

2008-2009 2^{nde} – Corrigé de la feuille d'exercices n°2

Exercice 1 : (Puissances)

$$A = 2^{-5} \times 2^8 \times 2 = 2^{-5+8+1} = 2^4$$

$$B = (2^0)^{2^{005}} + (2^{2^{005}})^0 = 2^0 + 2^0 = 1 + 1 = 2$$

$$C = (2^3 \times 2^{-4})^2 \times (3^2)^3 \times 3^{-5} = 2^6 \times 2^{-8} \times 3^6 \times 3^{-5} = 2^{-2} \times 3^1 = \frac{1}{4} \times 3 = \frac{3}{4}$$

$$D = \frac{3^{-2} \times 27}{(3^2)^3 \times 3^{-1}} = \frac{3^{-2} \times 3^3}{3^6 \times 3^{-1}} = \frac{3^1}{3^5} = 3^{-4} = \frac{1}{3^4} = \frac{1}{81}$$

$$E = \frac{25^2 \times 3^4}{15^3} = \frac{(5^2)^2 \times 3^4}{15^3} = \frac{5^4 \times 3^4}{15^3} = \frac{15^4}{15^3} = 15$$

$$F = \frac{14^2 \times (-3)^3}{21^2 \times 4^3} = \frac{(2 \times 7)^2 \times (-3)^3}{(3 \times 7)^2 \times (2^2)^3} = \frac{2^2 \times 7^2 \times (-3)^3}{3^2 \times 7^2 \times (2^2)^3} = -\frac{2^2 \times 3^3}{3^2 \times 2^6} = -\frac{3^1}{2^4} = -\frac{3}{16}$$

$$G = \frac{(-49)^3 \times 15^2}{3^3 \times (-5)^3 \times 7^4} = \frac{-(7^2)^3 \times (3 \times 5)^2}{3^3 \times (-5)^3 \times 7^4} = \frac{7^6 \times 3^2 \times 5^2}{3^3 \times 5^3 \times 7^4} = \frac{7^2}{3^1 \times 5^1} = \frac{49}{15}$$

$$H = \frac{3^5 \times 2^{-8}}{6^7 \times 4^{-6}} = \frac{3^5 \times 2^{-8}}{(2 \times 3)^7 \times (2^2)^{-6}} = \frac{3^5 \times 2^{-8}}{2^7 \times 3^7 \times 2^{-12}} = \frac{3^5 \times 2^{-8}}{2^{-5} \times 3^7} = 3^{-2} \times 2^{-3} = \frac{1}{9} \times \frac{1}{8} = \frac{1}{72}$$

$$I = \frac{0,000\ 03^2}{6 \times 10^{-9}} = \frac{(3 \times 10^{-5})^2}{6 \times 10^{-9}} = \frac{3^2 \times 10^{-10}}{3 \times 2 \times 10^{-9}} = \frac{3 \times 10^{-1}}{2} = \frac{3}{2 \times 10} = \frac{3}{20}$$

$$J = \frac{0,04^3 \times 0,64^2}{0,12^3 \times 0,48^2} = \frac{0,04^3}{0,12^3} \times \frac{0,64^2}{0,48^2} = \left(\frac{0,04}{0,12}\right)^3 \times \left(\frac{0,64}{0,48}\right)^2 = \left(\frac{1}{3}\right)^3 \left(\frac{4}{3}\right)^2 = \frac{4^2}{3^5} = \frac{16}{243}$$

$$K = \frac{(0,4)^4 \times 10^3}{2^5} = \frac{(4 \times 10^{-1})^4 \times 10^3}{2^5} = \frac{4^4 \times 10^{-4} \times 10^3}{2^5} = \frac{2^8 \times 10^{-1}}{2^5} = 2^3 \times 10^{-1} = \frac{8}{10} = \frac{4}{5}$$

$$L = \frac{60^{12} \times 9^{-3} \times 5^{-9}}{3 \times 24^8} = \frac{(2^2 \times 3 \times 5)^{12} \times (3^2)^{-3} \times 5^{-9}}{3 \times (2^3 \times 3)^8}$$

$$= \frac{2^{24} \times 3^{12} \times 5^{12} \times 3^{-6} \times 5^{-9}}{3 \times 2^{24} \times 3^8} = \frac{3^6 \times 5^3}{3^9} = \frac{5^3}{3^3} = \frac{125}{27}$$

$$\frac{0,000\ 02^2}{(0,02)^4} = \frac{(2 \times 10^{-5})^2}{(2 \times 10^{-2})^4} = \frac{2^2 \times 10^{-10}}{2^4 \times 10^{-8}} = \frac{1}{4} \times 10^{-2} = \frac{1}{4} \times \frac{1}{100} = \frac{1}{400}$$

Exercice 2 :

$$\frac{0,000\ 02^2}{(0,02)^4} = \frac{1}{4} \times 10^{-2} = 0,25 \times 10^{-2} = 2,5 \times 10^{-3}$$

Pour l'écriture scientifique :

