Auf den folgenden Seiten findest Du einige quadratische Gleichungen zum Üben. Alle geraden Aufgabennummern enthalten Gleichungen der Standard-Form $ax^2 + bx + c = 0$, die ungeraden kompliziertere. Die Lösungen stehen auf den letzten Seiten dieses Dokumentes. Bei den geraden Aufgaben sind das nur die Lösungsmengen, bei den ungeraden auch die zu einer Standard-Form vereinfachten Gleichungen.

Alles wurde von einem Computer-Programm erzeugt. Da ich an diesem Programm erst kürzlich einiges geändert habe, macht es vielleicht Fehler, von denen ich noch nichts weiß.

Falls Du Fehler findest, sage mir bitte Bescheid! (seltsam aussehende Terme, falsche Lösungen) Versichere Dich aber bitte vorher, ob es wirklich Fehler in diesem Dokument sind. Für jede fehlerhafte Gleichung, die Du als erste(r) findest, bekommst Du 1€.

Aufgabe 1:

a) $x \cdot (-x + 12{,}5) - 23 = 21{,}5x$

b) $-11e + e \cdot (\frac{1e}{3} + 9) = -3$

c) $x \cdot (\frac{1x}{4} - 10\frac{1}{3}) = -11\frac{1}{3}x$

d) $\frac{2}{3} \cdot (v - 7) \cdot (v + 6) - 17 = 6\frac{1}{3}v$

Aufgabe 2:

a) $-\frac{1}{9}x^2 + x - 2\frac{1}{4} = 0$

b) $-7x - 6{,}25 = 0$

c) $c^2 - 11c - 126 = 0$

d) $d^2 + 2d - 41{,}25 = 0$

Aufgabe 3:

a) $14{,}25x - 14x = -\frac{1}{3}x^2$

b) $-7\frac{1}{3}v = -\frac{1}{729}v^2 + \frac{1}{16} - 7\frac{1}{3}v$

c) $(-72{,}5y - 77) = 2 \cdot (y + 2) \cdot (y - 38)$

d) $-35 = 22x - 10x + x^2$

Aufgabe 4:

a) $0{,}2d^2 + d + 1{,}25 = 0$

b) $n^2 - 4n - 89\frac{4}{9} = 0$

c) $0{,}125x^2 + x + 2 = 0$

d) $\frac{1}{26}x^2 + \frac{1}{3}x = 0$

Aufgabe 5:

a) $-(j - 1) \cdot (j - 124) = 148{,}5j$

b) $x \cdot (-3x + 6\frac{1}{3}) = -(2x - 3)^2$

c) $(-59s - 119) = 6 \cdot (s + 4) \cdot (s - 6)$

d) $7 \cdot (-x + 0{,}25) = -(x - 4) \cdot (x - 5)$

Aufgabe 6:

a) $\frac{1}{7}x^2 - x + 1{,}75 = 0$

b) $x^2 + 4x - 91\frac{1}{16} = 0$

c) $0{,}2q^2 - 1{,}25q + 2 = 0$

d) $\frac{1}{3}x^2 + 2x + 3 = 0$

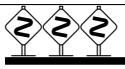
Aufgabe 7:

a) $-5r = -(r - 6) \cdot (r + 6)$

b) $35 \cdot (-0{,}5x + 0) = (x - 2) \cdot (x - 6)$

c) $14 + 0{,}5 \cdot (x + 1) \cdot (x + 28) = 5{,}5x$

d) $77\frac{1}{8} = -7f - 2 \cdot (f - 8) \cdot (f + 10)$



Aufgabe 8:

a) $\frac{5}{9}x^2 - 2x - 2{,}25 = 0$

b) $-4x^2 - 9x + 385 = 0$

c) $4x^2 + 31x - 16{,}5 = 0$

d) $\frac{1}{3}x^2 - 2x + 3 = 0$

Aufgabe 9:

a) $6\frac{7}{9} \cdot (x + 12) \cdot (x - 5) = -\frac{1}{15} \cdot (-678\frac{2}{3}x + 150) - 396\frac{23}{75} + (2\frac{2}{3}x + 0{,}6)^2$

b) $\frac{19}{124}b + 4\frac{30}{31} = -\frac{1}{31} \cdot (b - 11) \cdot (b + 14)$

c) $-22{,}25x = -x \cdot (x + 8{,}25) - 48{,}75$

d) $x \cdot (-98x + 56{,}5) + 19 = -(10x - 4)^2$

Aufgabe 10:

a) $5x^2 - 22x - 27 = 0$

b) $-5h^2 + 46{,}5h - 91 = 0$

c) $x^2 - 13x + 39\frac{3}{16} = 0$

d) $\frac{1}{9}x^2 + 0{,}5x = 0$

Aufgabe 11:

a) $5 \cdot (-9x - 156{,}5) = 4 \cdot (x - 18) \cdot (x + 11)$

b) $-\frac{14}{1849}x - \frac{574}{46225} = -\frac{1}{1849} \cdot (x + 17) \cdot (x - 3)$

c) $1\frac{1}{2} \cdot (x - 3) \cdot (x + 11) = -(x + 17{,}5)$

d) $c \cdot (-c - 10) + 210 = -11c$

Aufgabe 12:

a) $x^2 - 5{,}5x - 20 = 0$

b) $6s^2 + 61s + 143 = 0$

c) $5x^2 - 4{,}5x - 176 = 0$

d) $0{,}12n^2 - n - 4\frac{2}{3} = 0$

Aufgabe 13:

a) $4 \cdot (x - 2) \cdot (x + 36) + (-121x + 17) = -199{,}5$

b) $(\frac{1g}{2} - 3)^2 + 15 = -g \cdot (0{,}25g - 4)$

c) $2{,}4 \cdot (x - 11) \cdot (x - 16) = -0{,}2 \cdot (119x - 1237)$

d) $-2 \cdot (j - 5) \cdot (j - 17) = -(-70{,}5j + 83)$

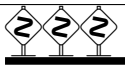
Aufgabe 14:

a) $x^2 - 10x + 12{,}75 = 0$

b) $0{,}25j^2 + j - 24 = 0$

c) $-x^2 - 13x - 26\frac{1}{4} = 0$

d) $\frac{1}{17}r^2 - \frac{1}{2}r = 0$



Aufgabe 15:

a) $5 \cdot (c+13) \cdot (c-21) = -7 \cdot (2c + 155\frac{13}{16})$

b) $1 + 8x = -x \cdot (0{,}25x - 7)$

c) $x \cdot (-x - 1) = -x$

d) $(-428{,}5x - 744) - (8x + 3) \cdot (8x - 3) = -63 \cdot (x + 3) \cdot (x + 4)$

