

$$1. (\sqrt{3} - 1)(1 + \sqrt{3})x + x^2\sqrt{2} = 0$$

$$(3 - 1)x + x^2\sqrt{2} = 0 \quad x(x\sqrt{2} + 2) = 0 \quad \left\{ \begin{array}{l} x_1 = 0 \\ x_2 = -\sqrt{2} \end{array} \right.$$

$$2. (x + \sqrt{2})^2 + (x\sqrt{2} - 1)^2 = 6$$

$$x^2 + 2x\sqrt{2} + 2 + 2x^2 - 2x\sqrt{2} + 1 = 6 \quad 3x^2 = 3 \quad x_{1,2} = \pm 1$$

$$3. \frac{2}{5}x = \frac{3}{2}\left(\frac{x^2}{5} - 1\right)$$

$$4x = 3x^2 - 15 \quad 3x^2 - 4x - 15 = 0 \quad x_{1,2} = \frac{2 \pm \sqrt{4 + 45}}{3} = \left\{ \begin{array}{l} x_1 = \frac{3}{3} \\ x_2 = -\frac{5}{3} \end{array} \right.$$

$$4. 3^{\frac{1}{3}}(x^2 - 3^{\frac{1}{3}}) = 2x$$

$$3^{\frac{1}{3}}x^2 - 2x - 3^{\frac{2}{3}} = 0 \quad x_{1,2} = \frac{1 \pm \sqrt{1 + 3}}{3^{\frac{1}{3}}} = \left\{ \begin{array}{l} x_1 = \frac{\sqrt[3]{9}}{3^{\frac{1}{3}}} \\ x_2 = -\frac{\sqrt[3]{9}}{3} \end{array} \right.$$

$$5. (\sqrt{5} + 1)(x^2 - x) + x(1 - x\sqrt{5}) + 2^{-2} = 0$$

$$x^2\sqrt{5} - x\sqrt{5} + x^2 - x + x - x^2\sqrt{5} + \frac{1}{4} = 0 \quad 4x^2 - 4x\sqrt{5} + 1 = 0 \quad x_{1,2} = \frac{2\sqrt{5} \pm \sqrt{20 - 4}}{4} = \left\{ \begin{array}{l} x_1 = \frac{\sqrt{5} + 2}{2} \\ x_2 = \frac{\sqrt{5} - 2}{2} \end{array} \right.$$

$$6. \frac{7}{2}\left(\frac{x^2}{12} + 8\right) - 4(1 + 2x) = 0$$

$$\frac{7}{24}x^2 + 28 - 4 - 8x = 0 \quad \frac{7}{24}x^2 - 8x + 24 = 0 \quad x_{1,2} = \frac{4 \pm \sqrt{16 - 7}}{\frac{7}{24}} = \left\{ \begin{array}{l} x_1 = \frac{24}{7} \\ x_2 = \frac{24}{7} \end{array} \right.$$

$$7. \frac{2-x}{x^2+8x+16} + \frac{3}{x+4} = \frac{x-2}{x^2+4x}$$

$$\frac{2-x}{(x+4)^2} + \frac{3}{x+4} = \frac{x-2}{x(x+4)}$$

$$\frac{x(2-x) + 3x(x+4) - (x-2)(x+4)}{x(x+4)^2} = 0$$

$$C.A.: \begin{cases} x \neq 0 \\ x \neq -4 \end{cases}$$

$$2x - x^2 + 3x^2 + 12x - x^2 - 4x + 2x + 8 = 0 \quad x^2 + 12x + 8 = 0 \quad x_{1,2} = -6 \pm \sqrt{36 - 8} = \left\{ \begin{array}{l} x_1 = -6 + 2\sqrt{7} \\ x_2 = -6 - 2\sqrt{7} \end{array} \right.$$

$$8. \frac{6x^2-5x+3}{3x-9x^2} = \frac{2-x}{3x-1} - \frac{2x-3}{3x}$$

$$\frac{6x^2-5x+3}{-3x(3x-1)} = \frac{2-x}{3x-1} - \frac{2x-3}{3x}$$

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

$$C.A.: \begin{cases} x \neq 0 \\ x \neq \frac{1}{3} \end{cases}$$

$$-6x^2 + 5x - 3 - 6x + 3x^2 + 6x^2 - 11x + 3 = 0 \quad 3x^2 - 12x = 0 \quad 3x(x-4) = 0 \quad \left\{ \begin{array}{l} x_1 = 0 \text{ non acc. per c.a.} \\ x_2 = 4 \end{array} \right.$$

$$9. \frac{1}{1+\frac{1}{1+\frac{1}{x}}} = x$$

$$\frac{1}{1+\frac{x}{x+1}} = x$$

$$\frac{x+1}{2x+1} = x$$

$$x+1 = 2x^2+x$$

$$x_{1,2} = \pm \frac{\sqrt{2}}{2}$$

$$C.A.: \begin{cases} x \neq 0 \\ x \neq -1 \\ x \neq -\frac{1}{2} \end{cases}$$