

Exercice 1

- (3) Si $a < 0$ et $b < 0$, alors $a^{100} \cdot b^{101} < 0$ car $a^{100} > 0$ (exposant pair) et $b^{101} < 0$ (exposant impair).

Exercice 2

$$\begin{aligned}
 (1) \quad \left(\frac{-5a}{4b}\right)^{13} \cdot \left(-\frac{16b^2}{25a}\right)^6 &= -\frac{5^{13}a^{13}}{(2^2)^{13}b^{13}} \cdot \frac{(2^4)^6(b^2)^6}{(5^2)^6a^6} \\
 &= -\frac{5^{13} \cdot a^{13} \cdot 2^{24} \cdot b^{12}}{2^{26} \cdot b^{13} \cdot 5^{12} \cdot a^6} \\
 &= -\frac{5 \cdot a^7}{2^2 \cdot b} = -\frac{5a^7}{4b}
 \end{aligned}$$

$$\begin{aligned}
 (2) \quad \frac{\overbrace{(-48)^{15}}^- \cdot \overbrace{(-15)^{48}}^+}{\underbrace{(-108)^{20}}^+ \underbrace{(-50)^{25}}^-} &= +\frac{(2^4 \cdot 3)^{15} (3 \cdot 5)^{48}}{(2^2 \cdot 3^3)^{20} (2 \cdot 5^2)^{25}} \\
 &= \frac{2^{60} \cdot 3^{15} \cdot 3^{48} \cdot 5^{48}}{2^{40} \cdot 3^{60} \cdot 2^{25} \cdot 5^{50}} \\
 &= \frac{2^{60} \cdot 3^{63} \cdot 5^{48}}{2^{65} \cdot 3^{60} \cdot 5^{50}} \\
 &= \frac{3^3}{2^5 \cdot 5^2} = \frac{27}{32 \cdot 25} = \frac{27}{800}
 \end{aligned}$$

$$\begin{aligned}
 (3) \quad \left[-((-a)^6 b)^7 \cdot \frac{a^8}{b}\right]^3 &= -(a^6 b)^{21} \left(\frac{a^8}{b}\right)^3 \\
 &= -a^{126} b^{21} \frac{a^{24}}{b^3} \\
 &= -a^{150} b^{18}
 \end{aligned}$$

Exercice 3

- (1) En notation scientifique :

- $123,4 \cdot 10^{16} = 1,234 \cdot 10^{18}$
- $0,000005 \cdot 1600000000 = 5 \cdot 10^{-6} \cdot 1,6 \cdot 10^9 = 8 \cdot 10^3$
- $15 \text{ milliards} \cdot 12 \text{ millions} = 15 \cdot 10^9 \cdot 12 \cdot 10^6 = 180 \cdot 10^{15} = 1,8 \cdot 10^{17}$

- (2) En notation décimale :

- $0,003 \cdot 10^{-2} = 0,00003$
- $120000 \cdot 10^{-6} = 1,2 \cdot 10^5 \cdot 10^{-6} = 1,2 \cdot 10^{-1} = 0,12$