Aufgabe 16:

a) $h^2 - 15h + 14 = 0$

b) $-\frac{1}{16}z^2 + 1 = 0$

c) $-4x^2 + 31x + 157\frac{1}{2} = 0$

d) $0{,}25x^2 - 3x + 7\frac{2}{9} = 0$

Aufgabe 17:

a) $(x - 9) \cdot (x + 14) = -(-5x + 126)$

b) $\frac{6}{121} \cdot (s + 7) \cdot (s + 13) = -\frac{1}{121} \cdot (-43s - 409{,}875) - (\frac{4s}{11} + 0{,}5)^2$

c) $-3\frac{15}{23}x = 24\frac{36}{115} - \frac{5}{23} \cdot (x + 19) \cdot (x + 7)$

d) $3\frac{4}{87} = -\frac{3}{29} \cdot (x + 16) \cdot (x + 4) + \frac{2}{29}x$

Aufgabe 18:

a) $\frac{1}{12}i^2 - i + 3 = 0$

b) $-1{,}25z^2 - 14z - 23 = 0$

c) $\frac{1}{3}x^2 - 2x + 3 = 0$

d) $\frac{1}{15}x^2 + x + 3{,}75 = 0$

Aufgabe 19:

a) $-11{,}5x + 11{,}5x - \frac{1}{729}x^2 = -0{,}04$

b) $(3x - 163) = -10 \cdot (x - 3) \cdot (x - 6)$

c) $32{,}7q = -q \cdot (2q + 7\frac{4}{5}) - 175$

d) $6\frac{11}{20}x + x^2 = 3 + 9{,}8x$

Aufgabe 20:

a) $x^2 + 11x + 14{,}25 = 0$

b) $-x^2 - x + 110 = 0$

c) $\frac{1}{6}n^2 + n = 0$

d) $-\frac{1}{21}x^2 + x - 5\frac{1}{4} = 0$

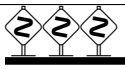
Aufgabe 21:

a) $(-7x - 37) = -2 \cdot (x + 5) \cdot (x + 7)$

b) $(-14{,}5y - 17) = -(y + 4) \cdot (y - 4)$

c) $\frac{1}{11} \cdot (15e - 137{,}75) = -\frac{1}{11} \cdot (e - 12) \cdot (e - 14)$

d) $(-d - 1\frac{9}{16}) = -(d + 5) \cdot (d - 8)$



Aufgabe 22:

a) $2t^2 - 35{,}5t + 155 = 0$

b) $-0{,}04m^2 + 1 = 0$

c) $x^2 - x - 56 = 0$

d) $-2x^2 - 19x + 26{,}875 = 0$

Aufgabe 23:

a) $\frac{2}{7}u = -1\frac{18}{49}u^2 + 0{,}625 + (1\frac{2}{7}u + \frac{1}{2})^2$

b) $-34\frac{1}{6}x - 273 = -x \cdot (5x + 7\frac{2}{3})$

c) $-48 \cdot (x - 5) \cdot (x + 18) + (55x - 4320) = -(7x - 1)^2 - 582{,}75x$

d) $0{,}125 \cdot (-6\frac{1}{2}e - 1) = -\frac{1}{16} \cdot (e - 1) \cdot (e + 14)$

Aufgabe 24:

a) $2x^2 + 21x - 23 = 0$

b) $\frac{1}{13}x^2 - x + 3{,}25 = 0$

c) $a^2 + 14{,}5a + 53 = 0$

d) $0{,}25d^2 + d + 1 = 0$

Aufgabe 25:

a) $\frac{1x}{3} \cdot (\frac{1x}{3} + 4) = (\frac{2x}{3} + 1)^2$

b) $\frac{1}{3} \cdot (-9\frac{2}{3}x - 5) = \frac{1}{9} \cdot (x - 6) \cdot (x - 5)$

c) $(-26r - 14{,}5) = (r - 18) \cdot (r + 1)$

d) $10j + 3j \cdot (j - 2) = 407$

Aufgabe 26:

a) $x^2 + 13\frac{4}{15}x + 44 = 0$

b) $-a^2 - 6{,}2a + 9{,}75 = 0$

c) $0{,}4x^2 - x + \frac{5}{8} = 0$

d) $\frac{1}{19}x^2 - x + 4{,}75 = 0$

Aufgabe 27:

a) $(-72x - 1727) - 36 \cdot (x + 6) \cdot (x - 8) = -(6x + 1) \cdot (6x - 1)$

b) $-\frac{2}{3} \cdot (x - 12) \cdot (x - 4) = -(-11\frac{2}{3}x + 31{,}625)$

c) $0{,}75x \cdot (-x - 7) + 17 = 1{,}75x$

d) $d^2 + 119 + 18{,}25d = -3{,}5d$

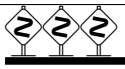
Aufgabe 28:

a) $3x^2 + 26{,}5x - 14 = 0$

b) $-s^2 = 0$

c) $4x^2 + 71x + 315 = 0$

d) $\frac{1}{3}t^2 + t - 36 = 0$



Aufgabe 29:

a) $-72 = 2\frac{1}{6}x + 3x^2 - (2x+9)\cdot(2x-9)$

b) $-(2c+2)\cdot(2c-2) + 3\cdot(c+20)\cdot(c+17) = -2\cdot(-52c-509)$

c) $-120{,}25 + (3x+2{,}25)\cdot(3x-2{,}25) - 135x = 9\cdot(x+1)\cdot(x-15)$

d) $-51 + a\cdot(4a+13{,}5) = 18\frac{1}{2}a$

Aufgabe 30:

