

# Einfache Gleichungen 1

1. a)  $x + 3 = 8$   
d)  $x + 4 = 5$   
g)  $x + 7 = 2$

b)  $x + 2 = 12$   
e)  $x + 22 = 44$   
h)  $x + 8 = -4$

c)  $x + 9 = 18$   
f)  $x + 28 = 30$   
i)  $x + 2 = -12$

2. a)  $x - 1 = 2$   
d)  $x - 8 = 9$   
g)  $x - 7 = -11$

b)  $x - 3 = 5$   
e)  $x - 2 = 13$   
h)  $x - 9 = -14$

c)  $x - 4 = 11$   
f)  $x - 12 = 22$   
i)  $x - 1 = -19$

3. a)  $x \cdot 5 = 15$   
d)  $3 \cdot x = 27$   
g)  $x \cdot 2 = 4,2$

b)  $x \cdot 2 = 8$   
e)  $9 \cdot x = 45$   
h)  $5 \cdot x = 12,5$

c)  $x \cdot 7 = 21$   
f)  $8 \cdot x = 64$   
i)  $9 \cdot x = 1,8$

4. a)  $\frac{x}{2} = 2$   
d)  $\frac{x}{5} = 9$   
g)  $\frac{x}{10} = 0,3$

b)  $\frac{x}{5} = 1$   
e)  $\frac{x}{7} = 7$   
h)  $\frac{x}{4} = 1,1$

c)  $\frac{x}{8} = 9$   
f)  $\frac{x}{6} = 9$   
i)  $\frac{x}{8} = 0,8$

5. a)  $x - 2 = 5$   
d)  $3 \cdot x = 3,6$   
g)  $x + 1,8 = 2,2$

b)  $3 + x = 1$   
e)  $x \cdot (-4) = -3,6$   
h)  $x - 3,6 = 1,5$

c)  $\frac{x}{12} = -4$   
f)  $\frac{x}{3} = -1,1$   
i)  $-3 \cdot x = -1,5$

6. a)  $3 - x = 4$   
d)  $9 - x = -3$   
g)  $-2 - x = 6$

b)  $2 - x = 8$   
e)  $5 - x = -8$   
h)  $3 - x = 5$

c)  $7 - x = 5$   
f)  $-3 - x = -1$   
i)  $-4 - x = 12$

7. a)  $3x + 4 = 16$   
d)  $4x - 1 = 15$   
g)  $5 - 2x = 15$

b)  $2x + 3 = 13$   
e)  $9x - 8 = 19$   
h)  $3 - 6x = 21$

c)  $4 + 5x = 19$   
f)  $10x - 15 = 45$   
i)  $9 - 5x = -36$

8. a)  $\frac{x}{2} - 4 = 3$   
d)  $\frac{x}{5} + 8 = 2$   
g)  $\frac{2x}{5} - 1 = 5$

b)  $3 + \frac{x}{3} = 2$   
e)  $4 + \frac{x}{8} = 5$   
h)  $-4 + \frac{5x}{6} = 1$

c)  $\frac{x}{5} - 3 = 4$   
f)  $\frac{3x}{4} + 2 = 5$   
i)  $9 + \frac{2x}{9} = 11$

9. a)  $\frac{12}{x} = 3$   
d)  $\frac{14}{x} = 7$

b)  $\frac{6}{x} = 3$   
e)  $\frac{16}{x} = 4$

c)  $\frac{15}{x} = 15$   
f)  $\frac{49}{x} = 7$

## Gleichungen mit Additions- und Subtraktionsklammern

- $2x + (3x + 4) = 19$
  - $12x - 4 + (3x + 1) = 27$
  - $4 - (3x - 2) + 5x = 4 - (x + 1)$
  - $12x + (3x + 4) + (2x + 3) = 41$
  - $8x - 3 + (x + 1) = 2x + 7 + (4x + 3)$
  - $(4x - 4) - 8 = -(3x - 2)$
- $12x + (13x - 19) - (11x - 15) = 25 - (17 - 13x)$
  - $(3x + 7) - 6 = 12x - (x + 4) - (4x - 5)$
  - $(5x - 3) - (2x - 4) = -(x + 3) - (x + 5) + (x + 3)$
  - $12 - (5x + 8) - (8x - 12) = 14x - 25 - (3x - 8) + (7x + 2)$
  - $-(3x - 5) - (7x - 24) = 3 + (x + 1) - (2x - 7)$
  - $12x - (3x + 8) + (39 - 5x) = 14 + (25x - 8) - (41 - x)$
- $12x - 3 - (23x - 48) + (x + 93) = 58x - (24x - 44) + 6$
  - $-(19x + 51) - (11x + 4) = -(39x + 45) + (8x - 7) - 24$
  - $24 - (14x - 8) - (3 + 12x) = 4 - (8x + 11)$
  - $3,7 - (8,1x + 5,4) - (2,6x + 8,3) = -3,1x + (8 - 1,6x)$
  - $(4,5x + 56) - (2,25x - 7) - (300 - 3x) = -(0,75x - 3)$
  - $3,5x - 6 - (4 - 2x) = (2,4x - 9,4) - (1,2x - 25,2)$

## Gleichungen – Klammer mal Zahl

- $7(x - 2) = 49$
  - $15(8x - 24) = 120$
  - $12(5x - 2) = 48 + 12x$
  - $7(5x + 2) + 9 = 58$
  - $6(3x - 25) = 12$
  - $3(4x + 18) = 6x + 108$
- $23(2x + 5) = 6x + 315$
  - $16(2x - 3) = 5(4x + 16) + 4$
  - $13(20 - 5x) = 15(30 - 5x)$
  - $17(5x + 3) = 401 + 35x$
  - $12(8x - 25) = 5(16x + 40) - 20$
  - $14(7x - 14) + 3 = 12(8x + 20) + 1$
- $5(3x - 4) = 7(2x - 3)$
  - $8(3x - 5) = 60 + 20x$
  - $3(x + 6) + 2(x + 1) = 40$
  - $3(6x - 9) = 9(2x - 3)$
  - $5x - 4(2 - 3x) = 22 + 7x$
  - $8(3x - 5) = 60 + 20x$
- $5x - 4(2 - 3x) = 22 + 7x$
  - $18q + 3 = 3(6,1q - 5)$
  - $4(x + 9) - 34 = 2(x - 4) + 11$
  - $6(1 - 3x) + 7(4x - 3) = 35$
  - $5(x + 1,2) - 4 = 10x + 3$
  - $8 - 10x - 2 = 8 - 5(x + 1,4)$

