Corrigés	4AS	Calcul numérique - Puissances

1

$$A = \frac{150\times10^{3}\times8\times10^{5}}{6\times10^{7}}$$

$$A = \frac{150\times8\times10^{8}}{6\times10^{7}}$$

$$A = \frac{6\times25\times8\times10}{6}$$

$$A = 25\times8\times10$$

$$A = 2000$$

$$A = 2\times10^{3}$$

$$B = \frac{2\times10^{-5}\times1,2\times10^{2}}{3\times10^{-7}}$$

$$B = \frac{2\times1,2}{3}\times\frac{10^{-5}\times10^{2}}{10^{-7}}$$

$$B = \frac{2,4}{3}\times10^{-5+2+7}$$

$$B = 0,8\times10^{4}$$

$$B = 8\times10^{3}$$

2

$$C = \frac{49\times10^{3}\times6\times10^{-10}}{14\times10^{-2}}$$

$$C = \frac{7\times7\times3\times2\times10^{-7}}{7\times2\times10^{-2}}$$

$$C=7\times3\times10^{-7-(-2)}$$

$$C = 21\times10^{-7-(-2)}$$

$$C=21\times10^{-5} = \frac{21}{10^5}$$

$$C = \frac{21}{100000}$$

$$B = \frac{7\times(7^{-2})^{-4}}{7^{11}}$$

$$B = \frac{7\times7^{8}}{7^{11}}$$

$$B = \frac{7^{1+8}}{7^{11}}$$

$$B = \frac{7^{9}}{7^{11}}$$

$$B = \frac{1}{7^{11-9}}$$

$$B = \frac{1}{7^{2}}$$

$$B = \frac{1}{49}$$

3

$$X=(\frac{1}{3})^8\times3^{10}=\frac{1^8}{3^8}\times3^{10}=1\times3^{10}\times3^{-8}=3^{10-8}=3^2$$

$$Y=(-\frac{4}{3})^5\times(\frac{3}{4})^6=\frac{(-1)^5\times4^5}{3^5}\times\frac{3^6}{4^6}=-4^{5-6}\times3^{6-5}=-4^{-1}\times3^1=-\frac{3}{4}$$

$$Z=(1,5)^{2011}\times(\frac{2}{3})^{2011}=(\frac{3}{2})^{2011}\times(\frac{2}{3})^{2011}=(\frac{3}{2}\times\frac{2}{3})^{2011}=1^{2011}=1$$

4

1) On a $(2^3)^5 = 2^{3\times5} = 2^{15}$, et $2^{3^5} = 2^{3\times3\times3\times3\times3} = 2^{243}$.

Or $234 > 15$ **, donc** $2^{3^5} > (2^3)^5$.

2) $A=(-3)^2+5\times 2^2=9+5\times 4$, (Le calcul de puissance est prioritaire…)

$A=9+20$ (La multiplication est prioritaire sur l'addition).

$A=29$

$$B=2\times(-4)^2+6\times(-1)^5=2\times 16+6\times(-1)=32-6=26.$$

5

$$A=(-a^{-2}b^3)^{-5}=(-1)^{-5}(a^{-2})^{-5}(b^3)^{-5}=-a^{10}\times b^{-15}=\frac{-a^{10}}{b^{15}}$$

$$B=(\frac{a}{5})^2\times(\frac{5}{b})^{-2}=\frac{a^2}{5^2}\times(\frac{b}{5})^2=\frac{a^2}{5^2}\times\frac{b^2}{5^2}=\frac{a^2b^2}{5^4}$$

$$C=(\frac{2a^2b}{4a^2b^2})^{-3}\times(\frac{2a^2b}{4a^2b^2})^{-3}=(\frac{2a^2b}{4a^2b^2})^{-6}=(\frac{2a^2b}{2\times 2a^2b\times b})^{-6}=(\frac{1}{2b})^{-6}=2^6\times b^6.$$

6

$$A=\frac{(3^5\times 2^{-2})^2}{(9^{-1}\times 2^3)^3}=\frac{3^{5\times 2}\times 2^{2\times(-2)}}{9^{(-1)\times 3}\times 2^{3\times 3}}=\frac{3^{10}\times 2^{(-4)}}{(3^2)^{-3}\times 2^9}=\frac{3^{10}\times 3^6}{2^9\times 2^4}=\frac{3^{16}}{2^{13}}=3^{16}\times 2^{-13}$$

$$B=\left(\frac{2^3\times 5^{-3}}{4\times 25}\right)^2\div\frac{10^2\times 2}{5^8}=\frac{2^6\times 5^{-6}}{(2^2\times 5^2)^2}\times\frac{5^8}{2\times(2\times 5)^2}=\frac{2^6\times 5^2}{2^4\times 5^4\times 2\times 2^2\times 5^2}$$

$$=\frac{2^6\times 5^2}{2^4\times 5^4\times 2\times 2^2\times 5^2}=\frac{2^6\times 5^2}{2^7\times 5^6}=2^{-1}\times 5^{-4}$$

$$C=40^{71}\times(1,25)^{48}\times 10^{-119}=(4\times 10)^{71}\times(\frac{125}{100})^{48}\times 10^{-119}=(2^2)^{71}\times 10^{71}\times(\frac{5^3}{10^2})^{48}\times 10^{-119}$$

$$=2^{142}\times 10^{71}\times\frac{5^{144}}{10^{96}}\times 10^{-119}=2^{142}\times 10^{71}\times 10^{-96}\times 5^{144}\times 10^{-119}=2^{142}\times 5^{142}\times 5^2\times 10^{-215}\times 10^{71}$$

$$=2^{142}\times 5^{-142}\times 5^2\times 10^{-144}=10^{142}\times 10^{-144}\times 5^2$$

$$=10^{-2}\times 5^2=2^{-2}\times 5^{-2}\times 5^2=2^{-2}=\frac{1}{4}$$

$$D = 12^{100} \times (1,5)^{50} \times 6^{-149} = (4\times 3)^{100} \times (\frac{3}{2})^{50} \times (2\times 3)^{-149} = (2^2)^{100} \times 3^{100} \times 3^{50} \times 2^{-50} \times 2^{-149} \times 3^{-149}$$

$$= 2^{200} \times 3 \times 2^{-199} = 2 \times 3 = 6$$

Corrigé