a) $0{,}5n^2 - n = 0$

b) $x^2 - x + 0{,}25 = 0$

c) $-\frac{1}{4}x^2 + 8x - 55 = 0$

d) $-\frac{3}{32}x^2 + x - 2\frac{2}{3} = 0$

Aufgabe 31:

a) $(8i+14)\cdot(8i-14) = 207 + 23i + 58i^2$

b) $\frac{1}{49}\cdot(-9k+23{,}75) = -\frac{1}{49}\cdot(k+12)\cdot(k-3)$

c) $\frac{3}{4}x = -344 + 0{,}5x + 3x^2$

d) $0{,}2\cdot(v-15)\cdot(v-12) = -(4{,}4v - 34\frac{3}{4})$

Aufgabe 32:

a) $-b^2 = 0$

b) $-5x^2 + 43x - 92 = 0$

c) $\frac{1}{23}t^2 + 0{,}25t = 0$

d) $\frac{1}{15}x^2 + 2x + 15 = 0$

Aufgabe 33:

a) $-5x + x^2 - 2x = 131{,}75$

b) $f\cdot(\frac{3}{13}f - 7\frac{2}{3}) + 5\frac{2}{3}f = 13$

c) $4\cdot(x-4)\cdot(x+21) - 65x = -251$

d) $\frac{1}{1296}\cdot(x+6)\cdot(x-4) = -\frac{1}{54}\cdot(-\frac{1x}{12} - 1{,}16)$

Aufgabe 34:

a) $-x^2 - 8x + 26\frac{1}{4} = 0$

b) $-g^2 + 6{,}5g + 17 = 0$

c) $-2x^2 + 5x + 207 = 0$

d) $\frac{1}{289}i^2 - 0{,}25 = 0$

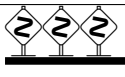
Aufgabe 35:

a) $67\frac{2}{3}x + 4x\cdot(x - \frac{2}{3}) = -259$

b) $5{,}375 = -x\cdot(\frac{2x}{43} + 7{,}25) + 8{,}25x$

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

d) $7x = (3x+1{,}5)\cdot(3x-1{,}5) - 1{,}5 - 8x^2$



Aufgabe 36:

a) $4x^2 - 13x + 6\frac{9}{25} = 0$

b) $-\frac{2}{11}s^2 + s - 1{,}375 = 0$

c) $e^2 - 5{,}3e + 7 = 0$

d) $4x^2 - 57x + 150{,}5 = 0$

Aufgabe 37:

a) $-20\frac{1}{3}v + 163\frac{8}{9} = \frac{4}{9} \cdot (v - 19) \cdot (v - 20)$

b) $-6 \cdot (x - 3) \cdot (x + 4) = -(48{,}5x - 61)$

c) $\frac{2}{3} \cdot (x - 5) \cdot (x - 5) = -\frac{1}{3} \cdot (-13x + 31)$

d) $-15 + x^2 - 15x = -13x$

Aufgabe 38:

a) $2x^2 - 11x + 2\frac{5}{8} = 0$

b) $-u^2 + 9u + 10 = 0$

c) $-15x^2 + 139x + 224 = 0$

d) $-x^2 + 11\frac{1}{3}x - 21 = 0$

Aufgabe 39:

a) $7z + (2z - 8)^2 + 51{,}5 = 2\frac{2}{3}z^2$

b) $-16{,}75p - 4{,}25p - p^2 = 104$

c) $x \cdot (3x + 2{,}5) + 94{,}25 = -31{,}5x$

d) $2 \cdot (x + 20) \cdot (x - 12) = -3 \cdot (-3x + 158\frac{1}{2})$

Aufgabe 40:

a) $4x^2 + 5x - 231 = 0$

b) $3m^2 + 49m + 190 = 0$

c) $x^2 - 2{,}5x - 21 = 0$

d) $\frac{2}{29}x^2 + x + 3{,}625 = 0$

Aufgabe 41:

a) $0{,}25x \cdot (x - 41) + 9{,}25x = -1$

b) $23 - \frac{2}{3}x = -x \cdot (x - 10)$

c) $(x + \frac{1}{2})^2 - \frac{4}{5} \cdot (x + 5) \cdot (x - 10) - 39 = 4x$

d) $2\frac{33}{124} = -\frac{1}{31} \cdot (15x + 155) - \frac{1}{31} \cdot (x + 15) \cdot (x + 1)$

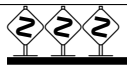
Aufgabe 42:

a) $4u^2 - 31u - 45 = 0$

b) $-\frac{1}{3}x^2 + 2x + 87{,}75 = 0$

c) $0{,}125c^2 - c + 2 = 0$

d) $-\frac{1}{16}m^2 - m - 4 = 0$



Aufgabe 43:

a) $2 \cdot (-5\frac{14}{15}x + 9) = \frac{1}{3} \cdot (x + 1) \cdot (x - 27)$

b) $8{,}6x + x \cdot (\frac{1x}{3} - \frac{3}{5}) = -45$

c) $-0{,}125x^2 + (\frac{1x}{2} - 1)^2 = -1$

d) $-(k + 5) \cdot (k - 25) = -(-26k - 1{,}75)$

Aufgabe 44:

a) $2r^2 + 19r + 42\frac{7}{9} = 0$

b) $-6w^2 - 3\frac{1}{2}w + 5 = 0$

c) $-0{,}5i^2 - 5i + 12 = 0$

d) $x^2 + 5x - 74{,}75 = 0$

Aufgabe 45:

a) $-(0{,}25i + 2)^2 = -0$

b) $(0{,}5x + 1) = -(x + 2) \cdot (x + 8)$

c) $(0{,}5x + 1) \cdot (\frac{1x}{2} - 1) - x^2 - 12x + 64 = -(x + 16) \cdot (x - 4)$

d) $0{,}2 \cdot (x + 2) \cdot (x - 11) = -\frac{1}{5} \cdot (6\frac{1}{2}x + 22)$

