

Corrigé du devoir de mathématiques

Exercice 1 $a = (\sqrt{12} - \sqrt{3})^2 = (\sqrt{12})^2 - 2\sqrt{12}\sqrt{3} + (\sqrt{3})^2 = 12 - 2\sqrt{36} + 3 = 12 - 12 + 3 = 3$

$$b = \frac{2}{2 + \sqrt{3}} = \frac{2(2 - \sqrt{3})}{(2 + \sqrt{3})(2 - \sqrt{3})} = 2(2 - \sqrt{3})$$

$$c = \frac{x + \frac{3}{2}}{x + \frac{1}{2}} - 1 = \frac{\frac{2x + 3}{2}}{\frac{2x + 1}{2}} - 1 = \frac{2x + 3}{2x + 1} - 1 = \frac{2x + 3}{2x + 1} - \frac{2x + 1}{2x + 1} = \frac{2}{2x + 1}$$

$$d = \frac{x(3x)^3}{9x^2} = \frac{x \times 3^3 x^3}{3^2 x^2} = 3x^2$$

Exercice 2

$$(E_1) : (2x - 3)(-x + 2) = 0 \iff \left\{ \begin{array}{l} 2x - 3 = 0 \\ \text{ou, } -x + 2 = 0 \end{array} \right. \iff \left\{ \begin{array}{l} x = \frac{3}{2} \\ \text{ou, } x = 2 \end{array} \right. \quad \underline{\mathcal{S}_1 = \left\{ \frac{3}{2}; 2 \right\}}$$

$$(E_2) : (x + 2)(3x - 2) - (x + 2)(x + 1) = 0 \iff (x + 2)(2x - 3) = 0$$

$$\iff \left\{ \begin{array}{l} x + 2 = 0 \\ \text{ou, } 2x - 3 = 0 \end{array} \right. \iff \left\{ \begin{array}{l} x = -2 \\ \text{ou, } x = \frac{3}{2} \end{array} \right. \quad \underline{\mathcal{S}_2 = \left\{ -2; \frac{3}{2} \right\}}$$

$$(E_3) : (x^2 - 9)(3x + 7) = 0 \iff \left\{ \begin{array}{l} x^2 - 9 = 0 \\ \text{ou, } 3x + 7 = 0 \end{array} \right.$$

$$\iff \left\{ \begin{array}{l} x^2 = 9 \\ \text{ou, } x = -\frac{7}{3} \end{array} \right. \iff \left\{ \begin{array}{l} x = -\sqrt{9} = 3 \text{ ou, } x = \sqrt{9} = 3 \\ \text{ou, } x = -\frac{7}{3} \end{array} \right. \quad \underline{\mathcal{S}_3 = \left\{ -\frac{7}{3}; -3; 3 \right\}}$$

$$(E_4) : (2x - 3)(x + 6) - (x + 6) = 0 \iff (x + 6)[(2x - 3) - 1] = 0$$

$$\iff (x + 6)[2x - 4] = 0 \iff \left\{ \begin{array}{l} x + 6 = 0 \\ \text{ou, } 2x - 4 = 0 \end{array} \right. \iff \left\{ \begin{array}{l} x = -6 \\ \text{ou, } x = 2 \end{array} \right. \quad \underline{\mathcal{S}_4 = \{-6; 2\}}$$

$$(E_5) : \frac{2}{2x + 5} - \frac{1}{4x - 3} = 0 \iff \frac{6x - 11}{(2x + 5)(4x - 3)} = 0 \iff \left\{ \begin{array}{l} 6x - 11 = 0 \\ \text{et, } (2x + 5)(4x - 3) \neq 0 \end{array} \right.$$

$$\iff \left\{ \begin{array}{l} x = \frac{11}{6} \\ \text{et, } x \neq -\frac{5}{2} \text{ et, } x \neq \frac{3}{4} \end{array} \right. \quad \underline{\mathcal{S}_5 = \left\{ \frac{11}{6} \right\}}$$

$$(E_6) : (2x + 3)^2 = 49 \iff \left\{ \begin{array}{l} 2x + 3 = -7 \\ \text{ou, } 2x + 3 = 7 \end{array} \right. \iff \left\{ \begin{array}{l} x = -5 \\ \text{ou, } x = 2 \end{array} \right. \quad \underline{\mathcal{S}_6 = \{-5; 2\}}$$

$$(E_7) : \frac{x}{2x + 1} = 1 \iff \frac{x}{2x + 1} - 1 = 0 \iff \frac{x}{2x + 1} - \frac{2x + 1}{2x + 1} = 0$$

$$\iff \frac{-x - 1}{2x + 1} = 0 \iff \left\{ \begin{array}{l} -x - 1 = 0 \\ \text{et, } 2x + 1 \neq 0 \end{array} \right. \iff \left\{ \begin{array}{l} x = -1 \\ \text{et, } x \neq -\frac{1}{2} \end{array} \right. \quad \underline{\mathcal{S}_7 = \{-1\}}$$

$$(E_8) : \frac{6x(x + 1)}{x - 4} = 30 + \frac{120}{x - 4} \iff \frac{6x(x + 1)}{x - 4} - \frac{30(x - 4)}{x - 4} - \frac{120}{x - 4} = 0$$

$$\iff \frac{6x^2 + 6x - 30x + 120 - 120}{x - 4} = 0 \iff \frac{6x^2 - 24x}{x - 4} = 0$$

On peut, et doit, factoriser le numérateur : $(E_8) \iff \frac{6x(x - 4)}{x - 4} = 0$

C'est une équation quotient, et donc, $\left\{ \begin{array}{l} 6x(x - 4) = 0 \\ \text{et, } x - 4 \neq 0 \end{array} \right. \iff \left\{ \begin{array}{l} 6x = 0 \text{ ou, } x - 4 = 0 \\ \text{et, } x - 4 \neq 0 \end{array} \right. \quad \underline{\mathcal{S}_8 = \{0\}}$