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# *Puissances*

## Exercices d'entraînement

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### Exercice 1

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Donne la notation scientifique des nombres suivants :

$$A = 1157\,200$$

$$B = 3,67$$

$$C = \frac{3}{40\,000}$$

$$D = 0,000\,004\,699$$

$$E = -58\,459$$

$$F = -0,000\,000\,00266$$

### Exercice 2

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Calcule et donne le résultat en notation scientifique :

$$A = 12 \times 15$$

$$B = \frac{-8 \times 5 \times 27}{(-9) \times 125 \times (-32)}$$

$$C = \frac{-16 \times 10^{288} \times 25 \times 10^{-305}}{-4 + 17 - 23 + 60 + 6 \times 75}$$

$$D = 1\,800\,000 \times 300\,000$$

$$E = \frac{24\,000}{0,000\,000\,02}$$

$$F = -\frac{0,07 \times (10^3)^{-8}}{\frac{140\,000}{(10^5)^2 \times 5 \times 10^{-22}}}$$

### Exercice 3

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Ecris chacun des nombres suivants sous la forme  $2^n \times 5^p$  où  $n$  et  $p$  sont deux entiers relatifs :

$$A = \frac{4}{1\,000}$$

$$B = \frac{64}{25\,000}$$

$$C = \frac{64 \times 5^4}{125 \times 16\,000}$$

$$D = \left[ (625\,000 \times 128)^{15} \times 500 \right]^4$$

# Puissances

Exercices d'entraînement - Version d'avril 2013

## Réponses

### Exercice 1

$$A = 1157\,200 = 1,157\,2 \times 1\,000\,000 = \boxed{1,157\,2 \times 10^6}$$

$$B = 3,67 = 3,67 \times 1 = \boxed{3,67 \times 10^0}$$

$$C = \frac{3}{40\,000} = \frac{3}{4 \times 10\,000} = \frac{3}{4 \times 10^4} = \frac{3}{4} \times 10^{-4} = 0,75 \times 10^{-4} = 7,5 \times 10^{-1} \times 10^{-4} = \boxed{7,5 \times 10^{-5}}$$

$$D = 0,000\,004\,699 = \frac{4,699}{1\,000\,000} = \frac{4,699}{10^6} = \boxed{4,699 \times 10^{-6}}$$

$$E = -58\,459 = -5,845\,9 \times 10\,000 = \boxed{-5,845\,9 \times 10^4}$$

$$F = -0,000\,000\,002\,66 = -\frac{2,66}{10^9} = \boxed{-2,66 \times 10^{-9}}$$

### Exercice 2

$$A = 12 \times 15 = 180 = 1,8 \times 100 = \boxed{1,8 \times 10^2}$$

$$B = \frac{-8 \times 5 \times 27}{(-9) \times 125 \times (-32)} = -\frac{8 \times 5 \times 27}{9 \times 125 \times 32} = -\frac{\cancel{8} \times \cancel{5} \times 3 \times \cancel{9}}{\cancel{9} \times \cancel{5} \times 25 \times 4 \times \cancel{8}} = -\frac{3}{25 \times 4} = -\frac{3}{100} = -0,03 = \boxed{-3 \times 10^{-2}}$$

$$C = \frac{-16 \times 10^{288} \times 25 \times 10^{-305}}{-4 + 17 - 23 + 60 + 6 \times 75} = \frac{-16 \times 25 \times 10^{288-305}}{50 + 450} = \frac{-400 \times 10^{-17}}{500} = \frac{-4 \times \cancel{100} \times 10^{-17}}{5 \times \cancel{100}} \\ = \frac{-4 \times 10^{-17}}{5} = -\frac{4}{5} \times 10^{-17} = -0,8 \times 10^{-17} = -8 \times 10^{-1} \times 10^{-17} = \boxed{-8 \times 10^{-18}}$$

$$D = 1\,800\,000 \times 300\,000 = 1,8 \times 1\,000\,000 \times 3 \times 100\,000 = 1,8 \times 10^6 \times 3 \times 10^5 \\ = 1,8 \times 3 \times 10^6 \times 10^5 = \boxed{5,4 \times 10^{11}}$$

$$E = \frac{24\,000}{0,000\,000\,02} = \frac{2,4 \times 10\,000}{\frac{2}{100\,000\,000}} = \frac{2,4 \times 10^4}{\frac{2}{10^8}} = \frac{2,4 \times 10^4}{2 \times 10^{-8}} = \frac{2,4}{2} \times \frac{10^4}{10^{-8}} = \frac{2,4}{2} \times 10^4 \times 10^8 = \boxed{1,2 \times 10^{12}}$$

