

Correction exercice

Exercice 1

$$25 \in \mathbb{N} ; -12 \in \mathbb{Z} ; -5,2 \in \mathbb{D} ; \frac{5}{4} \in \mathbb{D}$$

$$\frac{2}{3} \in \mathbb{Q} ; -\frac{12}{3} \in \mathbb{Z} ; (\sqrt{3}+2) \in \mathbb{R} ; \frac{\pi}{3} \in \mathbb{R} ; \sqrt{\frac{81}{3}} = 3 \in \mathbb{N}$$

Exercice 2

$$1) A = \frac{5}{2} + \frac{8}{3} = \frac{15}{6} + \frac{16}{6} = \frac{31}{6} \quad \left| \quad C = \frac{1}{2/5} = \frac{5}{2}$$

$$B = 2 + \frac{5}{7} = \frac{14}{7} + \frac{5}{7} = \frac{19}{7} \quad \left| \quad D = \frac{4/2}{6} = \frac{2}{6} = \frac{1}{3}$$

$$E = \frac{7/9}{14/27} = \frac{7}{9} \times \frac{27}{14 \times 2} = \frac{3}{2}$$

$$F = 1 + \frac{1}{3} \times \frac{5}{2 - \frac{5}{3}} = 1 + \frac{1}{3} \times \frac{5}{1/3} = 1 + \frac{1}{3} \times 5 \times 3$$

$$\underline{\underline{F=6}}$$

$$2) J = \frac{1}{x} + \frac{3}{x+2} \quad \text{On cherche les valeurs où le(s) dénominateur(s) s'annulent}$$

$$\text{Pour tout } x \neq 0 \text{ et } x \neq -2 \text{ on a } J = \frac{(x+2) + 3x}{x(x+2)} = \frac{4x+2}{x(x+2)}$$

$$\text{Pour tout } x \neq \frac{2}{3} \text{ et } x \neq -\frac{2}{3} \text{ on a } K = \frac{1}{2-3x} - \frac{1}{2+3x} = \frac{2+3x - (2-3x)}{(2-3x)(2+3x)}$$

$$\underline{\underline{K = \frac{6x}{4-9x^2}}}$$

$$\text{Pour tout } x \neq -2 \text{ on a } M = 5 + \frac{3}{2+x} = \frac{5(2+x) + 3}{2+x} = \frac{13+5x}{2+x}$$

$$\text{Pour tout } x \neq -1 \text{ on a } N = 2 + \frac{\frac{1}{3}x}{x+1} = \frac{2(x+1) + \frac{1}{3}x}{x+1} = \frac{\frac{7}{3}x + 2}{x+1} = \frac{7x+6}{3(x+1)}$$

$$\text{Pour tout } x \neq 0 \text{ on a } P = 1 - \frac{\frac{3}{2}(x+1)}{x} = 1 - \frac{3(x+1)}{2x} = \frac{2x-3x-3}{2x} = \underline{\underline{-\frac{x+3}{2x}}}$$

$$\text{Pour tout } x \neq 0 \text{ et } x \neq -1 \quad (\text{car } x^2+x=0 \Rightarrow x(x+1)=0 \text{ donc } x=0 \text{ ou } x=-1)$$

$$\text{On a } R = \frac{2(x+1) - (x-3)(x+1)}{x^2+x} = \frac{(x+1)(2-(x-3))}{x(x+1)} = \underline{\underline{\frac{-x+5}{x}}}$$

$$\text{Par } x-3=0 \\ x=3$$

$$\text{et } x+1=0 \\ x=-1$$

$$\text{et } x^2-9=0 \\ (x-3)(x+3)=0 \\ x=3 \quad x=-3$$

Pour tout $x \neq -3$, $x \neq -1$, et $x \neq 3$ on a :

$$S = \frac{x^2+x}{x-3} \times \frac{x^2-9}{x+1} = \frac{x(x+1)(x-3)(x+3)}{(x-3)(x+1)} = \underline{\underline{x(x+3)}}$$

