

Lineare Gleichungen - Lösungen

1. a) $7x + 5 = 33$
 $L = \{ 4 \}$
d) $2x - 5 = 1$
 $L = \{ 3 \}$
2. a) $12x - 27 = 9$
 $L = \{ 3 \}$
 $\frac{x}{5} - 5 = 2$
d) $\frac{x}{5}$
 $L = \{ 35 \}$
3. a) $2x - 3 - 4 = 13$
 $L = \{ 10 \}$
d) $6x = 72 - 2x$
 $L = \{ 9 \}$
4. a) $20x - 36 + 2x = 3x - 17$
 $L = \{ 1 \}$
c) $9x + 12 - 6x - 13 + 2x = 8$
 $L = \{ 1,8 \}$
e) $40 - 8x - 3x + 15 = 0$
 $L = \{ 15 \}$
- b) $6x + 5 = 29$
 $L = \{ 4 \}$
e) $7x - 17,5 = 0$
 $L = \{ 2,5 \}$
- b) $3x - 7 = 14$
 $L = \{ 7 \}$
 $\frac{x}{3} - 4 = 11$
e) $\frac{x}{3}$
 $L = \{ 45 \}$
- c) $18x + 128 = 128$
 $L = \{ 0 \}$
f) $3x + 5 = 20$
 $L = \{ 5 \}$
- c) $36 = x - 12$
 $L = \{ 48 \}$
 $\frac{x}{8} + 6 = 30$
f) $\frac{x}{8}$
 $L = \{ 192 \}$
- c) $3x + 1 = x + 9$
 $L = \{ 4 \}$
f) $20x - 36 + 2x = 3x - 17$
 $L = \{ 1 \}$
- b) $14x - 30 - 10x - 9 - 3x = 19 - 4x + 142$
 $L = \{ 40 \}$
d) $7x - 6 + 5x - 4 + 3x - 2 + x = -4$
 $L = \{ 0,5 \}$
f) $-8x + 16 - 3x - 9 = -15$
 $L = \{ 2 \}$

Gleichungen mit Multiplikationsklammern und Binomischen Formeln Lösungen

1. a) $5x - 4(2 - 3x) = 22 + 7x$
 $L = \{ 3 \}$
c) $8(3x - 5) = 60 + 20x$
 $L = \{ 25 \}$
e) $3(x + 6) + 2(x + 1) = 40$
 $L = \{ 4 \}$
2. a) $5x - 4(2 - 3x) = 22 + 7x$
 $L = \{ 3 \}$
c) $18q + 3 = 3(6,1q - 5)$
 $L = \{ 60 \}$
e) $4(x + 9) - 34 = 2(x - 4) + 11$
 $L = \{ 0,5 \}$
3. a) $13 + 2(3x - 2) = 3$
 $L = \{ -1 \}$
c) $3(5 - 2x) - 8 = 24 - 5(2x + 1)$
 $L = \{ 3 \}$
e) $6x + 5 = 2(4x - 1) - 7$
 $L = \{ 7 \}$
4. a) $(x + 3) \cdot 7 = 28$
 $L = \{ 1 \}$
c) $(2x - 8) \cdot 7 = 98$
 $L = \{ 11 \}$
e) $11 \cdot (2x - 19) = 121$
 $L = \{ 15 \}$
5. a) $(x + 3)^2 = (x - 1)^2$
 $L = \{ -1 \}$
c) $(2x + 4)^2 = (2x - 8)^2$
 $L = \{ 1 \}$
e) $(x - 1)^2 - (x - 4)^2 = (x + 3)^2 - (x + 2)^2$
 $L = \{ 5 \}$
f) $(2x + 1)^2 - (4x - 3)^2 = (3 - 6x)(2x + 1) - (x - 18)$
 $L = \{ 1 \}$
- b) $6(1 - 3x) + 7(4x - 3) = 35$
 $L = \{ 5 \}$
d) $5x - 4(2 - 3x) = 22 + 7x$
 $L = \{ 3 \}$
f) $8(3x - 5) = 60 + 20x$
 $L = \{ 25 \}$
- b) $6(1 - 3x) + 7(4x - 3) = 35$
 $L = \{ 5 \}$
d) $5(x + 1,2) - 4 = 10x + 3$
 $L = \{ -0,2 \}$
f) $8 - 10x - 2 = 8 - 5(x + 1,4)$
 $L = \{ 1 \}$
- b) $6t + 2 = 2(4t - 1) - 10$
 $L = \{ 7 \}$
d) $18 + 3(2x - 3) = 3$
 $L = \{ -1 \}$
f) $3(5 - 2x) - 7 = 25 - 5(1 + 2x)$
 $L = \{ 3 \}$
- b) $(x - 2) \cdot 5 = 25$
 $L = \{ 7 \}$
d) $(3x + 13) \cdot 3 = 156$
 $L = \{ 13 \}$
f) $(4x - 17) \cdot 3 + 5 = 14$
 $L = \{ 5 \}$
- b) $(x + 6)^2 - (x - 5)^2 = 0$
 $L = \{ -0,5 \}$
d) $(2x + 3)^2 - (x + 1)^2 - x(3x + 2) = 5$
 $L = \left\{ -\frac{3}{8} \right\}$

Gleichungen mit Brüchen - Lösungen

1. a) $\frac{x+5}{3} = \frac{x-5}{2}$
 HN: 6
 $2x + 10 = 3x - 15$
 $L = \{ 25 \}$
- b) $\frac{3x-3}{24} = \frac{5x+7}{56}$
 HN: 56
 $7x - 7 = 5x + 7$
 $L = \{ 7 \}$
- c) $\frac{4x+2}{3} = \frac{6x+17}{8}$
 HN: 24
 $32x + 16 = 18x + 51$
 $L = \{ 2,5 \}$
- d) $\frac{x-4}{2} = \frac{x-1}{3}$
 HN: 6
 $3x - 12 = 2x - 2$
 $L = \{ 10 \}$
- e) $\frac{2x-2}{3} = \frac{3x-2}{6}$
 HN: 6
 $4x - 4 = 3x - 2$
 $L = \{ 2 \}$
- f) $\frac{2x+5}{3} = \frac{8x+6}{5}$
 HN: 15
 $10x + 25 = 24x + 18$
 $L = \{ 0,5 \}$
2. a) $\frac{x-9}{3} + \frac{3x-4}{4} = \frac{2x+3}{3}$
 HN: 12
 $4x - 36 + 9x - 12 = 8x + 12$
 $L = \{ 12 \}$
- b) $\frac{3x+5}{4} - \frac{5x+15}{20} = \frac{2x+3}{5}$
 HN: 20
 $15x + 25 - 5x - 15 = 8x + 12$
 $L = \{ 1 \}$
- c) $\frac{3x+1}{4} + \frac{x-2}{3} - \frac{4x-5}{5} = 2$
 HN: 60
 $45x + 15 + 20x - 40 - 48x + 60 = 120$
 $L = \{ 5 \}$
- d) $\frac{7x-3}{6} = 2x - \frac{9x+9}{12}$
 HN: 12
 $14x - 6 = 24x - 9x - 9$
 $L = \{ 3 \}$
- e) $\frac{7x-5}{2} = \frac{5x-3}{2} + \frac{3x+5}{5}$
 HN: 10
 $35x - 25 = 25x - 15 + 6x + 10$
 $L = \{ 5 \}$
- f) $\frac{x+1}{2} - \frac{x-2}{3} = 2 + \frac{x-5}{4}$
 HN: 12
 $6x + 6 - 3x + 6 = 24 + 3x - 15$
 $L = \{ 5 \}$

Reinquadratische Gleichungen - Lösungen

1. a) $4x^2 - 100 = 0$
 $L = \{ 5; -5 \}$
- b) $5x^2 + 80 = 0$
 $L = \{ \}$
- c) $5x^2 - 245 = 0$
 $L = \{ 7; -7 \}$
- d) $2x^2 - 25 = 0$
 $L = \{ \sqrt{12,5}; -\sqrt{12,5} \}$
- e) $3x^2 - 14 = 0$
 $L = \left\{ \sqrt{\frac{14}{3}}; -\sqrt{\frac{14}{3}} \right\}$
- f) $8x^2 + 16 = 0$
 $L = \{ \}$
- g) $9x^2 - 81 = 0$
 $L = \{ 3; -3 \}$
- h) $0,3x^2 - 2,7 = 0$
 $L = \{ 3; -3 \}$
2. a) $(4x-1)^2 = (x-4)^2$
 $L = \{ 1; -1 \}$
- b) $(x+3)(x-3) = (6-x)(6+x) + 5$
 $L = \{ 5; -5 \}$
- c) $(5x+2)^2 = (3x+4)^2 + 4(1-x)$
 $L = \{ 1; -1 \}$
- d) $(4x-3)^2 = (5x-2)^2 - 4(x+1)$
 $L = \{ 1; -1 \}$
- e) $(x+5)(x-5) = (2-x)(2+x) + 3$
 $L = \{ 4; -4 \}$
- f) $(7x-6)(5x-2) = (6x-5)^2 - (-16x-22)$
 $L = \{ \}$

gemischt quadratische Gleichungen

1. a) $x(x+4) + 5 = -1 - (2x+3)$
 führt zu:
 $x^2 + 6x + 9 = 0$
 $L = \{ -3 \}$
- b) $3x(2x+5) = x - 2(2x+6)$
 führt zu:
 $x^2 + 3x + 2 = 0$
 $L = \{ -2; -1 \}$
- c) $2x(x-2) = 1 - 3(5-4x)$
 führt zu:
 $x^2 - 8x + 7 = 0$
 $L = \{ 1; 7 \}$
- d) $12x(x+1) = 42(x+1) - (3x-42)$
 führt zu:
 $4x^2 - 9x - 28 = 0$
 $L = \{ 4; -1,75 \}$
- e) $4(5-x) = 2(x+2)(5-x) - 3(x+2)$
 führt zu:
 $2x^2 - 7x + 6 = 0$
 $L = \{ 2; 1,5 \}$
- f) $(3x+1)(3x+2) + 28 = 12(3x+1)$
 führt zu:
 $x^2 - 3x + 2 = 0$
 $L = \{ 1; 2 \}$

2. a) $(x + 4)(x + 2) = -x(x + 10) - 4(x - 2)$

führt zu:

$$x^2 + 10x = 0$$

$$L = \{-10; 0\}$$

c) $(x + 4)(x + 2) = -4(x - 2) + x(x + 10)$

führt zu:

$$0 = 0$$

$$L = \mathbb{D}$$

e) $24(x - 2) = 5(x - 2)(x + 3) - 6(x + 3)$

führt zu:

$$x^2 - 5x = 0$$

$$L = \{0; 5\}$$

b) $(2x + 10)(x + 1) - 96 = 12(x + 1)$

führt zu:

$$x^2 = 49$$

$$L = \{-7; 7\}$$

d) $(x + 3)(x + 4) = 6(x + 9)$

führt zu:

$$x^2 + x - 42 = 0$$

$$L = \{-7; 6\}$$

f) $(7 + 5x)(9x - 8) = (5 + 7x)(9 - 8x)$

führt zu:

$$x^2 = 1$$

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

3. a) $(x + 2)^2 + 5x + 2 = (2x - 6)^2$

führt zu:

$$x^2 - 11x + 10 = 0$$

$$L = \{1; 10\}$$

c) $(3x + 1)^2 - (x + 2)^2 = 33$

führt zu:

$$4x^2 + x - 18 = 0$$

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

e) $(4 - 3x)^2 - (3 - 2x)^2 - 3 = 0$

führt zu:

$$5x^2 - 12x + 4 = 0$$

$$L = \{0,4; 2\}$$

b) $(x - 4)^2 + (x - 3)^2 = 61$

führt zu:

$$x^2 - 7x - 18 = 0$$

$$L = \{9; -2\}$$

d) $(x + 5)^2 + (x + 3)^2 = 100$

führt zu:

$$x^2 + 8x - 33 = 0$$

$$L = \{3; -11\}$$

f) $(x - 1)^2 - (2x - 2) = -(x - 3)^2$

führt zu:

$$x^2 - 5x + 6 = 0$$

$$L = \{2; 3\}$$

Prüfungsaufgaben

Bestimme die Lösungsmenge der folgenden Gleichung

$$(3x - 5)^2 - (x + 3)^2 = (x + 1)^2$$

Lösung

$$(3x - 5)^2 - (x + 3)^2 = (x + 1)^2 \quad \text{führt zu:}$$

$$7x^2 - 38x + 15 = 0$$

$$\text{hat als Lösung: } x_1 = 5 \quad x_2 = \frac{3}{7}$$

Bestimme die Lösungsmenge der folgenden Gleichung

$$(2x + 1)^2 - 10 = (3x - 1)^2 - (3x - 2)^2$$

Lösung

$$(2x + 1)^2 - 10 = (3x - 1)^2 - (3x - 2)^2$$

$$\text{führt zu: } 4x^2 - 2x - 6 = 0$$

$$\text{hat als Lösung: } x_1 = 1,5 \quad x_2 = -1$$

Bestimme die Lösungsmenge der folgenden Gleichung

$$2(x + 3)^2 + 3 = (x - 1)^2 - 6x - (x - 2)^2$$

Lösung

$$2(x + 3)^2 + 3 = (x - 1)^2 - 6x - (x - 2)^2$$

$$\text{führt zu: } x^2 + 8x + 12 = 0$$

$$\text{hat als Lösung: } x_1 = -2 \quad x_2 = -6$$