## Puissances

Exercices d'entraînement - Version d'avril 2013

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$$\begin{aligned} F &= -\frac{0,07 \times (10^3)^{-8}}{(10^5)^2 \times (-5) \times 10^{-22}} = -\frac{7 \times 10^{-2} \times 10^{-24}}{10^{10} \times 10^{-22} \times 5} = \frac{7 \times 10^{-26}}{1,4 \times 10^5} = \frac{7 \times 10^{-26}}{1,4 \times 10^{17}} = 7 \times 10^{-26} \times \frac{5}{1,4 \times 10^{17}} \\ &= \frac{7 \times 5}{1,4} \times 10^{-26} \times 10^{-17} = \frac{7 \times 5}{14 \times 10^{-1}} \times 10^{-43} = \frac{\cancel{7} \times 5}{2 \times \cancel{7}} \times \frac{10^{-43}}{10^{-1}} = \frac{5}{2} \times 10^{-42} = \boxed{2,5 \times 10^{-42}} \end{aligned}$$

### Exercice 3

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$$A = \frac{4}{1000} = \frac{2^2}{10^3} = 2^2 \times 10^{-3} = 2^2 \times (2 \times 5)^{-3} = 2^2 \times 2^{-3} \times 5^{-3} = \boxed{2^{-1} \times 5^{-3}}$$

$$B = \frac{64}{12\,500} = \frac{\cancel{4} \times 16}{\cancel{4} \times 3\,125} = \frac{16}{3\,125} = \frac{2^4}{25 \times 125} = \frac{2^4}{5^2 \times 5^3} = \frac{2^4}{5^5} = \boxed{2^4 \times 5^{-5}}$$

$$\begin{aligned} C &= \frac{64 \times 5^4}{125 \times 16\,000} = \frac{2^6 \times 5^4}{5^3 \times 16 \times 1\,000} = \frac{2^6 \times 5^4}{5^3 \times 2^4 \times 10^3} = \frac{2^6 \times 5^4}{2^4 \times 5^3 \times (2 \times 5)^3} = \frac{2^6 \times 5^4}{2^4 \times 5^3 \times 2^3 \times 5^3} \\ &= \frac{2^6 \times 5^4}{2^4 \times 2^3 \times 5^3 \times 5^3} = \frac{2^6 \times 5^4}{2^7 \times 5^6} = \frac{2^6}{2^7} \times \frac{5^4}{5^6} = 2^{6-7} \times 5^{4-6} = \boxed{2^{-1} \times 5^{-2}} \end{aligned}$$

$$\begin{aligned} D &= \left[ (625\,000 \times 128) \times 500 \right]^4 = \left[ (625 \times 1\,000 \times 2^7) \times 5 \times 100 \right]^4 = \left[ (5^4 \times 10^3 \times 2^7) \times 5 \times 10^2 \right]^4 \\ &= \left[ (5^4 \times (2 \times 5)^3 \times 2^7) \times 5 \times (2 \times 5)^2 \right]^4 = \left[ (5^4 \times 2^3 \times 5^3 \times 2^7) \times 5 \times 2^2 \times 5^2 \right]^4 = \left[ (2^{10} \times 5^7) \times 2^2 \times 5^3 \right]^4 \\ &= \left[ 2^{10 \times 4} \times 5^{7 \times 4} \times 2^2 \times 5^3 \right]^4 = \left[ 2^2 \times 2^{150} \times 5^3 \times 5^{105} \right]^4 = \left[ 2^{152} \times 5^{108} \right]^4 = 2^{4 \times 152} \times 5^{4 \times 108} = \boxed{2^{608} \times 5^{432}} \end{aligned}$$