Aufgabe 46:

a) $-\frac{1}{12}w^2 - w - 3 = 0$

b) $\frac{1}{11}x^2 + x + 2{,}75 = 0$

c) $0{,}2x^2 - x + 1\frac{1}{4} = 0$

d) $-x^2 + x - 0{,}25 = 0$

Aufgabe 47:

a) $2 \cdot (1\frac{2}{3}s + 4) = 0{,}5 \cdot (s - 2) \cdot (s + 8)$

b) $39 + i \cdot (i + 6) = 22i$

c) $170{,}5 = 139x + 4 \cdot (x - 3) \cdot (x - 19)$

d) $13{,}5x + 0{,}5x \cdot (x - 17) = -8$

Aufgabe 48:

a) $-\frac{1}{17}x^2 + 0{,}5x = 0$

b) $2x^2 - 19x + 39 = 0$

c) $2x^2 - 19x - 33 = 0$

d) $x^2 - 3x + 4 = 0$

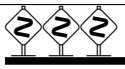
Aufgabe 49:

a) $a \cdot (-a + 12{,}5) = -(a + 6) \cdot (a - 5) + 1$

b) $x \cdot (-0{,}125x + 0) + (0{,}5x + 1)^2 = -1$

c) $(-13x + 128) = -995 - 6 \cdot (x + 14) \cdot (x - 16)$

d) $\frac{1}{14} \cdot (x + 8) \cdot (x - 10) = -\frac{2}{7} \cdot (-3x + 20)$



Aufgabe 50:

a) $x^2 - 10{,}25x - 4\frac{4}{9} = 0$

b) $-16s + 64 = 0$

c) $\frac{1}{625}h^2 - \frac{1}{16} = 0$

d) $\frac{2}{3}x^2 + x - 5{,}625 = 0$

Aufgabe 51:

a) $-24 \cdot (x-4) \cdot (x+5) = -(48\frac{2}{3}x - 459) - (5x-4)^2$

b) $-0{,}5 \cdot (x+2) \cdot (x+6) = 5 - 7x - (x+3) \cdot (x-3)$

c) $(-8x - 2\frac{1}{16}) = -(x-6) \cdot (x+22)$

d) $(x+1) \cdot (x+29) = -39 \cdot (-0{,}5x + 0)$

Aufgabe 52:

a) $1\frac{2}{3}j^2 - 4j - 99 = 0$

b) $z^2 = 0$

c) $\frac{2}{37}x^2 + x + 4{,}625 = 0$

d) $\frac{1}{12}x^2 - x - 6{,}72 = 0$

Aufgabe 53:

a) $-8 + x \cdot (\frac{1x}{2} - 10\frac{2}{3}) = -7\frac{2}{3}x$

b) $-(5x+3)^2 + 24 \cdot (x-1) \cdot (x+11) = -253 + 219x$

c) $39 = -36\frac{1}{4}r - r \cdot (2r - 7{,}25)$

d) $4 \cdot (x+6) \cdot (x-108) + (180x + 91) + 211x = -1856$

Aufgabe 54:

a) $\frac{1}{7}x^2 - 0{,}5x = 0$

b) $-y^2 - 0{,}5y + 68 = 0$

c) $j^2 = 0$

d) $-2\frac{2}{9}g^2 + 19g - 27 = 0$

Aufgabe 55:

a) $(-x + 55) + 10 \cdot (x+9) \cdot (x-21) = -1646$

b) $-(0{,}5x + 1) \cdot (0{,}5x - 1) = -x \cdot (\frac{1x}{6} + 1) + 1$

c) $x \cdot (x-12) = 4\frac{1}{4}x - 69$

d) $-99x - 31 \cdot (x+6) \cdot (x-8) = 1441 - (6x+7)^2$

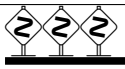
Aufgabe 56:

a) $-\frac{1}{31}z^2 + \frac{1}{3}z = 0$

b) $\frac{4}{9}h^2 - h - 38{,}5 = 0$

c) $x^2 + 5x + 7 = 0$

d) $x^2 - 16{,}25x + 67 = 0$



Aufgabe 57:

a) $2 + 18u - 80u^2 = -(9u - 1{,}5)^2$

b) $-22743 - 63 \cdot (d + 19) \cdot (d - 19) + (8d - 4)^2 = -56{,}5d$

c) $-(5x - 1)^2 - 2 = -x \cdot (24x - 8\frac{5}{6})$

d) $0{,}25j \cdot (-0{,}5j - 11) + 3{,}75j = 2$

Aufgabe 58:

a) $-\frac{1}{3}x^2 - 2x - 2{,}25 = 0$

b) $3m^2 + 28m - 143 = 0$

c) $\frac{1}{6}x^2 - x - 36 = 0$

d) $2h^2 - 31h + 119 = 0$

Aufgabe 59:

a) $(-19x + 161\frac{1}{8}) = -2 \cdot (x - 8) \cdot (x + 20)$

b) $-\frac{1}{4}x - 10\frac{3}{4}x + 2x^2 = 23\frac{8}{9}$

c) $3 \cdot (x + 19) = -2 \cdot (x + 4) \cdot (x - 8)$

d) $3 \cdot (-x - 60) = (x + 12) \cdot (x - 15)$

Aufgabe 60:

a) $-\frac{1}{3}x^2 - 2x - 3 = 0$

b) $12h^2 + 131h + 319 = 0$

c) $2x^2 + 17x + 31\frac{5}{8} = 0$

d) $6x^2 - 109x + 493 = 0$

Aufgabe 61:

a) $(56x + 187) = 6 \cdot (x + 10) \cdot (x + 25) - 232\frac{1}{2}x - 1060$

b) $11 \cdot (\frac{1x}{7} - 1) = -\frac{1}{7} \cdot (x - 7) \cdot (x - 18)$

c) $(-9x - 284{,}5) = -(2x + 2)^2 + 2\frac{2}{3} \cdot (x - 12) \cdot (x + 9)$

d) $x \cdot (35x + 4{,}5) + 12 = (6x + 4) \cdot (6x - 4)$

Aufgabe 62:

a) $2y^2 - 31y + 105 = 0$

b) $q^2 - 0{,}5q + 3 = 0$

c) $x^2 - \frac{1}{9} = 0$

d) $\frac{1}{7}x^2 + 2x + 7 = 0$

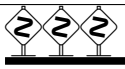
Aufgabe 63:

a) $-3\frac{1}{12}c + 3\frac{1}{3}c = -\frac{1}{21}c^2$

b) $89x + 4 \cdot (x + 1) \cdot (x - 26) = -78{,}5$

c) $(2x + 7)^2 = -11 \cdot (x + 3{,}5)$

d) $-\frac{1}{32} \cdot (x - 10) \cdot (x + 11) = -\frac{5}{16} \cdot (1\frac{1}{6}x - 11)$