## Gleichungen – Klammer mal Klammer

- $(20 + x)(20 - x) = (x + 2)(46 - x)$
  - $(x - 5)(x + 8) = (x - 2)(x + 1) + 6$
  - $(x - 8)(x - 15) = (x - 8)(x - 25)$
  - $(x + 5)(5 - x) = (12 + x)(4 - x) + 1$
  - $(x + 12)(x + 5) = (x - 8)(x + 7) - 10$
  - $(x + 9)(x - 17) = (x - 5)(x - 10)$
- $(x + 2)(x - 3) = x(x - 2)$
  - $(2x - 4)(3 - x) = (x + 4)(2 - 2x)$
  - $(x - 2)(x + 5) = (x + 6)(x - 1)$
  - $(2x + 4)(2x - 5) = (4x - 3)(x + 2)$
  - $x(3x + 2) = (3x - 6)(x + 2)$
  - $(x - 2)(2x + 3) = (4 - x)(5 - 2x) + 1$
- $(12 - x)(15 + x) = (8 - x)(9 + x)$
  - $(x + 20)(x - 30) = (x - 10)(x + 40)$
  - $(2x - 15)(3x + 4) = (6x - 4)(x + 12) - 117$
  - $(15 - x)(20 + x) = (30 - x)(5 + x)$
  - $(9 + x)(15 + x) = (3 + x)(5 + x)$
  - $(x + 2)(3 - x) = (5 + x)(7 - x) + 2(x + 29)$

# Gleichungen mit 1 Variablen – verm. Übungen 1

1. a)  $7x - (2x - 9) + (3x + 8) - (5x + 6) = 5$   
b)  $(4x - 5) - 6 = 12x - (x + 4) - (3x + 7)$
2. a)  $14x + (11x - 19) - (13x - 15) = 25 - (17 - 15x)$   
b)  $26x - (14 + 19x) + (25 + 21x) = 29 - (-23x + 18)$
3. a)  $17 - (13 - 9x) + (16x - 9) = (15x - 22) - (7 - 4x)$   
b)  $12 - (16 - 15x) + (11 - 9x) = (25 - 19x) - (13 - 23x)$
4. a)  $7x - [14 - (2x + 5)] = 18 - [3x + (15 - 4x)]$   
b)  $4x - [7 - (x + 15)] = 11 - [5x - (3x - 17)]$
5. a)  $21x - [9 - (5x - 6) + 8x] = 15 - [(4x - 7) - (6x - 5)]$   
b)  $19 - [13x - (22 + 7x) + 11] = 24x - [(15 - 4x) + (5x - 16)]$
6. a)  $12x - [14 - (9x - 11)] = 24x - [18 - (17x + 13)]$   
b)  $17 - [13x - (15 - 19x) - 21x] = 25 - [(11x - 23) - (18x - 7)]$
7. a)  $5(3x - 4) = 7(2x - 3)$   
b)  $3(6x - 9) = 9(2x - 3)$   
c)  $8(4x - 3) = 4(5x - 6)$   
d)  $3(7x - 9) = 4(6x - 7)$
8. a)  $8 - 7(3x + 2) = 9x - 6(5x + 1)$   
b)  $3x - 2(5x - 8) = 9 - 4(3x + 7)$
9. a)  $5(3x - 8) + 3(7x + 6) = 6(8x + 3) - 4(2x + 5)$   
b)  $8(4x + 3) - 5(6x - 5) = 4(9x + 4) - 7(4x - 5)$
10. a)  $5(8x + 5) - 4(3x + 4) - 2(11x - 17) = 25 - 3(5x - 7) + 6(3x - 2)$   
b)  $(2x - 3)7 - (x - 2)6 - (5x + 6)2 = 26 - (3x - 4)4 + (6x - 5)3$
11. a)  $(x + 4)(3x - 7) = (x - 2)(3x + 8)$   
b)  $(x + 5)(x + 2) = (x + 6)(x - 1)$
12. a)  $(x - 4)(6 - x) = (x - 3)(8 - x)$   
b)  $(x + 3)(2x + 5) = (x + 7)(2x - 1)$
13. a)  $(x - 2)(x + 3) = (x + 4)(x - 5)$   
b)  $(x + 1)(4x - 25) = (2x - 5)(2x - 8)$
14. a)  $(x + 5)(x - 3) = (x + 6)(x - 2)$   
b)  $(x - 7)(x - 4) = (x - 5)(x - 2)$
15. a)  $(x - 4)(x - 3) = x^2 - 7x + 12$   
b)  $(2x - 5)(x + 1) = 2x^2 - 3x - 5$
16. a)  $(5x - 6)(2x + 3) + (2x + 3)(3x - 2) = 2x(8x + 1)$   
b)  $(9x - 2)(2x - 5) + (3x + 4)(5x + 3) = 3x(11x - 3)$
17. a)  $(3x - 4)(2x - 1) - (3x + 1)(x - 3) = (3x - 1)(x - 1)$   
b)  $(2x + 1)(3x - 1) - (2x + 11)(2x - 5) = (x - 6)(2x - 3)$
18. a)  $(5x - 3)(2x - 3) - 2(4x - 1)(x - 3) = (2x - 3)(x + 5)$   
b)  $(3x + 1)(4x - 5) - 3(x - 3)(2x - 1) = (6x + 1)(x + 1)$   
  
