

Corrigé du devoir de mathématiques

Exercice 1 $a = \frac{4}{2x-3} - 1 = \frac{4}{2x-3} - \frac{2x-3}{2x-3} = \frac{-2x+7}{2x-3}$

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

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

$$d = \frac{x(3x)^7}{9^3 x^4} = \frac{x \times 3^7 x^7}{(3^2)^3 x^4} = \frac{3^7 x^8}{3^6 x^4} = 3x^4$$

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