

Übungen	
Gleichungen und Ungleichungen	

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| 1 a) $15x - 38 = 24x - 29$ | b) $26 + 17x = 11x + 23$ |
| 2 a) $18 - 5x - 7 = 12x + 11 - 17x$ | b) $18x + 17 - 23x = 14 - 11x - 15$ |
| 3 a) $4x + (3x + 13) = -8$ | b) $8x - (7 + 11x) = 5$ |
| 4 a) $5x - (4 - 7x) = 2$ | b) $5x - (8 + 9x) + 12 = 0$ |
| 5 a) $7x - (2x - 9) + (3x + 8) - (5x + 6) = 5$
b) $(4x - 5) - 6 = 12x - (x + 4) - (3x + 7)$ | |
| 6 a) $14x + (11x - 19) - (13x - 15) = 25 - (17 - 15x)$
b) $26x - (14 + 19x) + (25 + 21x) = 29 - (-23x + 18)$ | |
| 7 a) $17 - (13 - 9x) + (16x - 9) = (15x - 22) - (7 - 4x)$
b) $12 - (16 - 15x) + (11 - 9x) = (25 - 19x) - (13 - 23x)$ | |
| 8 a) $7x - [14 - (2x + 5)] = 18 - [3x + (15 - 4x)]$
b) $4x - [7 - (x + 15)] = 11 - [5x - (3x - 17)]$ | |
| 9 a) $21x - [9 - (5x - 6) + 8x] = 15 - [(4x - 7) - (6x - 5)]$
b) $19 - [13x - (22 + 7x) + 11] = 24x - [(15 - 4x) + (5x - 16)]$ | |
| 10 a) $12x - [14 - (9x - 11)] = 24x - [18 - (17x + 13)]$
b) $17 - [13x - (15 - 19x) - 21x] = 25 - [(11x - 23) - (18x - 7)]$ | |
| 11 a) $5(3x - 4) = 7(2x - 3)$ | b) $3(6x - 9) = 9(2x - 3)$ |
| 12 a) $8(4x - 3) = 4(5x - 6)$ | b) $3(7x - 9) = 4(6x - 7)$ |
| 13 a) $8 - 7(3x + 2) = 9x - 6(5x + 1)$ | b) $3x - 2(5x - 8) = 9 - 4(3x + 7)$ |
| 14 a) $5(3x - 8) + 3(7x + 6) = 6(8x + 3) - 4(2x + 5)$
b) $8(4x + 3) - 5(6x - 5) = 4(9x + 4) - 7(4x - 5)$ | |
| 15 a) $5(8x + 5) - 4(3x + 4) - 2(11x - 17) = 25 - 3(5x - 7) + 6(3x - 2)$
b) $(2x - 3)7 - (x - 2)6 - (5x + 6)2 = 26 - (3x - 4)4 + (6x - 5)3$ | |
| 16 a) $(x + 4)(3x - 7) = (x - 2)(3x + 8)$ | b) $(x + 5)(x + 2) = (x + 6)(x - 1)$ |
| 17 a) $(x - 4)(6 - x) = (x - 3)(8 - x)$ | b) $(x + 3)(2x + 5) = (x + 7)(2x - 1)$ |
| 18 a) $(x - 2)(x + 3) = (x + 4)(x - 5)$ | b) $(x + 1)(4x - 25) = (2x - 5)(2x - 8)$ |
| 19 a) $(x + 5)(x - 3) = (x + 6)(x - 2)$ | b) $(x - 7)(x - 4) = (x - 5)(x - 2)$ |
| 20 a) $(x - 4)(x - 3) = x^2 - 7x + 12$ | b) $(2x - 5)(x + 1) = 2x^2 - 3x - 5$ |
| 21 a) $(5x - 6)(2x + 3) + (2x + 3)(3x - 2) = 2x(8x + 1)$ | |
| 21 b) $(9x - 2)(2x - 5) + (3x + 4)(5x + 3) = 3x(11x - 3)$ | |
| 22 a) $(3x - 4)(2x - 1) - (3x + 1)(x - 3) = (3x - 1)(x - 1)$ | |
| 22 b) $(2x + 1)(3x - 1) - (2x + 11)(2x - 5) = (x - 6)(2x - 3)$ | |
| 23 a) $(5x - 3)(2x - 3) - 2(4x - 1)(x - 3) = (2x - 3)(x + 5)$ | |
| 23 b) $(3x + 1)(4x - 5) - 3(x - 3)(2x - 1) = (6x + 1)(x + 1)$ | |

