

① a) $x_{1/2} = \frac{8 \pm \sqrt{64 - 4 \cdot 15}}{2} = \frac{8 \pm 2}{2} \Rightarrow x_1 = 5, x_2 = 3$
 b) $x_{1/2} = \frac{1 \pm \sqrt{1 + 4 \cdot 4}}{2} = \frac{1 \pm 3}{2} \Rightarrow x_1 = 2, x_2 = -1$
 c) $x_{1/2} = \frac{1 \pm \sqrt{1 + 4 \cdot 2}}{-2} = \frac{1 \pm 3}{-2} \Rightarrow x_1 = -2, x_2 = 1$
 d) $x_{1/2} = \frac{1 \pm \sqrt{1 + 4 \cdot 3 \cdot 4}}{6} = \frac{1 \pm 7}{6} \Rightarrow x_1 = \frac{4}{3}, x_2 = -1$
 e) $x_{1/2} = \frac{-8 \pm \sqrt{64 - 4 \cdot 16}}{2} = \frac{-8 \pm 0}{2} \Rightarrow x = -4$
 f) $x_{1/2} = \frac{-1 \pm \sqrt{1 - 4}}{-2} \Rightarrow$ keine Lösung
 g) $x_{1/2} = \frac{8 \pm \sqrt{64 + 4 \cdot 5 \cdot 4}}{10} = \frac{8 \pm 12}{10} \Rightarrow x_1 = 2, x_2 = -\frac{2}{5}$
 h) $x_{1/2} = \frac{25 \pm \sqrt{625 - 4 \cdot 6 \cdot 4}}{12} = \frac{25 \pm 23}{12} \Rightarrow x_1 = 4, x_2 = \frac{1}{6}$
 i) $x_{1/2} = \frac{4 \pm \sqrt{16 - 4 \cdot 1 \cdot 5}}{2} \Rightarrow$ keine Lösung
 j) $x_{1/2} = \frac{-6 \pm \sqrt{36 - 4 \cdot 1 \cdot 9}}{-2} = \frac{-6 \pm 0}{-2} \Rightarrow x = 3$

④ a) $x_{1/2} = \frac{2 \pm \sqrt{4 + 4 \cdot 1 \cdot 1}}{2} = \frac{2 \pm \sqrt{8}}{2} = 1 \pm \sqrt{2}$
 b) $x_{1/2} = \frac{-5 \pm \sqrt{25 - 4 \cdot 1 \cdot 5}}{-2} = \frac{-5 \pm \sqrt{15}}{-2} = \frac{5}{2} \pm \frac{1}{2}\sqrt{15}$
 c) $x_{1/2} = \frac{-6 \pm \sqrt{36 + 4 \cdot 2 \cdot 2}}{4} = \frac{-6 \pm \sqrt{52}}{4}$
 d) $x_{1/2} = \frac{-6 \pm \sqrt{36 - 4 \cdot 3 \cdot 1}}{-6} = \frac{-6 \pm \sqrt{24}}{-6} = 1 \pm \frac{1}{3}\sqrt{6}$

⑤ a) $x(x^2 - 4x + 3) = 0 \Rightarrow x_1 = 0$
 $x^2 - 4x + 3 = 0$
 $x_{2/3} = \frac{4 \pm \sqrt{16 - 4 \cdot 1 \cdot 3}}{2} = \frac{4 \pm 2}{2} \Rightarrow x_2 = 3, x_3 = 1$
 b) $x^2(x^2 - 9x + 8) = 0 \Rightarrow x_1 = 0$
 $x^2 - 9x + 8 = 0$
 $x_{2/3} = \frac{9 \pm \sqrt{81 - 4 \cdot 1 \cdot 8}}{2} = \frac{9 \pm 7}{2} \Rightarrow x_2 = 8, x_3 = 1$
 c) $x^2 = t$
 $t^2 - 3t - 4 = 0$
 $t_{1/2} = \frac{3 \pm \sqrt{9 + 4 \cdot 1 \cdot 4}}{2} = \frac{3 \pm 5}{2} \Rightarrow t_1 = 4, t_2 = -1 \Rightarrow x_1 = 2, x_2 = -2$
 d) $x^3 = t$
 $t^2 - 26t - 27 = 0$
 $t_{1/2} = \frac{26 \pm \sqrt{676 + 4 \cdot 1 \cdot 27}}{2} = \frac{26 \pm 28}{2} \Rightarrow t_1 = 27, t_2 = -1 \Rightarrow x_1 = -1, x_2 = 3$

② a) $7x^2 - 8x + 1 = 0$
 $x_{1/2} = \frac{8 \pm \sqrt{64 - 4 \cdot 7 \cdot 1}}{14} = \frac{8 \pm 6}{14} \Rightarrow x_1 = 1, x_2 = \frac{1}{7}$
 b) $2x^2 - 3x - 9 = 0$
 $x_{1/2} = \frac{3 \pm \sqrt{9 + 4 \cdot 2 \cdot 9}}{4} = \frac{3 \pm 9}{4} \Rightarrow x_1 = 3, x_2 = -\frac{3}{2}$
 c) $1 \cdot 2 \cdot 2x^2 + 11x + 5 = 0$
 $x_{1/2} = \frac{-11 \pm \sqrt{121 - 4 \cdot 2 \cdot 5}}{4} = \frac{-11 \pm 9}{4} \Rightarrow x_1 = -\frac{1}{2}, x_2 = -5$
 d) $1 \cdot 3 \cdot 3x^2 - x - 2 = 0$
 $x_{1/2} = \frac{1 \pm \sqrt{1 + 4 \cdot 3 \cdot 2}}{6} = \frac{1 \pm 5}{6} \Rightarrow x_1 = \frac{1}{3}, x_2 = -\frac{2}{3}$

③ a) $x_{1/2} = \frac{-2 \pm \sqrt{4 - 4 \cdot 1 \cdot (-35)}}{2} = \frac{-2 \pm 12}{2} \Rightarrow x_1 = 5, x_2 = -7$
 b) $x_{1/2} = \frac{1 \pm \sqrt{1 + 4 \cdot 1 \cdot 12}}{2} = \frac{1 \pm 7}{2} \Rightarrow x_1 = 4, x_2 = -3$
 c) $x_{1/2} = \frac{1 \pm \sqrt{1 + 4 \cdot 1 \cdot 2}}{2} = \frac{1 \pm 3}{2} \Rightarrow x_1 = 2, x_2 = -1$
 d) $x_{1/2} = \frac{4 \pm \sqrt{16 - 4 \cdot 1 \cdot 3}}{2} = \frac{4 \pm 2}{2} \Rightarrow x_1 = 3, x_2 = 1$
 e) $x^2 + 10x - 16 = 2x - 32$
 $x_{1/2} = \frac{-8 \pm \sqrt{64 - 4 \cdot 1 \cdot 16}}{2} = \frac{-8}{2} \Rightarrow x = -4$
 f) $2x^2 + 2x = x^2 + 3x - x - 3 \Leftrightarrow x^2 + 3 = 0$
 $x_{1/2} = \frac{0 \pm \sqrt{0 - 12}}{2} \Rightarrow$ keine Lösung

⑥ a) $x_1 = 5, x_2 = -5$
 b) $x_1 = 3, x_2 = -3$
 c) $x_1 = 8, x_2 = -8$
 d) $x(x+4) = 0 \Rightarrow x_1 = 0, x_2 = -4$
 e) $x(2x-6) = 0 \Rightarrow x_1 = 0, x_2 = 3$
 f) $x(3x+3) = 0 \Rightarrow x_1 = 0, x_2 = -1$