

1.5

1) $8x^2 + 6x = 9$

$$8x^2 + 6x - 9 = 0$$

$$\Delta = 6^2 - 4 \cdot 8 \cdot (-9) = 324 = 18^2 > 0$$

$$x_1 = \frac{-6-18}{2 \cdot 8} = \frac{-24}{16} = -\frac{3}{2} \quad \text{et} \quad x_2 = \frac{-6+18}{2 \cdot 8} = \frac{12}{16} = \frac{3}{4}$$

$$S = \left\{-\frac{3}{2}; \frac{3}{4}\right\}$$

2) $2x^2 - x + 1 = 0$

$$\Delta = (-1)^2 - 4 \cdot 2 \cdot 1 = -7 < 0$$

$$S = \emptyset$$

3) $x^2 + 4 - 6x = 0$

$$x^2 - 6x + 4 = 0$$

$$\Delta = (-6)^2 - 4 \cdot 1 \cdot 4 = 20 > 0 \quad \sqrt{\Delta} = \sqrt{20} = \sqrt{2^2 \cdot 5} = 2\sqrt{5}$$

$$x_1 = \frac{-(-6)-2\sqrt{5}}{2 \cdot 1} = \frac{6-2\sqrt{5}}{2} = \frac{6}{2} - \frac{2\sqrt{5}}{2} = 3 - \sqrt{5}$$

$$x_2 = \frac{-(-6)+2\sqrt{5}}{2 \cdot 1} = \frac{6+2\sqrt{5}}{2} = \frac{6}{2} + \frac{2\sqrt{5}}{2} = 3 + \sqrt{5}$$

$$S = \{3 - \sqrt{5}; 3 + \sqrt{5}\}$$

4) $9x^2 - 30x + 25 = 0$

$$\Delta = (-30)^2 - 4 \cdot 9 \cdot 25 = 0$$

$$x = \frac{-(-30)}{2 \cdot 9} = \frac{30}{18} = \frac{5}{3}$$

$$S = \left\{\frac{5}{3}\right\}$$

5) $x^2 - 6x + 7 = 0$

$$\Delta = (-6)^2 - 4 \cdot 1 \cdot 7 = 8 > 0 \quad \sqrt{\Delta} = \sqrt{8} = \sqrt{2^2 \cdot 2} = 2\sqrt{2}$$

$$x_1 = \frac{-(-6)-2\sqrt{2}}{2 \cdot 1} = \frac{6-2\sqrt{2}}{2} = \frac{6}{2} - \frac{2\sqrt{2}}{2} = 3 - \sqrt{2}$$

$$x_2 = \frac{-(-6)+2\sqrt{2}}{2 \cdot 1} = \frac{6+2\sqrt{2}}{2} = \frac{6}{2} + \frac{2\sqrt{2}}{2} = 3 + \sqrt{2}$$

$$S = \{3 - \sqrt{2}; 3 + \sqrt{2}\}$$

6) $\frac{x^2 - 3}{2} - \frac{x^2 + 1}{3} = \frac{x^2 - 11}{6} \quad \Big| \cdot 6$

$$3(x^2 - 3) - 2(x^2 + 1) = x^2 - 11$$

$$3x^2 - 9 - 2x^2 - 2 = x^2 - 11$$

$$0 = 0$$

$S = \mathbb{R}$, car l'équation $0 = 0$ est vérifiée quel que soit $x \in \mathbb{R}$.

$$7) \quad x = \frac{2}{5} + \frac{5x^2}{16} \quad | \cdot 80$$

$$80x = 32 + 25x^2$$

$$25x^2 - 80x + 32 = 0$$

$$\Delta = (-80)^2 - 4 \cdot 25 \cdot 32 = 3200$$

$$\sqrt{\Delta} = \sqrt{3200} = \sqrt{10^2 \cdot 32} = 10\sqrt{32} = 10\sqrt{4^2 \cdot 2} = 10 \cdot 4\sqrt{2} = 40\sqrt{2}$$

$$x_1 = \frac{-(-80) - 40\sqrt{2}}{2 \cdot 25} = \frac{80 - 40\sqrt{2}}{50} = \frac{80}{50} - \frac{40\sqrt{2}}{50} = \frac{8}{5} - \frac{4\sqrt{2}}{5} = \frac{8-4\sqrt{2}}{5}$$

$$x_2 = \frac{-(-80) + 40\sqrt{2}}{2 \cdot 25} = \frac{80 + 40\sqrt{2}}{50} = \frac{80}{50} + \frac{40\sqrt{2}}{50} = \frac{8}{5} + \frac{4\sqrt{2}}{5} = \frac{8+4\sqrt{2}}{5}$$

$$S = \left\{ \frac{8-4\sqrt{2}}{5}; \frac{8+4\sqrt{2}}{5} \right\}$$

$$8) \quad \frac{(x-2)^2}{5} - \frac{(x-3)^2}{4} = 0 \quad | \cdot 20$$

$$4(x-2)^2 - 5(x-3)^2 = 0$$

$$4(x^2 - 4x + 4) - 5(x^2 - 6x + 9) = 0$$

$$4x^2 - 16x + 16 - 5x^2 + 30x - 45 = 0$$

$$-x^2 + 14x - 29 = 0 \quad | \cdot (-1)$$

$$x^2 - 14x + 29 = 0$$

$$\Delta = (-14)^2 - 4 \cdot 1 \cdot 29 = 80 \quad \sqrt{\Delta} = \sqrt{80} = \sqrt{4^2 \cdot 5} = 4\sqrt{5}$$

$$x_1 = \frac{-(-14) - 4\sqrt{5}}{2 \cdot 1} = \frac{14 - 4\sqrt{5}}{2} = \frac{14}{2} - \frac{4\sqrt{5}}{2} = 7 - 2\sqrt{5}$$

$$x_2 = \frac{-(-14) + 4\sqrt{5}}{2 \cdot 1} = \frac{14 + 4\sqrt{5}}{2} = \frac{14}{2} + \frac{4\sqrt{5}}{2} = 7 + 2\sqrt{5}$$

$$S = \{7 - 2\sqrt{5}; 7 + 2\sqrt{5}\}$$