Exercice 3

$$A = \sqrt{27} \times 5\sqrt{6} = \sqrt{9 \times 3} \times 5\sqrt{6} = 3\sqrt{3} \times 5\sqrt{6} = 15\sqrt{3 \times 6} = 15\sqrt{18} = \underline{\underline{45\sqrt{2}}}$$

$$B = 7\sqrt{75} - 2\sqrt{12} = 7\sqrt{25 \times 3} - 2\sqrt{4 \times 3} = 35\sqrt{3} - 4\sqrt{3} = \underline{\underline{31\sqrt{3}}}$$

$$C = 2\sqrt{5} + \sqrt{0,0045} = 2\sqrt{5} + \sqrt{45 \times 10^{-4}} = 2\sqrt{5} + 10^{-2}\sqrt{45 \times 5} = 2\sqrt{5} + 3 \times 10^{-2}\sqrt{5} = \underline{\underline{2,03\sqrt{5}}}$$

$$D = (11\sqrt{5} - 5\sqrt{11})(11\sqrt{5} + 5\sqrt{11}) = (11\sqrt{5})^2 - (5\sqrt{11})^2 = 121 \times 5 - 25 \times 11$$

Exercice 4

1) À la calculatrice $X = 2\sqrt{7}$

2) $X^2 = (\sqrt{10-\sqrt{84}} + \sqrt{10+\sqrt{84}})^2 = (\sqrt{10-\sqrt{84}})^2 + 2 \times \sqrt{10-\sqrt{84}} \times \sqrt{10+\sqrt{84}} + (\sqrt{10+\sqrt{84}})^2$

$$X^2 = 10 - \sqrt{84} + 2 \times \sqrt{(10-\sqrt{84})(10+\sqrt{84})} + 10 + \sqrt{84}$$

$$X^2 = 20 + 2 \times \sqrt{10^2 - (\sqrt{84})^2}$$

$$X^2 = 20 + 2 \times \sqrt{100 - 84}$$

$$X^2 = 20 + 2 \times \sqrt{16}$$

$$X^2 = 20 + 2 \times 4$$

$$X^2 = 28 \text{ donc } X = \sqrt{28} \text{ ou } X = -\sqrt{28}$$

donc $x = 2\sqrt{7}$ ou $x = -2\sqrt{7}$ mais X est la somme de deux nombres positifs donc X est positif donc $\underline{\underline{x = 2\sqrt{7}}}$

Exercice 5

$$a = \frac{7}{2\sqrt{3}} = \frac{7\sqrt{3}}{2\sqrt{3} \times \sqrt{3}} = \underline{\underline{\frac{7\sqrt{3}}{6}}}$$

$$b = \frac{14}{3\sqrt{7}} = \frac{14 \times \sqrt{7}}{3\sqrt{7} \times \sqrt{7}} = \frac{7 \times 2\sqrt{7}}{3 \times 7} = \underline{\underline{\frac{2\sqrt{7}}{3}}}$$

$$c = \frac{1}{2+\sqrt{5}} = \frac{1(2-\sqrt{5})}{(2+\sqrt{5})(2-\sqrt{5})} = \frac{2-\sqrt{5}}{2^2 - \sqrt{5}^2} = \underline{\underline{\frac{2-\sqrt{5}}{-1}}}$$

$$d = \frac{2+\sqrt{10}}{1+\sqrt{10}} = \frac{(2+\sqrt{10})(1-\sqrt{10})}{(1+\sqrt{10})(1-\sqrt{10})} = \frac{2-2\sqrt{10}+\sqrt{10}-10}{1^2 - \sqrt{10}^2} = \frac{-8-\sqrt{10}}{-9} = \underline{\underline{\frac{8+\sqrt{10}}{9}}}$$

$$e = \frac{2}{4-\sqrt{2}} = \frac{2(4+\sqrt{2})}{(4-\sqrt{2})(4+\sqrt{2})} = \frac{2(4+\sqrt{2})}{4^2 - \sqrt{2}^2} = \frac{2(4+\sqrt{2})}{2 \times 7} = \underline{\underline{\frac{4+\sqrt{2}}{7}}}$$

