

2.10

$$\begin{aligned}
1) \quad & (2x^2 + 3x + 1)^2 - (2x^2 - 4x - 1)^2 = 0 \\
& ((2x^2 + 3x + 1) - (2x^2 - 4x - 1)) ((2x^2 + 3x + 1) + (2x^2 - 4x - 1)) = 0 \\
& (7x + 2)(4x^2 - x) = 0 \\
& x(7x + 2)(4x - 1) = 0 \\
& x = 0 \quad \text{ou} \quad 7x + 2 = 0 \quad \text{ou} \quad 4x - 1 = 0 \\
& x = 0 \quad \text{ou} \quad x = -\frac{2}{7} \quad \text{ou} \quad x = \frac{1}{4} \\
& S = \left\{0; \frac{1}{4}; -\frac{2}{7}\right\}
\end{aligned}$$

$$\begin{aligned}
2) \quad & 2x(x - 1) = x(2x + 7) \\
& 2x(x - 1) - x(2x + 7) = 0 \\
& x(2(x - 1) - (2x + 7)) = 0 \\
& x(9) = 0 \\
& 9x = 0 \\
& x = 0 \\
& S = \{0\}
\end{aligned}$$

$$\begin{aligned}
3) \quad & (2x - 7)(5x + 3) = 8(4x^2 - 49) \\
& (2x - 7)(5x + 3) - 8(4x^2 - 49) = 0 \\
& (2x - 7)(5x + 3) - 8(2x - 7)(2x + 7) = 0 \\
& (2x - 7)((5x + 3) - 8(2x + 7)) = 0 \\
& (2x - 7)(-11x - 53) = 0 \\
& 2x - 7 = 0 \quad \text{ou} \quad -11x - 53 = 0 \\
& x = \frac{7}{2} \quad \text{ou} \quad x = -\frac{53}{11} \\
& S = \left\{-\frac{53}{11}; \frac{7}{2}\right\}
\end{aligned}$$

$$\begin{aligned}
4) \quad & (3x + 5)(x^2 - 1) = (2x - 7)(1 - x^2) \\
& (3x + 5)(x^2 - 1) - (2x - 7)(1 - x^2) = 0 \\
& (3x + 5)(x^2 - 1) + (2x - 7)(x^2 - 1) = 0 \\
& (x^2 - 1)((3x + 5) + (2x - 7)) = 0 \\
& (x^2 - 1)(5x - 2) = 0 \\
& (x - 1)(x + 1)(5x - 2) = 0 \\
& x - 1 = 0 \quad \text{ou} \quad x + 1 = 0 \quad \text{ou} \quad 5x - 2 = 0 \\
& x = 1 \quad \text{ou} \quad x = -1 \quad \text{ou} \quad x = \frac{2}{5} \\
& S = \left\{-1; \frac{2}{5}; 1\right\}
\end{aligned}$$

$$\begin{aligned}
5) \quad & (x-1)(x-2)(x-3)(x-4) = x(4-x^2)(4-x) \\
& (x-1)(x-2)(x-3)(x-4) - x(4-x^2)(4-x) = 0 \\
& (x-1)(x-2)(x-3)(x-4) - x(2-x)(2+x)(4-x) = 0 \\
& (x-1)(x-2)(x-3)(x-4) - x(x-2)(x+2)(x-4) = 0 \\
& (x-2)(x-4)((x-1)(x-3) - x(x+2)) = 0 \\
& (x-2)(x-4)(x^2 - 4x + 3 - x^2 - 2x) = 0 \\
& (x-2)(x-4)(-6x + 3) = -3(x-2)(x-4)(2x-1) = 0 \\
& x-2 = 0 \quad \text{ou} \quad x-4 = 0 \quad \text{ou} \quad 2x-1 = 0 \\
& x = 2 \quad \text{ou} \quad x = 4 \quad \text{ou} \quad x = \frac{1}{2} \\
& S = \left\{\frac{1}{2}; 2; 4\right\}
\end{aligned}$$

$$\begin{aligned}
6) \quad & x^3 - 1 + 3(x^2 - 1) = 15(1-x) - 5(x-1)^2 \\
& x^3 - 1 + 3(x^2 - 1) - 15(1-x) + 5(x-1)^2 = 0 \\
& (x-1)(x^2 + x + 1) + 3(x-1)(x+1) + 15(x-1) + 5(x-1)^2 = 0 \\
& (x-1)((x^2 + x + 1) + 3(x+1) + 15 + 5(x-1)) = 0 \\
& (x-1)(x^2 + x + 1 + 3x + 3 + 15 + 5x - 5) = 0 \\
& (x-1)(x^2 + 9x + 14) = 0 \\
& (x-1)(x+2)(x+7) = 0 \\
& x-1 = 0 \quad \text{ou} \quad x+2 = 0 \quad \text{ou} \quad x+7 = 0 \\
& x = 1 \quad \text{ou} \quad x = -2 \quad \text{ou} \quad x = -7 \\
& S = \{-7; -2; 1\}
\end{aligned}$$