrt{2(x+1)} + \sqrt{2x+15} = 13$

522. $\sqrt{3x-5} + \sqrt{3x+12} = 17$

523. $\sqrt{9x+10} - 3\sqrt{x-1} = 1$

524. $\sqrt{x+60} = 2\sqrt{x+5} + \sqrt{x}$

525. $\sqrt{9x+7} + \sqrt{4x+1} = \sqrt{25x+14}$

526. $\sqrt{4x+9} - \sqrt{x-1} = \sqrt{x+6}$

527. $2\sqrt{x+5} + 3\sqrt{x-7} = \sqrt{25x-79}$

528. $3\sqrt{x+3} - 2\sqrt{x-12} = 5\sqrt{x-9}$

529. $\sqrt{x-9} + \sqrt{x+12} = \sqrt{x-4} + \sqrt{x+3}$

530. $\sqrt{x-7} + \sqrt{x-2} - \sqrt{x-10} = \sqrt{x+5}$

531. $\sqrt{x+15} + \sqrt{x-24} - \sqrt{x-13} = \sqrt{x}$

532. $(a-x) : (\sqrt{a} + \sqrt{x}) = (b-x) : (\sqrt{b} - \sqrt{x})$

533. $\left(\sqrt{a\sqrt{b}} - \sqrt{b\sqrt{a}}\right)\sqrt{x} = a\sqrt{b\sqrt{x}} - b\sqrt{a\sqrt{x}}$

534. $\sqrt{(a^2b^2-x)(a^2c^2-x)} + \sqrt{(a^2b^2-x)(b^2c^2-x)} + \sqrt{(a^2c^2-x)(b^2c^2-x)} = x$

XXI. [XXII.]

Exponentialgleichungen, welche auf Gleichungen des ersten Grades führen.

Die Gleichungen 1.—40. sind ohne Anwendung von Logarithmen zu lösen.

1. $a^{x+7} = a^{10}$
2. $b^{5-x} = b^3$
3. $y^{2x+3} = y^{8-3x}$
4. $m^{3(x-5)} = m^{2(x-4)}$
5. $a^0 . a^{2(3x-7)} = a . a^{2x-3}$
6. $m . m^{3(x-7)} = m^{5(x-9)} . m^{x-5}$

7. $(a^{x-5})^{x-6} = (a^{x-8})^{x-1}$

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

9. $\sqrt[3]{a^{17-x}} = a^{x-5}$

10. $\sqrt[4]{a^{13x-2}} = \sqrt[3]{a^{7x+4}}$

11. $\sqrt[x-3]{a^7} = \sqrt[x-7]{a^3}$

12. $\sqrt[x-2]{a^{x-3}} = \sqrt[x+3]{a^{x+1}}$

13. $\sqrt{a^{x-3}} = \sqrt[x-2]{a^3}$

14. $\sqrt[3]{a^{2x-3}} = \sqrt[2x-5]{a^5}$

15. $\sqrt[m]{a^{x-m}} = \sqrt[x-n]{a^n}$

16. $\sqrt[n]{a^{x-m}} = \sqrt[x-n]{a^m}$

17. $\sqrt[3]{a^{5x+7}} \cdot \sqrt[4]{a^{3x+10}} = a^2 \cdot \sqrt{a^{5x}}$

18. $\sqrt{a^{7-3x}} \cdot \sqrt[3]{a^{x+1}} \cdot \sqrt[4]{a^{5x-7}} \cdot \sqrt[5]{a^{7-2x}} = 1$

19. $5^x = 25$, $3^x = 27$, $2^x = 1024$

20. $2^x = 16$, $2^x = -16$, $2^{-x} = 16$

21. $(-2)^x = 16$, $(-2)^x = -16$, $(-2)^{-x} = -16$

22. $(-2)^x = 32$, $(-2)^x = -32$, $(-2)^{-x} = -32$

23. $27^x = 81$, $27^x = -81$, $27^{-x} = 81$

24. $(-27)^x = 81$, $(-27)^x = -81$, $(-27)^{-x} = 81$

25. $16^x = 8$, $16^x = -8$, $(-16)^x = -8$

26. $32^x = 8$, $32^x = -8$, $(-32)^x = -8$

27. $10^x = 1$, $100^x = 1000$, $1000^x = 100000$

28. $10^x = 0{,}01$, $100^x = 0{,}001$, $1000^x = 0{,}01$

29. $\left(\frac{3}{4}\right)^x = \left(\frac{4}{3}\right)^7$

30. $\sqrt[3]{\left(\frac{a}{b}\right)^x} = \sqrt[5]{\left(\frac{b}{a}\right)^{11}}$

31. $\left(\frac{3}{7}\right)^{3x-7} = \left(\frac{7}{3}\right)^{7x-3}$

32. $\left(\frac{13}{17}\right)^{2x-5} = \left(\frac{17}{13}\right)^{5x-9}$

33. $(0{,}25)^x = 2^{10}$

34. $4^x = 0{,}125$

35. $(0{,}05)^{2x-1} = 20^{3x-8}$

36. $8^{2x+1} = (0{,}125)^{4-3x}$

37. $\left(\frac{3}{4}\right)^{2x-7} = (0{,}75)^{3x-11}$

38. $\left(\frac{7}{8}\right)^{5x-7} = (0{,}765625)^{2(x-1)}$

39. $4^x - 3^{x-\frac{1}{2}} = 3^{x+\frac{1}{2}} - 2^{2x-1}$

40. $32^{\frac{x+5}{x-7}} = 0{,}25 \cdot 128^{\frac{x+17}{x-3}}$

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41. $a^x = b$, $\sqrt[x]{a} = mn$, $a^x \cdot b^{mx} = c$

42. $a^{n-x} = n b^x$, $a^{mx-p} = b^{nx-q}$, $a^{3x-2} \cdot b^{2x-3} = c^{4x-5}$

43. $10^x = 3$, $100^x = 0{,}005736$ $1000^x = 0{,}093768$

44. $2^x = 10$, $7^x = 100$, $0{,}025229^x = 1000$

45. $3{,}111^x = 1{,}7497$ 46. $2{,}506184^x = 10$

47. $10^x = 1{,}3713^{10}$

48. $(1{,}04952^x)^{1{,}05} = (100^{1{,}05})^{1{,}04952}$

49. $10^{4x} = 5{,}7544$ 50. $5{,}188^x = 88238$

51. $7{,}8886^x = 9{,}92126$ 52. $1428{,}57^x = 0{,}0007$

53. $\sqrt[x]{9977} = 2{,}511308$ 54. $\sqrt[x]{8{,}3946} = 1000$

55. $\sqrt[x]{7692{,}3} = 0{,}00013$ 56. $\sqrt[10]{10} = \sqrt[x]{1{,}37129}$

57. $(0{,}088308)^{2x+3} = (88{,}308)^{2x-3}$

58. $3{,}9345^{3x-5} = 5 \,.\, (1{,}2708)^{4x-9}$

59. $25^{-x} = 11$ 60. $37^{-x} \,.\, (1105{,}8)^x = 57^{x-1}$

61. $\left(\frac{3}{5}\right)^{2x-3} = \left(\frac{4}{7}\right)^{3x-2}$

62. $179 \left(\frac{11}{13}\right)^{13x-11} = 356 \left(\frac{3}{5}\right)^{5x-3}$

63. $21^{\frac{1}{x}} = 1{,}78$ 64. $10^{\frac{1}{x}} = (32{,}43)^{\frac{1}{49}}$

65. $\sqrt[7x]{7^{5x+7}} = \sqrt[5x]{5^{7x+5}}$ 66. $\sqrt[3x]{100^{2x+5}} = \sqrt[x]{4{,}64159^{5x+2}}$

67. $\left(\frac{725}{936}\right)^{2x-9} \cdot \left(\frac{351}{575}\right)^{x-3} = \left(\frac{87}{184}\right)^{x-2} \cdot \left(\frac{575}{351}\right)^{x-6}$

68. $\sqrt[3]{\left(\frac{228}{697}\right)^{2x-7}} \cdot \sqrt[7]{\left(\frac{943}{532}\right)^{3x-8}} = \left(\frac{897}{1547}\right)^{x-4}$

69. $3^x - 5^{x+2} = 3^{x+4} - 5^{x+3}$

70. $5^{2x+1} - 7^{x+1} = 5^{2x} + 7^x$

71. $7^{2x-1} - 3^{3x-2} = 7^{2x+1} - 3^{3x+2}$

72. $5^x + 5^{x+1} + 5^{x+2} = 3^x + 3^{x+1} + 3^{x+2}$

73. $2^x + 2^{x+1} + 2^{x+2} + 2^{x+3} + 2^{x+4} = 3^x + 3^{x+1} + 3^{x+2} + 3^{x+3} + 3^{x+4}$

74. $a\,p^{hx+m} + a_1\,p^{hx+m_1} + a_2\,p^{hx+m_2} = b\,q^{kx+n} + b_1\,q^{kx+n_1} + b_2\,q^{kx+n_2}$

75. $5^{(7^x)} = 7^{(5^x)}$ 76. $8^{(3^x)} = 6^{(4^x)}$

77. $5^{(3^x)} = 3{,}694575^{(3{,}694575^x)}$ 78. $3^{(3^x)} = 40{,}76472^{(2^x)}$