Aufgabe 64:

a) $-90{,}25 = 0$

b) $b^2 + 10b - 11 = 0$

c) $e^2 - 6\frac{1}{2}e - 116 = 0$

d) $m^2 - 3{,}2m + 1{,}75 = 0$

Aufgabe 65:

a) $12 - 1{,}5x = -x \cdot (-x - 7)$

b) $37x = 27 - 2x \cdot (x - 6)$

c) $-22x^2 - 22x = -(5x + 5)^2$

d) $-\frac{1}{81} \cdot (x + 3) \cdot (x - 10) = -\frac{1}{27} \cdot (-2\frac{1}{3}x - 3{,}25)$

Aufgabe 66:

a) $2h^2 + 57h + 403 = 0$

b) $x^2 - 6\frac{1}{6}x - 10 = 0$

c) $2x^2 + 27x + 1 = 0$

d) $3v^2 + 5v - 232 = 0$

Aufgabe 67:

a) $(7x + 21) \cdot (7x - 21) - 34 \cdot (x - 1) \cdot (x - 410) + 10 \cdot (-1409x + 102) = -12510$

b) $(-21x + 156{,}5) = -(2x - 13)^2$

c) $-0{,}4 \cdot (x + 16) \cdot (x + 7) + 44{,}175 = -10{,}2x$

d) $0{,}2x \cdot (x + 19) = -5 + 1{,}8x$

Aufgabe 68:

a) $0{,}5x^2 - 7x + 24 = 0$

b) $x^2 - 2\frac{1}{4}x - 7 = 0$

c) $\frac{1}{47}x^2 - \frac{1}{5}x = 0$

d) $5x^2 - 24x + 19 = 0$

Aufgabe 69:

a) $(t + 2) \cdot (t - 6) = -(-0{,}5t - 1)$

b) $(6x + 4)^2 = -x \cdot (-35x - 37{,}9) - 11$

c) $0{,}25 + (n - 4) \cdot (n + 9) = 4n$

d) $11 + n \cdot (-n + 11\frac{2}{3}) = 21\frac{2}{3}n$

Aufgabe 70:

a) $2e^2 - 21e - 155 = 0$

b) $-8w = 0$

c) $x^2 - 7x - 60 = 0$

d) $\frac{1}{81}x^2 - 0{,}25 = 0$

Lösungen:

