

## Exercice 2

$$\begin{aligned}
 (1) \quad & \frac{x-3}{9} - \frac{2x+5}{6} = 2 - \frac{4x+1}{18} \\
 \Leftrightarrow & \frac{2x-6}{18} - \frac{6x+15}{18} = \frac{36}{18} - \frac{4x+1}{18} \quad / \cdot 36 \\
 \Leftrightarrow & 2x-6-6x-15 = 36-4x-1 \\
 \Leftrightarrow & -4x-21 = -4x+35 \\
 \Leftrightarrow & -21 = 35
 \end{aligned}$$

Ceci est impossible, donc  $S = \emptyset$ .

$$\begin{aligned}
 (2) \quad & 9x^2 - 4 = (3x-2)(5x+8) \\
 \Leftrightarrow & (3x-2)(3x+2) = (3x-2)(5x+8) \\
 \Leftrightarrow & (3x-2)(3x+2) - (3x-2)(5x+8) = 0 \\
 \Leftrightarrow & (3x-2)(3x+2-5x-8) = 0 \\
 \Leftrightarrow & (3x-2)(-2x-6) = 0 \\
 \Leftrightarrow & 3x-2 = 0 \text{ ou } -2x-6 = 0 \\
 \Leftrightarrow & x = \frac{2}{3} \text{ ou } x = -3
 \end{aligned}$$

Donc  $S = \{\frac{2}{3}, -3\}$ .

$$\begin{aligned}
 (3) \quad & x^2 + 4x = 45 \\
 \Leftrightarrow & x^2 + 4x - 45 = 0 \\
 \Leftrightarrow & (x^2 + 4x + 4) - 4 - 45 = 0 \\
 \Leftrightarrow & (x+2)^2 - 49 = 0 \\
 \Leftrightarrow & (x+2)^2 - 7^2 = 0 \\
 \Leftrightarrow & (x+2-7)(x+2+7) = 0 \\
 \Leftrightarrow & (x-5)(x+9) = 0 \\
 \Leftrightarrow & x = 5 \text{ ou } x = -9 \\
 \text{Donc } & S = \{5, -9\}.
 \end{aligned}$$

$$\begin{aligned}
 (4) \quad & x^4 + x^3 - x^2 - x = 0 \\
 \Leftrightarrow & (x^4 + x^3) - (x^2 + x) = 0 \\
 \Leftrightarrow & x^3(x+1) - x(x+1) = 0 \\
 \Leftrightarrow & (x+1)(x^3 - x) = 0 \\
 \Leftrightarrow & x(x+1)(x^2 - 1) = 0 \\
 \Leftrightarrow & x(x+1)(x-1)(x+1) = 0 \\
 \Leftrightarrow & x(x-1)(x+1)^2 = 0 \\
 \Leftrightarrow & x = 0 \text{ ou } x = 1 \text{ ou } x = -1 \\
 \text{Donc : } & S = \{0, -1, 1\}
 \end{aligned}$$

## Exercice 3

$$\begin{aligned}
 (1) \quad \text{a) } & \frac{x-\sqrt{6}}{x^2-6} = \frac{x-\sqrt{6}}{(x-\sqrt{6})(x+\sqrt{6})} \\
 & = \frac{1}{x+\sqrt{6}}
 \end{aligned}$$

C.E. :  $x \neq \sqrt{6}$  et  $x \neq -\sqrt{6}$

$$\begin{aligned}
 \text{b) } & \frac{x^3 + 3x^2 - x - 3}{(x+3)(2x-2)} = \frac{x^2(x+3) - (x+3)}{(x+3)(2x-2)} \\
 & = \frac{(x+3)(x^2-1)}{(x+3)(2x-2)} \\
 & = \frac{(x+3)(x-1)(x+1)}{2(x+3)(x-1)} = \frac{x+1}{2}
 \end{aligned}$$

C.E. :  $x \neq -3$  et  $x \neq 1$

$$\begin{aligned}(2) \quad \frac{a^2}{a^2 - b^2} + \frac{b}{a + b} - \frac{a}{a - b} &= \frac{a^2}{(a - b)(a + b)} + \frac{b(a - b)}{(a - b)(a + b)} - \frac{a(a + b)}{(a - b)(a + b)} \\ &= \frac{a^2 + ab - b^2 - a^2 - ab}{(a - b)(a + b)} \\ &= -\frac{b^2}{(a - b)(a + b)}\end{aligned}$$