Lösungen B

a) p-q-Formel

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

$x_{1/2} = +2{,}5 \pm \sqrt{6{,}25 - 6}$

$x_{1/2} = +2{,}5 \pm \sqrt{0{,}25}$

$x_{1/2} = +1{,}5 \pm 0{,}5$

$x_1 = 3$ und $x_2 = 2$

$L = \{2;3\}$

quadratische Ergänzung

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

$x^2 - 5x + 6{,}25 = -6 + 6{,}25$

$(x - 2{,}5)^2 = 0{,}25 \mid \sqrt{\ }$

$x - 2{,}5 = \pm 0{,}5 \mid + 2{,}5$

$x_1 = 3$ und $x_2 = 2$

$L = \{2;3\}$

b)

$2x^2 - 5x = 0 \mid : 2$

$x^2 - 2{,}5x = 0$

$x(x - 2{,}5) = 0$

$x_1 = 0$ und $x_2 = 2{,}5$

$L = \{0;2{,}5\}$

c)

$0{,}5x^2 - 50 = 0 \mid + 50$

$0{,}5x^2 = 50 \mid : 0{,}5$

$x^2 = 100 \mid \sqrt{\ }$

$x_1 = 10$ und $x_2 = -10$

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

d) p-q-Formel

$-4x^2 - 4x + 8 = 0 \mid : (-4)$

$x^2 + x - 2 = 0$

$x_{1/2} = -0{,}5 \pm \sqrt{0{,}25 + 2}$

$x_{1/2} = -0{,}5 \pm \sqrt{2{,}25}$

$x_{1/2} = -0{,}5 \pm 1{,}5$

$x_1 = 1$ und $x_2 = -2$

$L = \{-2;1\}$

quadratische Ergänzung

$-4x^2 - 4x + 8 = 0 \mid : (-4)$

$x^2 + x - 2 = 0 \mid + 2$

$x^2 + x + 0{,}25 = 2 + 0{,}25$

$(x + 0{,}5)^2 = 2{,}25 \mid \sqrt{\ }$

$x + 0{,}5 = \pm 1{,}5 \mid - 0{,}5$

$x_1 = 1$ und $x_2 = -2$

$L = \{-2;1\}$

e)

$x^2 = 4x \mid - 4x$

$x^2 - 4x = 0$

$x(x - 4) = 0$

$x_1 = 0$ und $x_2 = 4$

$L = \{0;4\}$

f) p-q-Formel

$x^2 = 3x - 7 \mid - 3x + 7$

$x^2 - 3x + 7 = 0$

$x_{1/2} = 1{,}5 \pm \sqrt{2{,}25 - 7}$

$x_{1/2} = 1{,}5 \pm \sqrt{-4{,}75}$

n.l.

$L = \{\ \}$

quadratische Ergänzung

$x^2 = 3x - 7 \mid - 3x$

$x^2 - 3x = -7$

$x^2 - 3x + 2{,}25 = -7 + 2{,}25$

$(x - 1{,}5)^2 = -4{,}75 \mid \sqrt{\ }$

n.l.

$L = \{\ \}$

g)

$\frac{1}{3}x^2 - 2x + 3 = 0 \mid : \frac{1}{3}$

$x^2 - 6x + 9 = 0$

$x_{1/2} = 3 \pm \sqrt{9 - 9}$

$x_{1/2} = 3 \pm \sqrt{0}$

$x_{1/2} = 3$

$L = \{3\}$

h)

$-x^2 - 8x = -25 - 8x \mid + 8x$

$-x^2 = -25 \mid : (-1)$

$x^2 = 25 \mid \sqrt{\ }$

$x_1 = 5$ und $x_2 = -5$

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

i)

$36 = -x^2 \,|:(-1)$

$-36 = x^2 \,|\sqrt{\ }$

n.l.

$L = \{\ \}$

j)

$5{,}6x = 1{,}4x^2 \,|-5{,}6x$

$1{,}4x^2 - 5{,}6x = 0 \,|:1{,}4$

$x^2 - 4x = 0$

$x(x-4) = 0$

$x_1 = 0$ und $x_2 = 4$

$L = \{0;4\}$

k)

$3x^2 = 0 \,|:3$

$x^2 = 0 \,|\sqrt{\ }$

$x_{1/2} = 0$

$L = \{0\}$

l) p-q-Formel

$12 - x = x^2 \,|-12 + x$

$x^2 + x - 12 = 0$

$x_{1/2} = -0{,}5 \pm \sqrt{0{,}25 + 12}$

$x_{1/2} = -0{,}5 \pm \sqrt{12{,}25}$

$x_{1/2} = -0{,}5 \pm 3{,}5$

$x_1 = 3$ und $x_2 = -4$

$L = \{-4;3\}$

quadratische Ergänzung

$12 - x = x^2 \,|+ x$

$x^2 + x = 12$

$x^2 + x + 0{,}25 = 12 + 0{,}25$

$(x + 0{,}5)^2 = 12{,}25 \,|\sqrt{\ }$

$x + 0{,}5 = \pm 3{,}5 \,|-0{,}5$

$x_1 = 3$ und $x_2 = -4$

$L = \{-4;3\}$

m)

$-4x = 2x^2 \,|+4x$

$2x^2 + 4x = 0 \,|:2$

$x^2 + 2x = 0$

$x(x+2) = 0$

$x_1 = 0$ und $x_2 = -2$

$L = \{-2;0\}$

n) p-q-Formel

$6x^2 - 18x + 36 = 0 \,|:6$

$x^2 - 3x + 6 = 0$

$x_{1/2} = 1{,}5 \pm \sqrt{2{,}25 - 6}$

$x_{1/2} = 1{,}5 \pm \sqrt{-3{,}75}$

n.l.

$L = \{\ \}$

quadratische Ergänzung

$6x^2 - 18x + 36 = 0 \,|:6$

$x^2 - 3x + 6 = 0 \,|-6$

$x^2 - 3x + 2{,}25 = -6 + 2{,}25$

$(x - 1{,}5)^2 = -3{,}75 \,|\sqrt{\ }$

n.l.

$L = \{\ \}$

o)

$0{,}1x^2 - 4{,}9 = 0 \,|+4{,}9$

$0{,}1x^2 = 4{,}9 \,|:0{,}1$

$x^2 = 49 \,|\sqrt{\ }$

$x_1 = 7$ und $x_2 = -7$

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