Exercice 3 : $A = \sqrt{4} + \sqrt{9} + \sqrt{16} = 2 + 3 + 4 = 9$

$$B = 1 - \sqrt{2} - 3\sqrt{2} - 5 - (3 - 7\sqrt{2}) = 1 - \sqrt{2} - 3\sqrt{2} - 5 - 3 + 7\sqrt{2} = -7 + 3\sqrt{2}$$

$$C = \sqrt{3} \times \sqrt{5} \times \sqrt{2} = \sqrt{30}$$

$$D = \sqrt{72} - 5\sqrt{8} + 3\sqrt{98} - 4\sqrt{128} = \sqrt{36 \times 2} - 5\sqrt{4 \times 2} + 3\sqrt{49 \times 2} - 4\sqrt{64 \times 2}$$

$$= 6\sqrt{2} - 10\sqrt{2} + 21\sqrt{2} - 32\sqrt{2} = -15\sqrt{2}$$

$$E = \sqrt{27} \times \sqrt{12} = \sqrt{9 \times 3} \times \sqrt{4 \times 3} = 3\sqrt{3} \times 2\sqrt{3} = 6 \times 3 = 18$$

$$F = (\sqrt{6} + 2)(\sqrt{3} - \sqrt{2}) = \sqrt{18} - \sqrt{12} + 2\sqrt{3} - 2\sqrt{2}$$

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

$$G = \frac{3\sqrt{5} + \sqrt{20}}{\sqrt{45}\left(2 - \frac{5}{6}\right)} = \frac{3\sqrt{5} + 2\sqrt{5}}{3\sqrt{5} \times \frac{7}{6}} = \frac{5\sqrt{5}}{3\sqrt{5} \times \frac{7}{6}} = \frac{5}{3 \times \frac{7}{6}} = \frac{5}{\frac{7}{2}} = 5 \times \frac{2}{7} = \frac{10}{7}$$

$$H = \frac{5\sqrt{2} + \sqrt{32}}{3\sqrt{2}} = \frac{5\sqrt{2} + 4\sqrt{2}}{3\sqrt{2}} = \frac{9\sqrt{2}}{3\sqrt{2}} = 3$$

$$I = [(3 - \sqrt{8})(3 + \sqrt{8})]^{50\,000} = [3^2 - (\sqrt{8})^2]^{50\,000} = (9 - 8)^{50\,000} = 1^{50\,000} = 1$$

$$J = \frac{7\sqrt{3} - \sqrt{27}}{-\sqrt{3}} = \frac{7\sqrt{3} - 3\sqrt{3}}{-\sqrt{3}} = \frac{4\sqrt{3}}{-\sqrt{3}} = -4$$

$$A = \frac{5}{\sqrt{7}} = \frac{5 \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} = \frac{5\sqrt{7}}{7}$$

$$B = \frac{-6}{\sqrt{12}} = -\frac{6 \times \sqrt{12}}{\sqrt{12} \times \sqrt{12}} = -\frac{6 \times 2\sqrt{3}}{12} = -\sqrt{3}$$

Exercice 4 :

$$C = \frac{3}{7\sqrt{5}} = \frac{3\sqrt{5}}{7 \times 5} = \frac{3\sqrt{5}}{35}$$

$$D = \frac{\sqrt{5} + 5}{\sqrt{5}} = \frac{\sqrt{5}}{\sqrt{5}} + \frac{5}{\sqrt{5}} = 1 + \frac{5\sqrt{5}}{5} = 1 + \sqrt{5}$$

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

$$F = \frac{2}{\sqrt{3} - 2} = \frac{2(\sqrt{3} + 2)}{(\sqrt{3} - 2)(\sqrt{3} + 2)} = \frac{2(\sqrt{3} + 2)}{3 - 4} = \frac{2(\sqrt{3} + 2)}{-1} = -2(\sqrt{3} + 2)$$

$$G = \frac{\sqrt{3}-1}{\sqrt{3}+1} = \frac{(\sqrt{3}-1)(\sqrt{3}-1)}{(\sqrt{3}+1)(\sqrt{3}-1)} = \frac{3+1-2\sqrt{3}}{3-1} = \frac{4-2\sqrt{3}}{2} = 2-\sqrt{3}$$

$$H = \frac{2\sqrt{3}}{3-\sqrt{3}} = \frac{2\sqrt{3}(3+\sqrt{3})}{(3-\sqrt{3})(3+\sqrt{3})} = \frac{6\sqrt{3}+6}{9-3} = \frac{6(\sqrt{3}+1)}{6} = \sqrt{3}+1$$

$$I = \frac{2}{\sqrt{10}-2\sqrt{3}} = \frac{2(\sqrt{10}+2\sqrt{3})}{(\sqrt{10}-2\sqrt{3})(\sqrt{10}+2\sqrt{3})} = \frac{2(\sqrt{10}+2\sqrt{3})}{10-12} = \frac{2(\sqrt{10}+2\sqrt{3})}{-2} = -\sqrt{10}-2\sqrt{3}$$

$$J = \frac{14}{4\sqrt{8}} + \frac{\sqrt{2}}{8} = \frac{7}{2 \times 2\sqrt{2}} + \frac{\sqrt{2}}{8} = \frac{7\sqrt{2}}{8} + \frac{\sqrt{2}}{8} = \frac{8\sqrt{2}}{8} = \sqrt{2}$$

$$K = \frac{\sqrt{3}-5}{1-\sqrt{3}} = \frac{(\sqrt{3}-5)(1+\sqrt{3})}{(1-\sqrt{3})(1+\sqrt{3})} = \frac{\sqrt{3}+3-5-5\sqrt{3}}{1-3} = \frac{-2-4\sqrt{3}}{-2} = \frac{-2(1+2\sqrt{3})}{-2} = 1+2\sqrt{3}$$