$$f = \frac{1-\sqrt{2}}{\sqrt{2}-\sqrt{3}} = \frac{(1-\sqrt{2})(\sqrt{2}+\sqrt{3})}{(\sqrt{2}-\sqrt{3})(\sqrt{2}+\sqrt{3})} = \frac{\sqrt{2}+\sqrt{3}-2-\sqrt{6}}{\sqrt{2}^2 - \sqrt{3}^2} = \underline{\underline{\frac{2-\sqrt{2}-\sqrt{3}+\sqrt{6}}{2}}}$$

$$g = \frac{\sqrt{3}x}{\sqrt{2}} - \frac{\sqrt{2}x}{\sqrt{3}} = \frac{\sqrt{3}x \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} - \frac{\sqrt{2}x \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\sqrt{6}x}{2} - \frac{\sqrt{6}x}{3} = \frac{3\sqrt{6}x - 2\sqrt{6}x}{6} = \underline{\underline{\frac{\sqrt{6}x}{6}}}$$

$$h = \frac{1}{\sqrt{2}-2} + \frac{3}{\sqrt{3}} = \frac{(\sqrt{2}+2)}{(\sqrt{2}-2)(\sqrt{2}+2)} + \frac{3\sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\sqrt{2}+2}{-2} + \frac{3\sqrt{3}}{3} = \underline{\underline{\frac{-3\sqrt{2}-6+6\sqrt{3}}{6}}}$$

$$h = \frac{2(-\sqrt{2}-2+2\sqrt{3})}{2 \times 2} = \underline{\underline{\frac{2\sqrt{3}-\sqrt{2}-2}{2}}}$$

$$i = \frac{1}{2-\sqrt{2}} - \frac{1}{2+\sqrt{2}} = \frac{1(2+\sqrt{2})}{(2-\sqrt{2})(2+\sqrt{2})} - \frac{1(2-\sqrt{2})}{(2+\sqrt{2})(2-\sqrt{2})} = \frac{2+\sqrt{2}}{4-2} - \frac{2-\sqrt{2}}{4-2}$$

$$i = \frac{2\sqrt{2}}{2} = \underline{\underline{\sqrt{2}}}$$

Exercice 6

$$A = a^2 \times a^5 \times a^{-3} = a^{2+5-3} = \underline{\underline{a^4}}$$

$$B = (a^{-2})^3 \times a = a^{-2 \times 3} \times a = a^{-6+1} = \underline{\underline{a^{-5}}}$$

$$C = (-2x^5)^{-4} = + 2^{-4} x^{-5 \times (-4)} = \underline{\underline{\frac{1}{16} x^{20}}}$$

$$D = \frac{a^5 b^{-4}}{a^{-5} b^{-2}} = a^{5-(-5)} b^{-4-(-2)} = \underline{\underline{a^{10} b^{-2}}}$$

$$E = \frac{16^{-4} \times 3^{21}}{6^3 \times 9^7} = \frac{(2^4)^{-4} \times 3^{21}}{(2 \times 3)^3 \times (3^2)^7} = \frac{2^{4 \times (-4)} \times 3^{21}}{2^3 \times 3^3 \times 3^{2 \times 7}} = 2^{-16-3} \times 3^{21-3-14}$$

$$\text{done } E = \underline{\underline{2^{-19} \times 3^4}}$$

$$F = (a^{-5} b^2)^{-1} \times a b^{-3} = a^{-5 \times (-1)} b^{2 \times (-1)} \times a^1 b^{-3} = a^5 b^{-2} a b^{-3} = \underline{\underline{a^6 b^{-5}}}$$

$$\begin{aligned} G &= \frac{2^{-5} \times (-6)^3 \times 3^{-4}}{-9^{-2} \times 8^{-4}} = \frac{2^{-5} \times (-6^3) \times 3^{-4}}{-(3^2)^{-2} \times (2^3)^{-4}} \\ &= \frac{2^{-5} \times 2^3 \times 3^3 \times 3^{-4}}{3^{-4} \times 2^{-12}} \\ &= 2^{-5+3-(-12)} \times 3^{3-4-(-4)} \end{aligned}$$

$$\underline{\underline{G = 2^{10} \times 3^3}}$$