



UNIVERSITÄTS-
BIBLIOTHEK
PADERBORN

Algebra

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Aufgaben

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Zur Einübung der Regel betrachten wir noch ein komplizierteres

Beispiel: $3\frac{3}{4}x - (1\frac{1}{2} + \frac{1}{2}x) = -3\frac{3}{4} + (1\frac{1}{2}x - (1\frac{1}{2} - x)) + 3\frac{3}{5}$

$$3\frac{3}{4}x - 1\frac{1}{2} - \frac{1}{2}x = -\frac{3}{20} + (1\frac{1}{2}x - 1\frac{1}{2} + x)$$

$$3\frac{1}{4}x - 1\frac{1}{2} = -\frac{3}{20} + (2\frac{1}{2}x - 1\frac{1}{2})$$

$$3\frac{1}{4}x - 1\frac{1}{2} = -\frac{3}{20} + 2\frac{1}{2}x - 1\frac{1}{2}$$

$$3\frac{1}{4}x - 1\frac{1}{2} = -1\frac{13}{20} + 2\frac{1}{2}x \quad || -2\frac{1}{2}x + 1\frac{1}{2}$$

$$\frac{3}{4}x = -\frac{3}{20} \quad || \cdot \frac{4}{3}$$

$$x = -\frac{1}{5}$$

Manchmal vereinfacht sich die Rechnung, wenn man als allerersten Schritt die Gleichung mit dem Hauptnenner multipliziert, um die Brüche zu beseitigen.

Beispiel:

$$\frac{5x + 12,5}{7} - \frac{5(0,4 - 2x)}{6} = \frac{9x - 0,7}{4} - \frac{7x - 1,1}{3} + 2 \quad || \cdot 84$$

$$12(5x + 12,5) - 14 \cdot 5 \cdot (0,4 - 2x) = 21(9x - 0,7) - 28(7x - 1,1) + 2 \cdot 84$$

$$60x + 150 - 28 + 140x = 189x - 14,7 - 196x + 30,8 + 168$$

$$200x + 122 = -7x + 184,1 \quad || +7x - 122$$

$$207x = 62,1 \quad || : 207$$

$$x = 0,3$$

Aufgaben

1. a) $8 + 6x = 20$ b) $-3 + 5x = 17$ c) $4x - 12 = 44$
2. a) $1 = 13 - 6x$ b) $10 = 24 - 7x$ c) $-9x - 144 = -36$
3. a) $19 - x = 100 - 10x$ b) $3x + 1 = 5x - 3$ c) $19 - 2x = 8x - 16$
4. a) $4x + 15 - x = 54$ b) $5x + 2 + x = 26$ c) $-x + 8 - 3x = 0$
5. a) $17 = 17 - 12x + 3x$ b) $31 + x = 111 - 7x$ c) $21 + 8x = 30 + 5x$
6. a) $11x - 41 = 10x - 31$ b) $5x - 5 = 15 + 3x$ c) $4x - 16 = 19 - 3x$
7. a) $8x + 22 - x = 100 - 11x - 42$
 b) $9x = 7x + 16 + 5x + 7 - 10x$
 c) $19 + 3x - 23 = 10 + 2x - 34$
8. a) $29x + 39 - 34x = 49 - 20x - 10$
 b) $4x + 4 - 7x = -8x + 2 + 5x - 4$
9. a) $8x - 17 + x = 9x - 13 - 4$
 b) $9x - 16 = 10x - 9 - 4x + 5$
10. a) $0 = 14 - 8x + x - 3x + x + 4$
 b) $9x + 34 - 6x - 33 + 2x = 9$

