Puissances : correction

Exercice 1

$4^3 = 4 \times 4 \times 4 = 16 \times 4 = 64$ $\left(\frac{2}{3}\right)^2 = \frac{2}{3} \times \frac{2}{3} = \frac{2 \times 2}{3 \times 3} = \frac{4}{9}$

$10^9 = 1000000000$ $10^{-6} = 0,000001$

$(-2)^4 = (-2) \times (-2) \times (-2) \times (-2) = 2 \times 2 \times 2 \times 2 = 4 \times 2 \times 2 = 8 \times 2 = 16$

$(-3)^3 = (-3) \times (-3) \times (-3) = -3 \times 3 \times 3 = -9 \times 3 = -27$

$1^{2016} = 1$ $0^{3025} = 0$ $8^1 = 8$ $125^0 = 1$

$4^{-1} = \frac{1}{4^1} = \frac{1}{4}$ $3^{-2} = \frac{1}{3^2} = \frac{1}{3 \times 3} = \frac{1}{9}$

$\left(\frac{1}{5}\right)^{-3} = \frac{1}{\left(\frac{1}{5}\right)^3} = \frac{1}{\left(\frac{1}{5}\right) \times \left(\frac{1}{5}\right) \times \left(\frac{1}{5}\right)} = \frac{1}{\frac{1 \times 1 \times 1}{5 \times 5 \times 5}} = \frac{1}{\frac{1}{25 \times 5}} = \frac{1}{\frac{1}{125}} = 125$

$\left(-\frac{6}{7}\right)^{-2} = \frac{1}{\left(-\frac{6}{7}\right)^2} = \frac{1}{\left(-\frac{6}{7}\right) \times \left(-\frac{6}{7}\right)} = \frac{1}{\left(\frac{6}{7}\right) \times \left(\frac{6}{7}\right)} = \frac{1}{\frac{6 \times 6}{7 \times 7}} = \frac{1}{\frac{36}{49}} = \frac{49}{36}$

$(-2)^{-2} = \frac{1}{(-2)^2} = \frac{1}{(-2) \times (-2)} = \frac{1}{2 \times 2} = \frac{1}{4}$

Exercice 2

$A = 3,123 \times 10^5 = 312300$ $B = 0,000123 \times 10^6 = 123$ $C = 13 \times 10^{-4} = 0,0013$

$D = 0,13 \times 10^{-2} = 0,0013$ $E = 5^2 = 25$ $F = 10^{-3} = 0,001$

$G = 2,731 \times 10^{-2} = 0,02731$ $H = 0,15 \times 10^0 = 0,15$ $I = 0,245 \times 10^1 = 2,45$

$J = 1007,1 \times 10^{-4} = 0,10071$

Exercice 3

$A = 527 = 5,27 \times 10^2$ $B = 0,00041 = 4,1 \times 10^{-4}$ $C = 123000000 = 1,25 \times 10^8$

$D = 0,0125 \times 10^5 = 1,25 \times 10^{-2} \times 10^5 = 1,25 \times 10^{-2+5} = 1,25 \times 10^3$

$E = 58 \times 10^3 = 5,8 \times 10^1 \times 10^3 = 5,8 \times 10^{1+3} = 5,8 \times 10^4$

$A = 4^7 \times 4^{10} \times 4^{-2} = 4^{7+10+(-2)} = 4^{15}$

$B = \frac{5^2 \times 5^7}{5^{-3}} = 5^{2+7-(-3)} = 5^{12}$

$H = 0,0314 \times 10^{-1} = 3,14 \times 10^{-2} \times 10^{-1} = 3,14 \times 10^{-2-1} = 3,14 \times 10^{-4}$

Exercice 4

$A = 4^7 \times 4^{10} \times 4^{-2} = 4^{7+10+(-2)} = 4^{15}$

$B = \frac{5^2 \times 5^7}{5^{-3}} = 5^{2+7-(-3)} = 5^{12}$

$C = 4^7 \times 5^7 = (4 \times 5)^7 = 20^7$

$D = \left(\frac{3}{7}\right)^9 \times \left(\frac{3}{7}\right) = \left(\frac{3}{7}\right)^9 \times \left(\frac{3}{7}\right)^1 = \left(\frac{3}{7}\right)^{9+1} = \left(\frac{3}{7}\right)^{10}$

$E = \left(2^2\right)^3 = 2^{2 \times 3} = 2^6$

$F = \frac{2^3 \times (-4)^5 \times 8^{-3}}{16} = \frac{2^3 \times -\left(2^2\right)^5 \times \left(2^3\right)^{-3}}{2^4} = \frac{-2^3 \times 2^{2 \times 5} \times 2^{3 \times (-3)}}{2^4} = 2^{3+10+(-9)-4} = 2^0 = 1$

$G = \frac{(-3)^3 \times 27^{-1}}{9^{-2}} = \frac{-3^3 \times \left(3^3\right)^{-1}}{\left(3^2\right)^{-2}} = -\frac{3^3 \times 3^{3 \times (-1)}}{3^{2 \times (-2)}} = -3^{3+(-3)-(-4)} = 3^4$

$H = \frac{2 \times (-4)^3}{3 \times (-3)^3 \times 27} = \frac{2^1 \times \left(-\left(2^2\right)^3\right)}{3^1 \times \left(-\left(3^3\right)\right) \times 3^3} = \frac{-2^{1+2 \times 3}}{-3^{1+3+3}} = \frac{-2^7}{-3^7} = \left(\frac{-2}{-3}\right)^7 = \left(\frac{2}{3}\right)^7$

Exercice 5

$A = \frac{(-0,4) \times 50 \times 10^{-1}}{10^3 \times 0,0025} = -\frac{4 \times 10^{-1} \times 5 \times 10^1 \times 10^{-1}}{10^3 \times 25 \times 10^{-4}} = -\frac{4 \times 5 \times 10^{-1+1+(-1)}}{5 \times 5 \times 10^{3+(-4)}} = -\frac{4 \times 5 \times 10^{-1}}{5 \times 5 \times 10^{-1}} = -\frac{4}{5}$

$B = \frac{(-81) \times 0,024}{1,2 \times (-0,090)} = \frac{-9^2 \times 24 \times 10^{-3}}{-12 \times 10^{-1} \times 9 \times 10^{-2}} = \frac{-9 \times 9 \times 12 \times 2 \times 10^{-3}}{-12 \times 9 \times 10^{-1+(-2)}} = \frac{-9 \times 9 \times 12 \times 2 \times 10^{-3}}{-12 \times 9 \times 10^{-3}} = \frac{9 \times 2 \times 10^{-3}}{10^{-3}} = 18$