a)  $(x + 3)^2 + (x - 4)^2 = (x - 1)^2 + (x + 2)^2$

19. a)  $(x + 3)^2 + (x - 4)^2 = (x - 1)^2 + (x + 2)^2$   
 b)  $(3x + 5)^2 + (2x - 3)^2 = (4x + 1)^2 - 3(x^2 - 1)$
20. a)  $(x + 1)^2 - (x - 3)^2 = (x - 2)^2 - (x - 4)^2$   
 b)  $(4x + 3)^2 - (5x - 2)^2 = 6(x + 9) - (3x - 7)^2$
21. a)  $(x + 1)(x - 1) - (x - 3)^2 = (x + 4)^2 - (x - 2)(x + 2)$   
 b)  $(x - 3)^2 - (x + 6)(x - 6) = (2x + 3)(2x - 3) - 4(x^2 - 15)$
22. a)  $(2x + 1)^2 - (x - 4)^2 = (3x - 2)^2 - (2x + 1)(2x - 1) - 2(x^2 - 7x + 10)$   
 b)  $(2x - 3)^2 + (3x + 5)^2 = (4x + 3)^2 - (3x - 2)(x + 6) - (2x - 7)$

## Gleichungen mit 1 Variablen – verm. Übungen 2

1.  $5x + 4 - 6x + 8 = 3x + 4 - 8x - 7 + 3x$
2.  $18 - x - 15 + x + 2x = 18 - x + 19 + 3x - 1 - x$
3.  $x - (x + 3) + x - 5 = 6 - (x - 4) + (x + 1)$
4.  $25x + 14 - (3x - 8) = 9x - (6x + 3) - 4x + (2 + 22x)$
5.  $5 - [x + 6 - (3 - x)] - 10x = 6x - [(3x + 2) - x] - 17x$
6.  $4(x - 3) + 5(x + 6) = 3 - 5(x + 3) + 13x$
7.  $5x - (6 - 3x) + 6(3x - 8) = 23x - 4(x - 5) + 6x$
8.  $172x + 19(24x - 17) = 207x - 18(61 - 18x) + 96x$
9.  $12(x + 13) - 14x + 5(x + 12) - 4(x + 3) = 0$
10.  $9x - \{5x - [4x - (3x - 2) - 3] - 4\} = 5x - 6 + x$
11.  $x + 15 + 5(2x - 10) = 4x - (5 + x) + 2$
12.  $17(3x - 8) - [4x - (3 - x)] = 46x - 1 - 3(x + 2)$
13.  $31x - 58 + 4x - 16 = 5x + 24 + 9x - 18 + 4$
14.  $52(17x - 28) + 92(44 - 53x) = -51x + 20563 + 29(71x + 1)$
15.  $3x + 6(5x + 8) - 6 - (3 + x) - 6(x - 1) - 23x = 0$
16.  $2x + 3a - 5b + 4a - x = 4(a + b)$
17.  $12x - a - (a - x) = 14x + (a + b) - 3x + b$
18.  $a + a^2 - b^2 - x = x - a + a^2 - b^2$

19.  $ax + b + 2ax - 12b = 5ax - 3b - 6ax$

20.  $(3a - x)^2 = (5a - x)^2$

21.  $(5 + x)^2(a - b) = (5 + x)^2(a + b) - 2bx^2$

## Gleichungen mit 1 Variablen – verm. Übungen 3

Bestimme die Lösungsmenge zu folgenden Gleichungen.

1. a)  $12x - 56 = 16$

b)  $5x + 39 = -26$

c)  $\frac{4}{5}x + 40 = 48$

d)  $1\frac{3}{5}x + 4,2 = 7,4$

e)  $7x - 4 + 2x = 52 - 5x$

f)  $40 - 2x + 5x = 68 + x$

g)  $22x + 4(9 - 3x) = 46$

h)  $4(3x - 5) + 30 = 46$

2. a)  $18x - 75 + 3x + 128 - 7x = 68 - 8x - 25 + 14x$

b)  $113x + 73 - 5x - 16 = 23x + 85 - 33x + 45 + 62x + 151$

c)  $6x - 2(x - 16) = 5 - 3(11 - x) + 60$

d)  $4x - 5(x - 12) = 40 + 9(9 - x) - 11$

e)  $\frac{3}{4}(16x + 24) + 6(3x - 4) = \frac{2}{3}(27x + 18) + 6x - 3$

f)  $3x - 15 + 2x = 18 + 4x + 25$

3. a)  $17x - 33 + 12x - 16 = 4x + 56 + 10x$

b)  $-22x + 36 + 18x - 6 = 16x + 55 + 12x - 89$

c)  $4x - 22 + 3x - 45 = 8 - 2x + 26 + 5x - 1$

d)  $6x + 36 - 2x + 45 = 3x + 88 - 8x + 47$

e)  $12x - 66 - 34 + 2x = 8x - 35 + 2x + 99$

f)  $-12x + 25 + 6x - 38 = 66 + 2x - 22 + 3x - 12x$

4. a)  $66x + 14 - 39 + 12x - 100 = -12x - 47 + 23x + 56$

b)  $22x + 48 - 55x - 55x = 36 - 45 + 12x - 43$

c)  $-22 + 14x - 33 + 10x - 77 + 25x = 88 - 14x + 65 - 5 + 35$

d)  $-78 + 66x - 21x + 20 - 47 + 88x = 10x - 36 - 36x + 90$

e)  $55x - 44x - 12x - 12x + 96 = 12x + 99 - 178 - 66x - 30$

f)  $-44 - 25x + 29 - 32x - 98x + 14x = -47x + 66 - 58x + 124 + 11$

5. a)  $12x - 33 + 20x - 78x + 36 - 48 + 30x - 45x + 558 - 14x - 605 - 58 = 0$

b)  $-33x - 44x + 54 - 88 + 12x - 100 + 222x = 12 - 45x + 999 - 10x + 305 + 34$

c)  $36x - 78 + 61x - 69 - 78 + 22x - 47x = 369 - 44x + 45 - 12x + 78 + 120x + 11$