1a $-x^2 - 9x - 23 = 0$ $\quad \emptyset$

1b $\frac{1}{3}e^2 - 2e + 3 = 0$ $\quad \{3\}$

1c $0{,}25x^2 + x = 0$ $\quad \{-4; 0\}$

1d $\frac{2}{3}v^2 - 7v - 45 = 0$ $\quad \{-4{,}5; 15\}$

2a $\{4{,}5\}$

2b $\{-\frac{25}{28}\}$

2c $\{-7; 18\}$

2d $\{-7\frac{1}{2}; 5{,}5\}$

3a $\frac{1}{3}x^2 + 0{,}25x = 0$ $\quad \{-0{,}75; 0\}$

3b $\frac{1}{729}v^2 - \frac{1}{16} = 0$ $\quad \{6\frac{3}{4}; -6\frac{3}{4}\}$

3c $-2y^2 - 0{,}5y + 75 = 0$ $\quad \{6; -6{,}25\}$

3d $-x^2 - 12x - 35 = 0$ $\quad \{-5; -7\}$

4a $\{-2\frac{1}{2}\}$

4b $\{-7\frac{2}{3}; 11\frac{2}{3}\}$

4c $\{-4\}$

4d $\{-8\frac{2}{3}; 0\}$

5a $-j^2 - 23{,}5j - 124 = 0$ $\quad \{-15{,}5; -8\}$

5b $x^2 - 5\frac{2}{3}x + 9 = 0$ $\quad \emptyset$

5c $-6s^2 - 47s + 25 = 0$ $\quad \{0{,}5; -8\frac{1}{3}\}$

5d $x^2 - 16x + 21{,}75 = 0$ $\quad \{1{,}5; 14{,}5\}$

6a $\{3{,}5\}$

6b $\{7{,}75; -11{,}75\}$

6c $\emptyset$

6d $\{-3\}$

7a $r^2 - 5r - 36 = 0$ $\quad \{9; -4\}$

7b $-x^2 - 9{,}5x - 12 = 0$ $\quad \{-8; -1\frac{1}{2}\}$

7c $0{,}5x^2 + 9x + 28 = 0$ $\quad \{-14; -4\}$

7d $2f^2 + 11f - 82{,}875 = 0$ $\quad \{4\frac{1}{4}; -9{,}75\}$

8a $\{4{,}5; -0{,}9\}$

8b $\{-11; 8{,}75\}$

8c $\{-8{,}25; 0{,}5\}$

8d $\{3\}$

9a $-\frac{1}{3}x^2 - x - \frac{18}{25} = 0$ $\{-1{,}2; -1\frac{4}{5}\}$

9b $\frac{1}{31}b^2 + 0{,}25b = 0$ $\{-7{,}75; 0\}$

9c $x^2 - 14x + 48{,}75 = 0$ $\{6{,}5; 7\frac{1}{2}\}$

9d $2x^2 - 23{,}5x + 35 = 0$ $\{1\frac{3}{4}; 10\}$

10a $\{-1; 5{,}4\}$

10b $\{2\frac{4}{5}; 6{,}5\}$

10c $\{8{,}25; 4{,}75\}$

10d $\{-4{,}5; 0\}$

11a $-4x^2 - 17x + 9\frac{1}{2} = 0$ $\{-4{,}75; 0{,}5\}$

11b $\frac{1}{1849}x^2 - 0{,}04 = 0$ $\{8\frac{3}{5}; -8{,}6\}$

11c $1\frac{1}{2}x^2 + 13x - 32 = 0$ $\{-10\frac{2}{3}; 2\}$

11d $-c^2 + c + 210 = 0$ $\{-14; 15\}$

12a $\{-2{,}5; 8\}$

12b $\{-3\frac{2}{3}; -6{,}5\}$

12c $\{-5{,}5; 6{,}4\}$

12d $\{11\frac{2}{3}; -3\frac{1}{3}\}$

13a $4x^2 + 15x - 71\frac{1}{2} = 0$ $\{-6{,}5; 2{,}75\}$

13b $0{,}5g^2 - 7g + 24 = 0$ $\{8; 6\}$

13c $2{,}4x^2 - 41x + 175 = 0$ $\{8{,}75; 8\frac{1}{3}\}$

13d $-2j^2 - 26{,}5j - 87 = 0$ $\{-7{,}25; -6\}$

14a $\{8{,}5; 1{,}5\}$

14b $\{8; -12\}$

14c $\{-2{,}5; -10\frac{1}{2}\}$

14d $\{8{,}5; 0\}$

15a $5c^2 - 26c - 274\frac{5}{16} = 0$ $\{-5{,}25; 10{,}45\}$

15b $0{,}25x^2 + x + 1 = 0$ $\{-2\}$

15c $-x^2 = 0$ $\{0\}$

15d $-x^2 + 12\frac{1}{2}x + 21 = 0$ $\{-1{,}5; 14\}$

16a $\{14; 1\}$

16b $\{-4; 4\}$

16c $\{-3{,}5; 11{,}25\}$

16d $\{3\frac{1}{3}; 8\frac{2}{3}\}$

17a $x^2 = 0$ $\{0\}$

17b $\frac{2}{11}s^2 + s + 1{,}375 = 0$ $\{-2{,}75\}$

17c $\frac{5}{23}x^2 + 2x + 4\frac{3}{5} = 0$ $\{-4{,}6\}$

17d $\frac{3}{29}x^2 + 2x + 9\frac{2}{3} = 0$ $\{-9\frac{2}{3}\}$

18a $\{6\}$

18b $\{-2; -9{,}2\}$

18c $\{3\}$

18d $\{-7{,}5\}$

19a $-\frac{1}{729}x^2 + \frac{1}{25} = 0$ $\{5{,}4; -5{,}4\}$

19b $10x^2 - 87x + 17 = 0$ $\{\frac{1}{5}; 8{,}5\}$

19c $2q^2 + 40{,}5q + 175 = 0$ $\{-14; -6{,}25\}$

19d $x^2 - 3\frac{1}{4}x - 3 = 0$ $\{4; -0{,}75\}$

20a $\{-1{,}5; -9\frac{1}{2}\}$

20b $\{-11; 10\}$

20c $\{-6; 0\}$

20d $\{10{,}5\}$

21a $2x^2 + 17x + 33 = 0$ $\{-3; -5{,}5\}$

21b $y^2 - 14{,}5y - 33 = 0$ $\{-2; 16\frac{1}{2}\}$

21c $\frac{1}{11}e^2 - e + 2{,}75 = 0$ $\{5{,}5\}$

21d $d^2 - 4d - 41\frac{9}{16} = 0$ $\{-4{,}75; 8{,}75\}$

22a $\{10; 7\frac{3}{4}\}$

22b $\{-5; 5\}$

22c $\{-7; 8\}$

22d $\{-10{,}75; 1{,}25\}$

23a $-\frac{2}{7}u^2 - u - 0{,}875 = 0$ $\{-1{,}75\}$

23b $5x^2 - 26{,}5x - 273 = 0$ $\{10{,}5; -5{,}2\}$

23c $x^2 - \frac{1}{4}x + 1 = 0$ $\emptyset$

23d $\frac{1}{16}e^2 - 1 = 0$ $\{4; -4\}$

24a $\{-11{,}5; 1\}$

24b $\{6{,}5\}$

24c $\emptyset$

24d $\{-2\}$

25a $-\frac{1}{3}x^2 - 1 = 0$ $\emptyset$

25b $-\frac{1}{9}x^2 - 2x - 5 = 0$ $\{-15; -3\}$

25c $-r^2 - 9r + 3{,}5 = 0$ $\{-4{,}5 \pm \sqrt{23{,}75}\}$

25d $3j^2 + 4j - 407 = 0$ $\{11; -12\frac{1}{3}\}$

26a $\{-6\frac{3}{5}; -6\frac{2}{3}\}$
26b $\{-7{,}5; 1{,}3\}$
26c $\{1{,}25\}$
26d $\{9{,}5\}$

27a $0 = 0$ $\mathbb{R}$
27b $-\frac{2}{3}x^2 - x - \frac{3}{8} = 0$ $\{-0{,}75\}$
27c $-0{,}75x^2 - 7x + 17 = 0$ $\{-11\frac{1}{3}; 2\}$
27d $d^2 + 21{,}75d + 119 = 0$ $\emptyset$

28a $\{-9\frac{1}{3}; 0{,}5\}$
28b $\{0\}$
28c $\{-9; -8{,}75\}$
28d $\{-12; 9\}$

29a $x^2 - 2\frac{1}{6}x - 153 = 0$ $\{13{,}5; -11\frac{1}{3}\}$
29b $-c^2 + 7c + 6 = 0$ $\{3{,}5 \pm \sqrt{18{,}25}\}$
29c $-9x + 9\frac{11}{16} = 0$ $\{1\frac{11}{144}\}$
29d $4a^2 - 5a - 51 = 0$ $\{4{,}25; -3\}$