Gleichungen mit Formvariablen

- 1 a) $6x + 5a = 4x + 9a$ b) $17a + 7x = 29a + 4x$
- 2 a) $8x - 5a + 1b = 5x - 2a + 10b$ b) $17x + 14a - 196 = 14x + 23a - 13b$
- 3 a) $2(3x + 4a + 2) = 5(x + 2a + 1)$ b) $7(x + 2a + 1) = 5(x + 4a + 3)$
- 4 a) $4a(x + 1) = 2a(x + ä) + 6a$ b) $a(6x - 1) = 3a(x + 3a) + 2a$
- 5 a) $3(4a + b + 2x) = 4(3a + 2b + x) - 3b$
b) $2(3a + 2x) + 3(2b + x) = 2(4a + 3b) + 5a$
- 6 a) $3(5x + 2a + b) = 2(7x + 3a + 2b - 1)$
b) $2(5x + a + 3b) = 3(3x + a + 2b - 1)$
- 7 a) $(8x + 7) - (3x + 5 - 7a) = (5x - 6) - (2x - 8 - 11a)$
b) $(9x - 4) - (4x - 5 + 2b) = (8x + 7) - (5x + 6 - 4b)$
- 8 a) $(4a - 5x) - (3b - 14x) - (7x + 6a - 3b) = 0$
b) $4x - (3x - 8a) = 2x - (8x - 9a - 6b) - (5b - 6x)$
- 9 a) $6(4x + a) - 3(5x + 3b) - 15a = 0$
b) $4(3a - 2x + 4) - 2(6a - 8b - 5x) = 4(5b + 4)$
- 10 a) $5(4x - 3a + 3) - 4(3b - 5a + 4x) = 5(5a + 3)$
b) $4(x - 2 + 3a) - 3(5a - 1) = 3(x + 5 - 4a) - 5(3x + 4 - 5a)$
- 11 a) $4(5x - 4a + 3) - 3(6x - 5a - 3b) = 3(a + 3b + 4)$
b) $6(3x - 5a + 1) - 4(2x - 1b + 3) = 5(4x - 3a) + 3(6b - 5x - 2)$
- 12 a) $(x - a)(a + 2) + 6a = 2(x + 3a)$
b) $(x - a)(a + 5) - 4a = 4(2x - 3a) - 3(x - 2a)$
- 13 a) $(2x - 3a)(6x + 5a) = (3x - 4a)(4x + a) - a(x - a)$
b) $(2x - 4a)(2x + 3a) = (4x - 5a)(x + 2a) - a(6x - a)$
- 14 a) $ax + x = a^2 + a$ b) $ax + 5ab = 5a^2 + bx$
- 15 a) $2ax + 8ab = 4a^2b + 4x$ b) $6ax - 9ab = 18a^2 - 3bx$
- 16 a) $ax + 4x = a^2 + 7a + 12$ b) $bx - 3x = b^2 - 4b + 3$
- 17 a) $ax - 5a = a^2 - 3x + 6$ b) $bx + 3b = b^2 + x + 2$

Ungleichungen

Bringen Sie folgende Ungleichungen auf ihre einfachste äquivalente Form und bestimmen Sie die Lösungsmenge! Stellen Sie die Lösungsmenge auf der Zahlengeraden dar und machen Sie Sie Stichproben!

- 6 a) $x + 7 < 12$ b) $x + 4 > 5$ c) $8 < x + 7$ d) $4 > x + 3$
- 7 a) $x - 5 > 9$ b) $6 + x < 5$ c) $1 < x + 1$ d) $2 < x - 2$
- 8 a) $3x > 6$ b) $5x > 10$ c) $2x < 0$ d) $4x < 8$
- 9 a) $2x > -4$ b) $3x > -12$ c) $5x > -5$ d) $6x < 18$
- 10 a) $5x > 0$ b) $7x > -8$ c) $4x < 5$ d) $3x < -7$
- 11 a) $-2x > 8$ b) $-8x < 16$ c) $-3x < 3$ d) $-4x < 4$
- 12 a) $4x + 5 < 17$ b) $3x + 8 > 23$ c) $7x + 2 < 16$ d) $9x + 5 < 14$
- 13 a) $6x - 5 > 13$ b) $5x - 14 > 1$ c) $8x + 3 < 11$ d) $7x - 1 < 6$
- 14 a) $x - 7 < 3$ b) $x - 5 < 3$ c) $9x - 2 > 6$ d) $5x + 7 > 12$
- 10 a) $4 - 3x > 10$ b) $8 - 2x > 12$ c) $3 - 5x < 13$ d) $4 - 6x < 10$