d)  $-987x - 564 + 55x - 123 + 78 = -987x + 258 - 25x + 478 + 255$

e)  $16x^2 - 56x + 22 - 851 - 951 + 357x = 16x^2 + 698 - 14x + 548 - 20x - 11$

f)  $-65a + 58 - 36a + 587 - 33a = 698 + 14a - 587a + 698 - 32a + 191$

6. a)  $-789v + 258 - 11v + 456 - 894 = 336v + 201 - 45v + 710$

b)  $66z + 587 - 65z + 32z - 784 = -35z + 368 - 45z + 125 - 12$

c)  $-47y + 569 - 45y - 55y + 231 = -147y + 987 - 36y + 444 + 89$

d)  $665m - 478 - 365m + 884 - 320m = 6987 - 358 - 12m - 3365 + 6$

e)  $-254a + 369 - 258 + 458a - 369 = -540a + 3320 + 142$

f)  $-258x + 5873 - 3369 + 368x - 897 - 321x + 33 = 1007$

## Einfache Gleichungen 1 – Lösungen

1. a)  $x + 3 = 8$

$L = \{ 5 \}$

d)  $x + 4 = 5$

$L = \{ 1 \}$

g)  $x + 7 = 2$

$L = \{ -5 \}$

b)  $x + 2 = 12$

$L = \{ 10 \}$

e)  $x + 22 = 44$

$L = \{ 22 \}$

h)  $x + 8 = -4$

$L = \{ -12 \}$

c)  $x + 9 = 18$

$L = \{ 9 \}$

f)  $x + 28 = 30$

$L = \{ 2 \}$

i)  $x + 2 = -12$

$L = \{ -14 \}$

2. a)  $x - 1 = 2$

$L = \{ 3 \}$

d)  $x - 8 = 9$

$L = \{ 17 \}$

g)  $x - 7 = -11$

$L = \{ -4 \}$

b)  $x - 3 = 5$

$L = \{ 8 \}$

e)  $x - 2 = 13$

$L = \{ 15 \}$

h)  $x - 9 = -14$

$L = \{ -5 \}$

c)  $x - 4 = 11$

$L = \{ 15 \}$

f)  $x - 12 = 22$

$L = \{ 34 \}$

i)  $x - 1 = -19$

$L = \{ -18 \}$

3. a)  $x \cdot 5 = 15$

$L = \{ 3 \}$

d)  $3 \cdot x = 27$

$L = \{ 9 \}$

g)  $x \cdot 2 = 4,2$

$L = \{ 2,1 \}$

b)  $x \cdot 2 = 8$

$L = \{ 4 \}$

e)  $9 \cdot x = 45$

$L = \{ 5 \}$

h)  $5 \cdot x = 12,5$

$L = \{ 2,5 \}$

c)  $x \cdot 7 = 21$

$L = \{ 3 \}$

f)  $8 \cdot x = 64$

$L = \{ 8 \}$

j)  $9 \cdot x = 1,8$

$L = \{ 0,2 \}$

4. a)  $\frac{x}{2} = 2$

$L = \{ 4 \}$

d)  $\frac{x}{5} = 9$

$L = \{ 45 \}$

g)  $\frac{x}{10} = 0,3$

$L = \{ 3 \}$

b)  $\frac{x}{5} = 1$

$L = \{ 5 \}$

e)  $\frac{x}{7} = 7$

$L = \{ 49 \}$

h)  $\frac{x}{4} = 1,1$

$L = \{ 4,4 \}$

c)  $\frac{x}{8} = 9$

$L = \{ 72 \}$

f)  $\frac{x}{6} = 9$

$L = \{ 54 \}$

i)  $\frac{x}{8} = 0,8$

$L = \{ 6,4 \}$

5. a)  $x - 2 = 5$

$L = \{ 7 \}$

d)  $3 \cdot x = 3,6$

$L = \{ 1,2 \}$

g)  $x + 1,8 = 2,2$

$L = \{ 0,4 \}$

b)  $3 + x = 1$

$L = \{ -2 \}$

e)  $x \cdot (-4) = -3,6$

$L = \{ 0,9 \}$

h)  $x - 3,6 = 1,5$

$L = \{ 5,1 \}$

c)  $\frac{x}{12} = -4$

$L = \{ -48 \}$

f)  $\frac{x}{3} = -1,1$

$L = \{ -3,3 \}$

j)  $-3 \cdot x = -1,5$

$L = \{ 0,5 \}$

6. a)  $3 - x = 4$

$L = \{ -1 \}$

d)  $9 - x = -3$

$L = \{ 12 \}$

g)  $-2 - x = 6$

$L = \{ -8 \}$

b)  $2 - x = 8$

$L = \{ -6 \}$

e)  $5 - x = -8$

$L = \{ 13 \}$

h)  $3 - x = 5$

$L = \{ -2 \}$

c)  $7 - x = 5$

$L = \{ 2 \}$

f)  $-3 - x = -1$

$L = \{ -2 \}$

i)  $-4 - x = 12$

$L = \{ -16 \}$

7. a)  $3x + 4 = 16$   
 $L = \{ 4 \}$   
 d)  $4x - 1 = 15$   
 $L = \{ 4 \}$   
 g)  $5 - 2x = 15$   
 $L = \{ -5 \}$
- b)  $2x + 3 = 13$   
 $L = \{ 5 \}$   
 e)  $9x - 8 = 19$   
 $L = \{ 3 \}$   
 h)  $3 - 6x = 21$   
 $L = \{ -3 \}$
- c)  $4 + 5x = 19$   
 $L = \{ 3 \}$   
 f)  $10x - 15 = 45$   
 $L = \{ 6 \}$   
 i)  $9 - 5x = -36$   
 $L = \{ 9 \}$
8. a)  $\frac{x}{2} - 4 = 3$   
 $L = \{ 14 \}$   
 d)  $\frac{x}{5} + 8 = 2$   
 $L = \{ -30 \}$   
 g)  $\frac{2x}{5} - 1 = 5$   
 $L = \{ 15 \}$
- b)  $3 + \frac{x}{3} = 2$   
 $L = \{ -3 \}$   
 e)  $4 + \frac{x}{8} = 5$   
 $L = \{ 8 \}$   
 h)  $-4 + \frac{5x}{6} = 1$   
 $L = \{ 6 \}$
- c)  $\frac{x}{5} - 3 = 4$   
 $L = \{ 35 \}$   
 f)  $\frac{3x}{4} + 2 = 5$   
 $L = \{ 4 \}$   
 i)  $9 + \frac{2x}{9} = 11$   
 $L = \{ 9 \}$
9. a)  $\frac{12}{x} = 3$   
 $L = \{ 4 \}$   
 d)  $\frac{14}{x} = 7$   
 $L = \{ 2 \}$
- b)  $\frac{6}{x} = 3$   
 $L = \{ 2 \}$   
 e)  $\frac{16}{x} = 4$   
 $L = \{ 4 \}$
- c)  $\frac{15}{x} = 15$   
 $L = \{ 1 \}$   
 f)  $\frac{49}{x} = 7$   
 $L = \{ 7 \}$

## Gleichungen mit Additions- und Subtraktionsklammern Lösungen

1. a)  $2x + (3x + 4) = 19$   
 $L = \{ 3 \}$   
 c)  $12x - 4 + (3x + 1) = 27$   
 $L = \{ 2 \}$   
 e)  $4 - (3x - 2) + 5x = 4 - (x + 1)$   
 $L = \{ -1 \}$
- b)  $12x + (3x + 4) + (2x + 3) = 41$   
 $L = \{ 2 \}$   
 d)  $8x - 3 + (x + 1) = 2x + 7 + (4x + 3)$   
 $L = \{ 4 \}$   
 f)  $(4x - 4) - 8 = - (3x - 2)$   
 $L = \{ 2 \}$
2. a)  $12x + (13x - 19) - (11x - 15) = 25 - (17 - 13x)$   
 $L = \{ 12 \}$   
 b)  $(3x + 7) - 6 = 12x - (x + 4) - (4x - 5)$   
 $L = \{ 0 \}$   
 c)  $(5x - 3) - (2x - 4) = - (x + 3) - (x + 5) + (x + 3)$   
 $L = \{ -1,5 \}$   
 d)  $12 - (5x + 8) - (8x - 12) = 14x - 25 - (3x - 8) + (7x + 2)$   
 $L = \{ 1 \}$   
 e)  $-(3x - 5) - (7x - 24) = 3 + (x + 1) - (2x - 7)$   
 $L = \{ 2 \}$   
 f)  $12x - (3x + 8) + (39 - 5x) = 14 + (25x - 8) - (41 - x)$   
 $L = \{ 3 \}$
3. a)  $12x - 3 - (23x - 48) + (x + 93) = 58x - (24x - 44) + 6$   
 $L = \{ 2 \}$   
 b)  $-(19x + 51) - (11x + 4) = -(39x + 45) + (8x - 7) - 24$   
 $L = \{ -21 \}$

- c)  $24 - (14x - 8) - (3 + 12x) = 4 - (8x + 11)$   
 $L = \{ 2 \}$
- d)  $3,7 - (8,1x + 5,4) - (2,6x + 8,3) = -3,1x + (8 - 1,6x)$   
 $L = \{ -3 \}$
- e)  $(4,5x + 56) - (2,25x - 7) - (300 - 3x) = - (0,75x - 3)$   
 $L = \{ 40 \}$
- f)  $3,5x - 6 - (4 - 2x) = (2,4x - 9,4) - (1,2x - 25,2)$   
 $L = \{ 6 \}$

## Gleichungen Klammer mal Zahl – Lösungen

1. a)  $7(x - 2) = 49$   
 $L = \{ 9 \}$
- b)  $7(5x + 2) + 9 = 58$   
 $L = \{ 1 \}$
- c)  $15(8x - 24) = 120$   
 $L = \{ 4 \}$
- d)  $6(3x - 25) = 12$   
 $L = \{ 9 \}$
- e)  $12(5x - 2) = 48 + 12x$   
 $L = \{ 1,5 \}$
- f)  $3(4x + 18) = 6x + 108$   
 $L = \{ 9 \}$
2. a)  $23(2x + 5) = 6x + 315$   
 $L = \{ 5 \}$
- b)  $17(5x + 3) = 401 + 35x$   
 $L = \{ 7 \}$
- c)  $16(2x - 3) = 5(4x + 16) + 4$   
 $L = \{ 11 \}$
- d)  $12(8x - 25) = 5(16x + 40) - 20$   
 $L = \{ 30 \}$
- e)  $13(20 - 5x) = 15(30 - 5x)$   
 $L = \{ 19 \}$
- f)  $14(7x - 14) + 3 = 12(8x + 20) + 1$   
 $L = \{ 217 \}$
3. a)  $5(3x - 4) = 7(2x - 3)$   
 $L = \{ -1 \}$
- b)  $3(6x - 9) = 9(2x - 3)$   
 $L = G$
- c)  $8(3x - 5) = 60 + 20x$   
 $L = \{ 25 \}$
- d)  $5x - 4(2 - 3x) = 22 + 7x$   
 $L = \{ 3 \}$
- e)  $3(x + 6) + 2(x + 1) = 40$   
 $L = \{ 4 \}$
- f)  $8(3x - 5) = 60 + 20x$   
 $L = \{ 25 \}$
4. a)  $5x - 4(2 - 3x) = 22 + 7x$   
 $L = \{ 3 \}$
- b)  $6(1 - 3x) + 7(4x - 3) = 35$   
 $L = \{ 5 \}$
- c)  $18q + 3 = 3(6,1q - 5)$   
 $L = \{ 60 \}$
- d)  $5(x + 1,2) - 4 = 10x + 3$   
 $L = \{ -0,2 \}$
- e)  $4(x + 9) - 34 = 2(x - 4) + 11$   
 $L = \{ 0,5 \}$
- f)  $8 - 10x - 2 = 8 - 5(x + 1,4)$   
 $L = \{ 1 \}$