30a $\{2; 0\}$
30b $\{\frac{1}{2}\}$
30c $\{22; 10\}$
30d $\{5\frac{1}{3}\}$

31a $6i^2 - 23i - 403 = 0$ $\{-6{,}5; 10\frac{1}{3}\}$
31b $\frac{1}{49}k^2 - \frac{1}{4} = 0$ $\{3{,}5; -3{,}5\}$
31c $-3x^2 + 0{,}25x + 344 = 0$ $\{10{,}75; -10\frac{2}{3}\}$
31d $0{,}2v^2 - v + 1{,}25 = 0$ $\{2{,}5\}$

32a $\{0\}$
32b $\{4; 4{,}6\}$
32c $\{-5\frac{3}{4}; 0\}$
32d $\{-15\}$

33a $x^2 - 7x - 131{,}75 = 0$ $\{15{,}5; -8{,}5\}$
33b $\frac{3}{13}f^2 - 2f - 13 = 0$ $\{13; -4\frac{1}{3}\}$
33c $4x^2 + 3x - 85 = 0$ $\{-5; 4{,}25\}$
33d $\frac{1}{1296}x^2 - 0{,}04 = 0$ $\{7{,}2; -7{,}2\}$

34a $\{2{,}5; -10\frac{1}{2}\}$

34b $\{-2; 8{,}5\}$

34c $\{11{,}5; -9\}$

34d $\{8{,}5; -8{,}5\}$

35a $4x^2 + 65x + 259 = 0$ $\{-7; -9{,}25\}$

35b $\frac{2}{43}x^2 - x + 5\frac{3}{8} = 0$ $\{10{,}75\}$

35c $5x^2 - 17x + 14 = 0$ $\{2; 1\frac{2}{5}\}$

35d $-x^2 + 7x + 3\frac{3}{4} = 0$ $\{-0{,}5; 7\frac{1}{2}\}$

36a $\{0{,}6; 2{,}65\}$

36b $\{2{,}75\}$

36c $\{2{,}8; 2\frac{1}{2}\}$

36d $\{10{,}75; 3{,}5\}$

37a $-\frac{4}{9}v^2 - 3v - 5 = 0$ $\{-3; -3{,}75\}$

37b $-6x^2 + 42\frac{1}{2}x + 11 = 0$ $\{-\frac{1}{4}; 7\frac{1}{3}\}$

37c $\frac{2}{3}x^2 - 11x + 27 = 0$ $\{3; 13{,}5\}$

37d $x^2 - 2x - 15 = 0$ $\{5; -3\}$

38a $\{5\frac{1}{4}; 0{,}25\}$

38b $\{-1; 10\}$

38c $\{10\frac{2}{3}; -1{,}4\}$

38d $\{9; 2\frac{1}{3}\}$

39a $1\frac{1}{3}z^2 - 25z + 115{,}5 = 0$ $\{8{,}25; 10{,}5\}$

39b $-p^2 - 21p - 104 = 0$ $\{-8; -13\}$

39c $3x^2 + 34x + 94{,}25 = 0$ $\{-6{,}5; -4\frac{5}{6}\}$

39d $2x^2 + 7x - 4{,}5 = 0$ $\{-1{,}75 \pm \sqrt{5\frac{5}{16}}\}$

40a $\{7; -8{,}25\}$

40b $\{-6\frac{1}{3}; -10\}$

40c $\{6; -3{,}5\}$

40d $\{-7{,}25\}$

41a $0{,}25x^2 - x + 1 = 0$ $\{2\}$

41b $x^2 - 10\frac{2}{3}x + 23 = 0$ $\{3; 7\frac{2}{3}\}$

41c $0{,}2x^2 + x + 1{,}25 = 0$ $\{-2\frac{1}{2}\}$

41d $\frac{1}{31}x^2 + x + 7{,}75 = 0$ $\{-15{,}5\}$

42a $\{9; -1\frac{1}{4}\}$

42b $\{-13{,}5; 19{,}5\}$

42c $\{4\}$

42d $\{-8\}$

43a $-\frac{1}{3}x^2 - 3{,}2x + 27 = 0$ $\{-15; 5{,}4\}$

43b $\frac{1}{3}x^2 + 8x + 45 = 0$ $\{-9; -15\}$

43c $0{,}125x^2 - x + 2 = 0$ $\{4\}$

43d $-k^2 - 6k + 123{,}25 = 0$ $\{8{,}5; -14{,}5\}$

44a $\{-3\frac{2}{3}; -5\frac{5}{6}\}$

44b $\{-1{,}25; \frac{2}{3}\}$

44c $\{-12; 2\}$

44d $\{6{,}5; -11{,}5\}$

45a $-\frac{1}{16}i^2 - i - 4 = 0$ $\{-8\}$

45b $x^2 + 10\frac{1}{2}x + 17 = 0$ $\{-2; -8{,}5\}$

45c $0{,}25x^2 - 1 = 0$ $\{-2; 2\}$

45d $\frac{1}{5}x^2 - \frac{1}{2}x = 0$ $\{2{,}5; 0\}$

46a $\{-6\}$

46b $\{-5\frac{1}{2}\}$

46c $\{2{,}5\}$

46d $\{0{,}5\}$

47a $-0{,}5s^2 + \frac{1}{3}s + 16 = 0$ $\{6; -5\frac{1}{3}\}$

47b $i^2 - 16i + 39 = 0$ $\{3; 13\}$

47c $-4x^2 - 51x - 57{,}5 = 0$ $\{-1\frac{1}{4}; -11{,}5\}$

47d $0{,}5x^2 + 5x + 8 = 0$ $\{-8; -2\}$

48a $\{0; 8{,}5\}$

48b $\{6{,}5; 3\}$

48c $\{-1{,}5; 11\}$

48d $\emptyset$

49a $13\frac{1}{2}a - 31 = 0$ $\{2\frac{8}{27}\}$

49b $\frac{1}{8}x^2 + x + 2 = 0$ $\{-4\}$

49c $6x^2 - 25x - 221 = 0$ $\{8{,}5; -4\frac{1}{3}\}$

49d $\frac{1}{14}x^2 - x = 0$ $\{14; 0\}$

50a $\{10\frac{2}{3}; -\frac{5}{12}\}$