11. a) $11x = 8x + 15 + 6x + 6 - 10x$
 b) $27x - 9 - 17x + 10 = 45 + 5x - 4$
12. a) $7x - 6 + 5x - 4 + 3x - 2 + x - 4 = 0$
 b) $18 = 93 - 6x - 11 - 4x - 5 - 2x + 1$
13. a) $12x - 10 + 8x - 6 + 4x - 8 = 0$
 b) $6x - 13 + x - 1 + 12x - 15 - 10x + 2 = 0$
14. a) $19x = 5x + 2 + 5x + 3 + 7x + 3 + 6$
 b) $36 + 12x - 19 - x + 10 - 8x = 0$
15. a) $21x - 21 - 7x + 7 = 7x + 21 + 14x - 7 - 19x + 26x$
 b) $121x + 49 - 234x + 3 - x = x - 56 - 115x + 108$
16. a) $\frac{x}{4} - \frac{x}{3} + \frac{x}{8} - \frac{x}{6} + \frac{x}{2} + \frac{x}{12} = 11$ b) $\frac{7}{3}x + \frac{7}{6} - \frac{7}{2}x + \frac{1}{5} = 3 - \frac{14}{5}x$
17. a) $(-0,7)^3 + 5,94x - 9,02 + 2,63x + 11,31 = 6,24x - 6,263 - 1,11$
 b) $0 = 12,9x - 1,45x - 3,29 - 0,99x - 11x + 0,32$
18. a) $2x - \frac{2}{3}x - \frac{3}{5}x = \frac{3}{2}x - \frac{1}{2} - \frac{2}{5}x + 2 - \frac{2}{3}x$
 b) $-0,5x + 9 = \frac{3}{2}x + 4 - \frac{6}{5}x + 0,2$
19. a) $5x - 9 = 3x + 7$ b) $2x + 11 = 8x - 10$
20. a) $126 + 7x = \frac{1}{5}x - 44$ b) $7,5 - 2,4x = 3,1x - 9$
21. a) $\frac{1}{2}x - \frac{1}{8}x = 2 + \frac{1}{4}x$ b) $\frac{1}{7}x + \frac{1}{3}x - 13 = \frac{1}{6}x$
22. a) $\frac{4}{5}x + 18 = \frac{1}{3}x + 0,2x + 2$ b) $1,5x - 8,5 = \frac{19}{24}x$
23. a) $\frac{0,64}{3}x + 0,5x - 0,43 = x$ b) $\frac{2,75}{9}x - \frac{x}{0,72} + x + 6 = 0$
24. a) $\frac{2x+5}{3} = x + 4$ b) $\frac{8+12x}{19} = \frac{6x-7}{4}$
25. a) $\frac{3x-6}{5} - \frac{1-15x}{2} = 1$ b) $\frac{13x+8}{6} - \frac{1}{3} = \frac{3}{5} + \frac{6-11x}{15}$
26. a) $\frac{5x}{36} + \frac{1}{3} = 0$ b) $\frac{3x-7}{5} = 4$
 c) $5 = \frac{28+0,7x}{7} + 0,85$ d) $3 + \frac{8-11x}{6} = \frac{2}{3}$
27. a) $4(2x-3) = 2(3x-4)$ b) $(25+3x) \cdot 7 = (7+25x) \cdot 3$
28. a) $13 - 3(5-x) = 7(x+1) - 13$
 b) $5(2x-300) - (150-x) \cdot 2 = 3x$

29. a) $3(1,8 + 3x) - 26 = 9 - 5(1,5x - 2)$
 b) $0,75(7x - 16) - 0,25(9x - 60) + 1 = 0$
 c) $5\left(\frac{x}{3} - 26\right) - 3\left(\frac{x}{4} + 3\right) = \frac{x}{2} - 14$
 d) $\frac{1}{7}\left(1 - \frac{2}{3}x\right) - \frac{3}{4}\left(\frac{x}{2} + 1\right) = \frac{1}{2}(2 - x)$
30. a) $3x + (9 - x) = 13$ b) $5x - (1 + 2x) = 11$
 c) $-(8 - x) + 2x = 10$
31. a) $9x - 2 - (7 - 2x) = 13$ b) $x - (2x - (3x - 1)) = 101$
 c) $12x = -12 - (-12x - 12)$ d) $5x - (3 - 4x) = 3^2 \cdot (x + 4)$
32. a) $9 - (5x + 2) + (10 + 8x) - (3x - 18) = x + 20$
 b) $93 + 2x - (19x - 15) = 100 - 7x - (11x - (5 + 2x))$
33. a) $(25 + 12x) - (10x - 11) = (12 + 6x) - ((12x + 13) - (10x - 11))$
 b) $-2x - (4 + (2x - 3)) = (30 - 18x) - (2x - (3x - 5))$
34. a) $5(5 + 2x) = 9 + 4x$ b) $0 = 4(10 - 2x) - 3(x - 5)$
 c) $3(9 - x) = 5(x - 9)$ d) $2^3(x - 3^2) = 3^2(x + 2^3)$
35. a) $1(4x - 3) + 3(9 - 18x) = 10(1 - 3x)$
 b) $7(3x - 7) + 5(x - 3) + 4(17 - x) = 103 - 11x$
36. a) $13x - 7(11 - x) + 11 = 4x - 3(20 - x) + 7x$
 b) $8(2x - 3) - 5(2x - 8) = 32 - 4(1 - 3x) + 8x$
37. a) $3\frac{1}{3}x - 4\frac{1}{4} = 5\frac{1}{5}x - 6\frac{1}{6}$ b) $0,1x - 0,2 = 0,3x - 0,4$
38. a) $\frac{1}{2}x + \frac{1}{3}x - \frac{3}{7} = -\frac{38}{7}$ b) $\frac{1}{3}x + \frac{1}{12} = \frac{1}{3}x + \frac{1}{12} + \frac{1}{6}x$
39. a) $10x = 7\frac{1}{3}x - 3\frac{1}{2}x + 5\frac{1}{3}x - 3\frac{1}{5}x + 1 + 5x$
 b) $x = \frac{3}{2}x - \frac{2}{3}x + \frac{3}{4}x - \frac{3}{5}x + \frac{5}{6}$
40. a) $\frac{4x}{3} - \frac{3x}{2} + \frac{4x}{5} + \frac{1}{6} = \frac{9}{5} - x$
 b) $-37\frac{13}{30} = \frac{x}{3} - \frac{x}{2} + \frac{x}{6} - 1\frac{5}{12}x + 2\frac{4}{5} - 3\frac{9}{10}x + 98$
41. a) $47x - 43 = 73 + 41,5x + 7,2x + 16,6$
 b) $0 = 1,45x - 2,7x - 0,6x + 0,5x - 7,8 - 1,2$
42. a) $18x - 7,52 - 2,35x = 5,381 - 2,9x - 0,58 + 13x$
 b) $1,45x + 3,29 = 12,9x - 0,99x - 11x + 0,32$
43. a) $\frac{2}{3}(x - 5) - x = 1 + \frac{2}{3}(11 - 2x)$
 b) $\frac{1}{4}(3x - 16) = 2x - 3(5 + \frac{3}{4}x) + \frac{2}{3}(4 - x)$

44. a) $3x(x+7) - x(3x+7) + 70 = 0$

b) $4x(6-3x) + 6x(2x+1) = 15$

45. $(\frac{3}{7}x - \frac{7}{3}) \cdot 21x - (33x+5) \cdot \frac{3}{11}x = 277$

46. $0,32x(1,25x-10) + (6,3-0,8x) \cdot 0,5x + 1 = 0$

47. a) $x - (x - (x - (x - 1) - 1) - 1) = 0$

b) $1 - 2(x - 3(x - 4(x - 5))) = 11(11 - 2x) + 2x$

48. a) $6x - \frac{x-3}{2} = 5x + \frac{3+x}{2}$ b) $\frac{-x+3}{2} + 6x = \frac{x-3}{2} + 5x$

Die Aufgaben 49 bis 51 sollen den Einfluß von Rundungen zeigen.

49. a) $3,14x - 6,28 = -9,577$

b) $3,14x - 6,28 = -9,58$

c) $3,1x - 6,3 = -9,6$

d) $3x - 6 = -10$

50. a) $-1,27x + 9,51 = 9,88 - 1,22x$ b) $-1,3x + 9,5 = 9,9 - 1,2x$

c) $-x + 10 = 10 - x$

51. a) $3,14x - 7,28 = -8,193$ b) $3,1x - 7,3 = -8,2$ c) $3x - 7 = -8$

52. $25\left(\frac{2}{15}x + \frac{1}{3}\right) - x + 2\left(\frac{x}{6} - 15\right) - 36x = 0$

53. $x + 2[x + 3(x + 4)] = 15$

54. $\left[\left(x \cdot \frac{1}{2} + \frac{1}{2}\right) \cdot \frac{2}{3} + \frac{1}{3}\right] \cdot \frac{3}{4} + \frac{1}{4} = \frac{x}{2}$

55. $1 - 5(4x - 11) = 5[3x - 7(2x - 1)]$

56. $1,5(3 - 5x) - [4(2,8 + 0,3x) - 10] + 9x = 0$

• 57. $1 - (2 + 3 \cdot [(3x - 8) - 2(8 - 3x)]) = 5(1 - 2x) - 2$

• 58. $\left(\left[(x+1) \cdot 2 + \frac{1}{2}\right] \cdot 3 + \frac{1}{3}\right) \cdot 4 + \frac{1}{4} = \left(\left[(x+1) \cdot 2 + \frac{x}{2}\right] \cdot 3 + \frac{x}{3}\right) \cdot 4 + \frac{x}{4}$

59. $5 \cdot \frac{x-2}{9} - (2x-18) \cdot 3 = \frac{7}{3} \cdot \frac{9x+10}{5}$

• 60. $\frac{3}{2} \cdot \frac{3x+5}{6} - \frac{2(2x-3)-24}{5} = 1\frac{1}{4} - \frac{(x-270) \cdot \frac{1}{5}}{9}$

• 61. $\frac{\frac{4}{5}(x+4)}{6} - 3\left(\frac{3x-1}{4} - x\right) = 2x - 11$

• 62. $\frac{7\left(\frac{x}{3} - \frac{1}{2}\right)}{16} + \frac{2}{3} \cdot \frac{4x+2,5}{8} - 3\left(1 - \frac{x}{64}\right) + \frac{17}{32} \cdot (x-2) = \frac{1}{192}$