## Gleichungen – Klammer mal Klammer – Lösungen

1. a)  $(20 + x)(20 - x) = (x + 2)(46 - x)$   
 $L = \{ 7 \}$
- b)  $(x + 5)(5 - x) = (12 + x)(4 - x) + 1$   
 $L = \{ 3 \}$
- c)  $(x - 5)(x + 8) = (x - 2)(x + 1) + 6$   
 $L = \{ 11 \}$
- d)  $(x + 12)(x + 5) = (x - 8)(x + 7) - 10$   
 $L = \{ -7 \}$
- e)  $(x - 8)(x - 15) = (x - 8)(x - 25)$   
 $L = \{ 8 \}$
- f)  $(x + 9)(x - 17) = (x - 5)(x - 10)$   
 $L = \{ 29 \}$
2. a)  $(x + 2)(x - 3) = x(x - 2)$   
 $L = \{ 6 \}$
- b)  $(2x + 4)(2x - 5) = (4x - 3)(x + 2)$   
 $L = \{ -2 \}$
- c)  $(2x - 4)(3 - x) = (x + 4)(2 - 2x)$   
 $L = \{ 6 \}$
- d)  $x(3x + 2) = (3x - 6)(x + 2)$   
 $L = \{ 6 \}$



$$L = \{ 1,25 \}$$

$$e) (x - 2)(x + 5) = (x + 6)(x - 1)$$

$$L = \{ -2 \}$$

$$L = \{ -6 \}$$

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

$$L = \{ 2,25 \}$$

$$3. a) (12 - x)(15 + x) = (8 - x)(9 + x)$$

$$L = \{ 54 \}$$

$$c) (x + 20)(x - 30) = (x - 10)(x + 40)$$

$$L = \{ -5 \}$$

$$e) (2x - 15)(3x + 4) = (6x - 4)(x + 12) - 117$$

$$L = \{ 1 \}$$

$$f) (x + 2)(3 - x) = (5 + x)(7 - x) + 2(x + 29)$$

$$L = \{ -29 \}$$

$$b) (15 - x)(20 + x) = (30 - x)(5 + x)$$

$$L = \{ 5 \}$$

$$d) (9 + x)(15 + x) = (3 + x)(5 + x)$$

$$L = \{ -7,5 \}$$

## Gleichungen mit 1 Variablen – verm. Übungen 1 – Lösungen

$$1. a) 7x - (2x - 9) + (3x + 8) - (5x + 6) = 5$$

$$L = \{ -2 \}$$

$$b) (4x - 5) - 6 = 12x - (x + 4) - (3x + 7)$$

$$L = \{ 0 \}$$

$$2. a) 14x + (11x - 19) - (13x - 15) = 25 - (17 - 15x)$$

$$L = \{ -4 \}$$

$$b) 26x - (14 + 19x) + (25 + 21x) = 29 - (-23x + 18)$$

$$L = \{ 0 \}$$

$$3. a) 17 - (13 - 9x) + (16x - 9) = (15x - 22) - (7 - 4x)$$

$$L = \{ -4 \}$$

$$b) 12 - (16 - 15x) + (11 - 9x) = (25 - 19x) - (13 - 23x)$$

$$L = \{ 2,5 \}$$

$$4. a) 7x - [14 - (2x + 5)] = 18 - [3x + (15 - 4x)]$$

$$L = \{ 1,5 \}$$

$$b) 4x - [7 - (x + 15)] = 11 - [5x - (3x - 17)]$$

$$L = \{ -2 \}$$

$$5. a) 21x - [9 - (5x - 6) + 8x] = 15 - [(4x - 7) - (6x - 5)]$$

$$L = \{ 2 \}$$

$$b) 19 - [13x - (22 + 7x) + 11] = 24x - [(15 - 4x) + (5x - 16)]$$

$$L = \{ 1 \}$$

$$6. a) 12x - [14 - (9x - 11)] = 24x - [18 - (17x + 13)]$$

$$L = \{ -1 \}$$

$$b) 17 - [13x - (15 - 19x) - 21x] = 25 - [(11x - 23) - (18x - 7)]$$

$$L = \{ -0,5 \}$$

$$7. a) 5(3x - 4) = 7(2x - 3)$$

$$L = \{ -1 \}$$

$$c) 8(4x - 3) = 4(5x - 6)$$

$$L = \{ 0 \}$$

$$b) 3(6x - 9) = 9(2x - 3)$$

$$L = \mathbb{D}$$

$$d) 3(7x - 9) = 4(6x - 7)$$

$$L = \left\{ \frac{1}{3} \right\}$$

8. a)  $8 - 7(3x + 2) = 9x - 6(5x + 1)$   
 $L = \mathbb{D}$   
 b)  $3x - 2(5x - 8) = 9 - 4(3x + 7)$   
 $L = \{ -7 \}$
9. a)  $5(3x - 8) + 3(7x + 6) = 6(8x + 3) - 4(2x + 5)$   
 $L = \{ -5 \}$   
 b)  $8(4x + 3) - 5(6x - 5) = 4(9x + 4) - 7(4x - 5)$   
 $L = \left\{ -\frac{1}{3} \right\}$
10. a)  $5(8x + 5) - 4(3x + 4) - 2(11x - 17) = 25 - 3(5x - 7) + 6(3x - 2)$   
 $L = \{ -3 \}$   
 b)  $(2x - 3)7 - (x - 2)6 - (5x + 6)2 = 26 - (3x - 4)4 + (6x - 5)3$   
 $L = \{ -6 \}$
11. a)  $(x + 4)(3x - 7) = (x - 2)(3x + 8)$   
 $L = \{ 4 \}$                       b)  $(x + 5)(x + 2) = (x + 6)(x - 1)$   
 $L = \{ -8 \}$
12. a)  $(x - 4)(6 - x) = (x - 3)(8 - x)$   
 $L = \{ 0 \}$                       b)  $(x + 3)(2x + 5) = (x + 7)(2x - 1)$   
 $L = \{ 11 \}$
13. a)  $(x - 2)(x + 3) = (x + 4)(x - 5)$   
 $L = \{ -7 \}$                       b)  $(x + 1)(4x - 25) = (2x - 5)(2x - 8)$   
 $L = \{ 13 \}$
14. a)  $(x + 5)(x - 3) = (x + 6)(x - 2)$   
 $L = \left\{ -\frac{3}{2} \right\}$                       b)  $(x - 7)(x - 4) = (x - 5)(x - 2)$   
 $L = \left\{ \frac{9}{2} \right\}$
15. a)  $(x - 4)(x - 3) = x^2 - 7x + 12$   
 $L = \mathbb{D}$                       b)  $(2x - 5)(x + 1) = 2x^2 - 3x - 5$   
 $L = \mathbb{D}$
16. a)  $(5x - 6)(2x + 3) + (2x + 3)(3x - 2) = 2x(8x + 1)$   
 $L = \{ 4 \}$   
 b)  $(9x - 2)(2x - 5) + (3x + 4)(5x + 3) = 3x(11x - 3)$   
 $L = \{ 2 \}$
17. a)  $(3x - 4)(2x - 1) - (3x + 1)(x - 3) = (3x - 1)(x - 1)$   
 $L = \{ -6 \}$   
 b)  $(2x + 1)(3x - 1) - (2x + 11)(2x - 5) = (x - 6)(2x - 3)$   
 $L = \{ -9 \}$
18. a)  $(5x - 3)(2x - 3) - 2(4x - 1)(x - 3) = (2x - 3)(x + 5)$   
 $L = \{ 9 \}$   
 b)  $(3x + 1)(4x - 5) - 3(x - 3)(2x - 1) = (6x + 1)(x + 1)$   
 $L = \{ 5 \}$
19. a)  $(x + 3)^2 + (x - 4)^2 = (x - 1)^2 + (x + 2)^2$   
 $L = \{ 5 \}$   
 b)  $(3x + 5)^2 + (2x - 3)^2 = (4x + 1)^2 - 3(x^2 - 1)$   
 $L = \{ -3 \}$

20. a)  $(x + 1)^2 - (x - 3)^2 = (x - 2)^2 - (x - 4)^2$   
 $L = \{ -1 \}$   
 b)  $(4x + 3)^2 - (5x - 2)^2 = 6(x + 9) - (3x - 7)^2$   
 $L = \{ 0 \}$
21. a)  $(x + 1)(x - 1) - (x - 3)^2 = (x + 4)^2 - (x - 2)(x + 2)$   
 $L = \{ -15 \}$   
 b)  $(x - 3)^2 - (x + 6)(x - 6) = (2x + 3)(2x - 3) - 4(x^2 - 15)$   
 $L = \{ -1 \}$
22. a)  $(2x + 1)^2 - (x - 4)^2 = (3x - 2)^2 - (2x + 1)(2x - 1) - 2(x^2 - 7x + 10)$   
 $L = \{ 0 \}$   
 b)  $(2x - 3)^2 + (3x + 5)^2 = (4x + 3)^2 - (3x - 2)(x + 6) - (2x - 7)$   
 $L = \{ -0,5 \}$

## Gleichungen mit 1 Variablen – verm. Übungen 2 – Lösungen

1.  $5x + 4 - 6x + 8 = 3x + 4 - 8x - 7 + 3x$   
 $L = \{ -15 \}$
2.  $18 - x - 15 + x + 2x = 18 - x + 19 + 3x - 1 - x$   
 $L = \{ 33 \}$
3.  $x - (x + 3) + x - 5 = 6 - (x - 4) + (x + 1)$   
 $L = \{ 19 \}$
4.  $25x + 14 - (3x - 8) = 9x - (6x + 3) - 4x + (2 + 22x)$   
 $L = \{ -23 \}$
5.  $5 - [x + 6 - (3 - x)] - 10x = 6x - [(3x + 2) - x] - 17x$   
 $L = \{ -4 \}$
6.  $4(x - 3) + 5(x + 6) = 3 - 5(x + 3) + 13x$   
 $L = \{ -30 \}$
7.  $5x - (6 - 3x) + 6(3x - 8) = 23x - 4(x - 5) + 6x$   
 $L = \{ 74 \}$
8.  $172x + 19(24x - 17) = 207x - 18(61 - 18x) + 96x$   
 $L = \{ -775 \}$
9.  $12(x + 13) - 14x + 5(x + 12) - 4(x + 3) = 0$   
 $L = \{ 204 \}$
10.  $9x - \{5x - [4x - (3x - 2) - 3] - 4\} = 5x - 6 + x$   
 $L = \{ 9 \}$
11.  $x + 15 + 5(2x - 10) = 4x - (5 + x) + 2$