50b $\{4\}$

50c $\{-6\frac{1}{4}; 6{,}25\}$

50d $\{-3{,}75; 2{,}25\}$

51a $x^2 - 15\frac{1}{3}x + 37 = 0$ $\{12\frac{1}{3}; 3\}$

51b $0{,}5x^2 + 3x - 20 = 0$ $\{-10; 4\}$

51c $x^2 + 8x - 134\frac{1}{16} = 0$ $\{8{,}25; -16\frac{1}{4}\}$

51d $x^2 + 10{,}5x + 29 = 0$ $\emptyset$

52a $\{-6{,}6; 9\}$

52b $\{0\}$

52c $\{-9{,}25\}$

52d $\{-4{,}8; 16{,}8\}$

53a $0{,}5x^2 - 3x - 8 = 0$ $\{-2; 8\}$

53b $-x^2 - 9x - 20 = 0$ $\{-4; -5\}$

53c $2r^2 + 29r + 39 = 0$ $\{-1{,}5; -13\}$

53d $4x^2 - 17x - 645 = 0$ $\{-10{,}75; 15\}$

54a $\{3{,}5; 0\}$

54b $\{8; -8{,}5\}$

54c $\{0\}$

54d $\{1{,}8; 6{,}75\}$

55a $10x^2 - 121x - 189 = 0$ $\{-1{,}4; 13{,}5\}$

55b $-\frac{1}{12}x^2 + x = 0$ $\{12; 0\}$

55c $x^2 - 16{,}25x + 69 = 0$ $\emptyset$

55d $5x^2 + 47x + 96 = 0$ $\{-3; -6{,}4\}$

56a $\{10\frac{1}{3}; 0\}$

56b $\{10{,}5; -8{,}25\}$

56c $\emptyset$

56d $\emptyset$

57a $u^2 - 9u + 4\frac{1}{4} = 0$ $\{8{,}5; 0{,}5\}$

57b $d^2 - 7{,}5d + 16 = 0$ $\emptyset$

57c $-x^2 + 1\frac{1}{6}x - 3 = 0$ $\emptyset$

57d $-0{,}125j^2 + j - 2 = 0$ $\{4\}$

58a $\{-4{,}5; -1{,}5\}$

58b $\{-13; 3\frac{2}{3}\}$

58c $\{-12; 18\}$

58d $\{7; 8{,}5\}$

59a $2x^2 + 5x - 158{,}875 = 0$ $\{7{,}75; -10{,}25\}$

59b $2x^2 - 11x - 23\frac{8}{9} = 0$ $\{-1\frac{2}{3}; 7\frac{1}{6}\}$

59c $2x^2 - 5x - 7 = 0$ $\{3{,}5; -1\}$

59d $-x^2 = 0$ $\{0\}$

60a $\{-3\}$

60b $\{-3\frac{2}{3}; -7{,}25\}$

60c $\{-2{,}75; -5{,}75\}$

60d $\{9\frac{2}{3}; 8{,}5\}$

61a $-6x^2 + 78{,}5x - 253 = 0$ $\{7\frac{1}{3}; 5{,}75\}$

61b $\frac{1}{7}x^2 - 2x + 7 = 0$ $\{7\}$

61c $1\frac{1}{3}x^2 + 7x + 7{,}5 = 0$ $\{-1{,}5; -3{,}75\}$

61d $-x^2 + 4{,}5x + 28 = 0$ $\{8; -3{,}5\}$

62a $\{10{,}5; 5\}$

62b $\emptyset$

62c $\{-\frac{1}{3}; \frac{1}{3}\}$

62d $\{-7\}$

63a $\frac{1}{21}c^2 + \frac{1}{4}c = 0$ $\{-5{,}25; 0\}$

63b $4x^2 - 11x - 25{,}5 = 0$ $\{-1{,}5; 4{,}25\}$

63c $4x^2 + 39x + 87\frac{1}{2} = 0$ $\{-6{,}25; -3{,}5\}$

63d $-\frac{1}{32}x^2 + \frac{1}{3}x = 0$ $\{10\frac{2}{3}; 0\}$

64a $\emptyset$

64b $\{1; -11\}$

64c $\{-8; 14{,}5\}$

64d $\{2{,}5; 0{,}7\}$

65a $-x^2 - 8\frac{1}{2}x + 12 = 0$ $\{-4{,}25 \pm \sqrt{30\frac{1}{16}}\}$

65b $2x^2 + 25x - 27 = 0$ $\{-13{,}5; 1\}$

65c $3x^2 + 28x + 25 = 0$ $\{-8\frac{1}{3}; -1\}$

65d $-\frac{1}{81}x^2 + \frac{1}{4} = 0$ $\{4{,}5; -4{,}5\}$

66a $\{-13; -15\frac{1}{2}\}$

66b $\{-1\frac{1}{3}; 7{,}5\}$

66c $\{-6{,}75 \pm \sqrt{45\frac{1}{16}}\}$

66d $\{-9\frac{2}{3}; 8\}$

67a $15x^2 - 116x - 851 = 0$ $\{12\frac{1}{3}; -4{,}6\}$

67b $4x^2 - 73x + 325{,}5 = 0$ $\{10{,}5; 7{,}75\}$

67c $-0{,}4x^2 + x - 0{,}625 = 0$ $\{1\frac{1}{4}\}$

67d $0{,}2x^2 + 2x + 5 = 0$ $\{-5\}$

68a $\{6; 8\}$

68b $\{4; -1{,}75\}$

68c $\{9{,}4; 0\}$

68d $\{3{,}8; 1\}$

69a $t^2 - 4\frac{1}{2}t - 13 = 0$ $\{6\frac{1}{2}; -2\}$

69b $x^2 + 10{,}1x + 27 = 0$ $\emptyset$

69c $n^2 + n - 35{,}75 = 0$ $\{-6\frac{1}{2}; 5{,}5\}$

69d $-n^2 - 10n + 11 = 0$ $\{1; -11\}$

70a $\{15{,}5; -5\}$

70b $\{0\}$

70c $\{-5; 12\}$

70d $\{-4{,}5; 4{,}5\}$

Gesamtpunktzahl: