

Préparer son entrée en seconde : calcul numérique 2 : les puissances

Correction 1

- a. $0,6512 \times 10^4 = 6,512 \times 10^5$ est faux car :
 $0,6512 \times 10^4 \times 10^1 \times 10^{-1} = 0,6512 \times 10 \times 10^4 \times 10^{-1}$
 $= 6,512 \times 10^3$
- b. $0,0021 \times 10^{-2} = 2,1 \times 10^{-5}$ est vraie car :
 $0,0021 \times 10^{-2} = 0,0021 \times 10^{-2} \times 10^3 \times 10^{-3}$
 $= 0,0021 \times 10^3 \times 10^{-2} \times 10^{-3} = 2,1 \times 10^{-5}$
- c. $5\,000 \times 10^2 = 5 \times 10^{-1}$ est faux car :
 $5\,000 \times 10^2 = 5\,000 \times 10^2 \times 10^3 \times 10^{-3}$
 $= 5\,000 \times 10^{-3} \times 10^2 \times 10^3 = 5 \times 10^5$
- d. $561 \times 10^7 = 5,61 \times 10^9$ est vraie car :
 $561 \times 10^7 = 561 \times 10^7 \times 10^{-2} \times 10^2$
 $= 561 \times 10^{-2} \times 10^7 \times 10^2 = 5,61 \times 10^9$
- e. $0,000\,000\,023 \times 10^{-1} = 2,3 \times 10^{-9}$ est vraie car :
 $0,000\,000\,023 \times 10^{-1} = 0,000\,000\,023 \times 10^{-1} \times 10^8 \times 10^{-8}$
 $= 0,000\,000\,023 \times 10^8 \times 10^{-1} \times 10^{-8} = 2,3 \times 10^{-9}$

Correction 2

- a. $3^7 \times 3^8 = 3^{7+8} = 3^{15}$ b. $5^8 \times 5^7 = 5^{8+7} = 5^{15}$
- c. $3 \times 3^{11} = 3^{1+11} = 3^{12}$ d. $3^8 \times 5^8 = (3 \times 5)^8 = 15^8$
- e. $4^{12} \times 5^{12} = (4 \times 5)^{12} = 20^{12}$ f. $17^5 \times 2^5 = (17 \times 2)^5 = 34^5$

Correction 3

- a. $5,2^4 \times 10\,000 = 5,2^4 \times 10^4 = (5,2 \times 10)^4 = 52^4$
- b. $84^5 \times 0,000\,01 = 84^5 \times 0,1^5 = (84 \times 0,1)^5 = 8,4^5$

Correction 4

- a. $2^{-4} \times 3^{-4} = (2 \times 3)^{-4} = 6^{-4}$
- b. $5^4 \times 3^4 = (5 \times 3)^4 = 15^4$
- c. $5,6^{10} \times 10^{10} = (5,6 \times 10)^{10} = 56^{10}$

Correction 5

- a. $\frac{5^2}{5^3} = 5^{2-3} = 5^{-1}$ b. $\frac{7^{-3}}{7^5} = 7^{-3-5} = 7^{-8}$
- c. $\frac{12^{22}}{12^{-12}} = 12^{22-(-12)} = 12^{22+12} = 12^{34}$
- d. $\frac{2^{-5}}{2^{-12}} = 2^{-5-(-12)} = 2^{-5+12} = 2^7$
- e. $\frac{3^7}{3^4} = 3^{7-4} = 3^3$ f. $\frac{8^3}{8^{-5}} = 8^{3+5} = 8^8$
- g. $\frac{3^{12}}{3^5} = 3^{12-5} = 3^7$ h. $\frac{7^{-9}}{7^{10}} = 7^{-9-10} = 7^{-19}$

Correction 6

- a. $\frac{a^5}{a^9} = a^{5-9} = a^{-4}$ b. $\frac{a^{12}}{a^{-5}} = a^{12-(-5)} = a^{17}$

Correction 7

- a. $4\,540\,000 = (4\,540\,000 \times 10^{-6}) \times 10^6 = 4,54 \times 10^6$
- b. $0,000\,054 = (0,000\,054 \times 10^5) \times 10^{-5} = 5,4 \times 10^{-5}$
- c. $354,1 \times 10^{11} = (354,1 \times 10^{-2}) \times (10^{11} \times 10^2)$
 $= 3,541 \times 10^{11+2} = 3,541 \times 10^{13}$
- d. $79,8 \times 10^{-8} = (79,8 \times 10^{-1}) \times (10^{-8} \times 10^1)$
 $= 7,98 \times 10^{-8+1} = 7,98 \times 10^{-7}$
- e. $0,000\,079 \times 10^8 = (0,000\,079 \times 10^5) \times (10^8 \times 10^{-5})$
 $= 7,9 \times 10^{8+(-5)} = 7,9 \times 10^3$
- f. $0,005\,2 \times 10^{-4} = (0,005\,2 \times 10^3) \times (10^{-4} \times 10^{-3})$
 $= 5,2 \times 10^{-4-3} = 5,2 \times 10^{-7}$

Correction 8

- a. $10^2 \times 10^7 = 10^{2+7} = 10^9$ b. $10^{14} \times 10^{21} = 10^{14+21} = 10^{35}$
- c. $\frac{10^7}{10^4} = 10^{7-4} = 10^3$ d. $\frac{10^{21}}{10^{14}} = 10^{21-14} = 10^7$
- e. $(10^4)^2 = 10^{4 \times 2} = 10^8$ f. $(10^3)^3 = 10^{3 \times 3} = 10^9$

Correction 9

- a. $5^2 \times 5^5 = 5^{2+5} = 5^7$
- b. $7^4 \times 7^{-7} = 7^{4+(-7)} = 7^{-3}$
- c. $5 \times 5^{-4} = 5^1 \times 5^{-4} = 5^{1+(-4)} = 5^{-3}$
- d. $8^5 \times 8^{-3} \times 8^{-2} = 8^{5+(-3)+(-2)} = 8^0 = 1$
- e. $5^{20} \times 5^{-9} = 5^{20+(-9)} = 5^{11}$