$$L = \{ 4 \}$$

12.  $17(3x - 8) - [4x - (3 - x)] = 46x - 1 - 3(x + 2)$

$$L = \{ 42 \}$$

13.  $31x - 58 + 4x - 16 = 5x + 24 + 9x - 18 + 4$

$$L = \{ 4 \}$$

14.  $52(17x - 28) + 92(44 - 53x) = -51x + 20563 + 29(71x + 1)$

$$L = \{ -3 \}$$

15.  $3x + 6(5x + 8) - 6 - (3 + x) - 6(x - 1) - 23x = 0$

$$L = \{ -15 \}$$

16.  $2x + 3a - 5b + 4a - x = 4(a + b)$

$$L = \{ -3a + 9b \}$$

17.  $12x - a - (a - x) = 14x + (a + b) - 3x + b$

$$L = \{ b + 1,5a \}$$

18.  $a + a^2 - b^2 - x = x - a + a^2 - b^2$

$$L = \{ a \}$$

19.  $ax + b + 2ax - 12b = 5ax - 3b - 6ax$

$$L = \left\{ \frac{2b}{a} \right\} \text{ (mit } a \neq 0 \text{)}$$

20.  $(3a - x)^2 = (5a - x)^2$

$$L = \{ 4a \} \text{ (mit } a \neq 0 \text{)}$$

21.  $(5 + x)^2(a - b) = (5 + x)^2(a + b) - 2bx^2$

$$L = \{ -2,5 \}$$

## Gleichungen mit 1 Variablen – verm. Übungen 3 – Lösungen

Bestimme die Lösungsmenge zu folgenden Gleichungen.

1. a)  $12x - 56 = 16$

$$L = \{ 6 \}$$

c)  $\frac{4}{5}x + 40 = 48$

$$L = \{ 10 \}$$

e)  $7x - 4 + 2x = 52 - 5x$

$$L = \{ 4 \}$$

g)  $22x + 4(9 - 3x) = 46$

$$L = \{ 1 \}$$

b)  $5x + 39 = -26$

$$L = \{ -13 \}$$

d)  $1\frac{3}{5}x + 4,2 = 7,4$

$$L = \{ 2 \}$$

f)  $40 - 2x + 5x = 68 + x$

$$L = \{ 14 \}$$

h)  $4(3x - 5) + 30 = 46$

$$L = \{ 3 \}$$

2. a)  $18x - 75 + 3x + 128 - 7x = 68 - 8x - 25 + 14x$   
 $L = \{-1,25\}$   
 b)  $113x + 73 - 5x - 16 = 23x + 85 - 33x + 45 + 62x + 151$   
 $L = \{4\}$   
 c)  $6x - 2(x - 16) = 5 - 3(11 - x) + 60$   
 $L = \{0\}$   
 d)  $4x - 5(x - 12) = 40 + 9(9 - x) - 11$   
 $L = \{6,25\}$   
 e)  $\frac{3}{4}(16x + 24) + 6(3x - 4) = \frac{2}{3}(27x + 18) + 6x - 3$   
 $L = \{2,5\}$   
 f)  $3x - 15 + 2x = 18 + 4x + 25$   
 $L = \{58\}$
3. a)  $17x - 33 + 12x - 16 = 4x + 56 + 10x$   
 $L = \{7\}$   
 b)  $-22x + 36 + 18x - 6 = 16x + 55 + 12x - 89$   
 $L = \{2\}$   
 c)  $4x - 22 + 3x - 45 = 8 - 2x + 26 + 5x - 1$   
 $L = \{25\}$   
 d)  $6x + 36 - 2x + 45 = 3x + 88 - 8x + 47$   
 $L = \{6\}$   
 e)  $12x - 66 - 34 + 2x = 8x - 35 + 2x + 99$   
 $L = \{41\}$   
 f)  $-12x + 25 + 6x - 38 = 66 + 2x - 22 + 3x - 12x$   
 $L = \{57\}$
4. a)  $66x + 14 - 39 + 12x - 100 = -12x - 47 + 23x + 56$   
 $L = \{2\}$   
 b)  $22x + 48 - 55x - 55x = 36 - 45 + 12x - 43$   
 $L = \{1\}$   
 c)  $-22 + 14x - 33 + 10x - 77 + 25x = 88 - 14x + 65 - 5 + 35$   
 $L = \{5\}$   
 d)  $-78 + 66x - 21x + 20 - 47 + 88x = 10x - 36 - 36x + 90$   
 $L = \{1\}$   
 e)  $55x - 44x - 12x - 12x + 96 = 12x + 99 - 178 - 66x - 30$   
 $L = \{-5\}$   
 f)  $-44 - 25x + 29 - 32x - 98x + 14x = -47x + 66 - 58x + 124 + 11$   
 $L = \{-6\}$
5. a)  $12x - 33 + 20x - 78x + 36 - 48 + 30x - 45x + 558 - 14x - 605 - 58 = 0$   
 $L = \{-2\}$   
 b)  $-33x - 44x + 54 - 88 + 12x - 100 + 222x = 12 - 45x + 999 - 10x + 305 + 34$   
 $L = \{7\}$   
 c)  $36x - 78 + 61x - 69 - 78 + 22x - 47x = 369 - 44x + 45 - 12x + 78 + 120x + 11$   
 $L = \{91\}$   
 d)  $-987x - 564 + 55x - 123 + 78 = -987x + 258 - 25x + 478 + 255$   
 $L = \{20\}$   
 e)  $16x^2 - 56x + 22 - 851 - 951 + 357x = 16x^2 + 698 - 14x + 548 - 20x - 11$   
 $L = \{9\}$   
 f)  $-65a + 58 - 36a + 587 - 33a = 698 + 14a - 587a + 698 - 32a + 191$   
 $L = \{2\}$

6. a)  $-789v + 258 - 11v + 456 - 894 = 336v + 201 - 45v + 710$   
 $L = \{-1\}$
- b)  $66z + 587 - 65z + 32z - 784 = -35z + 368 - 45z + 125 - 12$   
 $L = \{6\}$
- c)  $-47y + 569 - 45y - 55y + 231 = -147y + 987 - 36y + 444 + 89$   
 $L = \{20\}$
- d)  $665m - 478 - 365m + 884 - 320m = 6987 - 358 - 12m - 3365 + 6$   
 $L = \{-358\}$
- e)  $-254a + 369 - 258 + 458a - 369 = -540a + 3320 + 142$   
 $L = \{5\}$
- f)  $-258x + 5873 - 3369 + 368x - 897 - 321x + 33 = 1007$   
 $L = \{3\}$