

EXERCICE 1 :

Calculer en respectant les priorités :

$A = 3\left(\frac{1}{2}\right)^3$	$B = 5\left(-\frac{3}{4}\right)^2$
$C = \frac{2}{3}\left(\frac{3}{2}\right)^3$	$D = -\frac{5}{2}\left(-\frac{4}{5}\right)^2$
$E = -\frac{7}{3}\left(-\frac{2}{3}\right)^{-2}$	$F = \left(-\frac{2}{3}\right)^3\left(-\frac{1}{4}\right)^2$

EXERCICE 2

Calculer en respectant les priorités :

$A = \left(\frac{1}{2}\right)^3 - \left(\frac{3}{4}\right)^3$	$B = 5\left(\frac{2}{3}\right)^3 - 2\left(\frac{1}{9}\right)^2$
$C = \frac{5}{4}\left(\frac{2}{3}\right)^2 - \frac{1}{9}\left(\frac{5}{2}\right)^2$	$D = -\frac{4}{5}\left(\frac{10}{3}\right)^2 - \frac{7}{3}\left(-\frac{3}{2}\right)^3$

EXERCICE 3 :

Calculer mentalement en utilisant astucieusement la « distributivité des puissances » :

$A = 2^7 \times 5^7$	$B = 4^3 \times 5^3$
$C = 5^{-3} \times 2^{-3}$	$D = 0,5^{-13} \times 2^{-13}$
$E = 2^{-6} \times 10^6 \times (-5)^{-6}$	$F = (-20)^3 \times 100^{-3} \times 5^3$

EXERCICE 4 :

Calculer mentalement en utilisant astucieusement la « distributivité des puissances » :

$A = \frac{4^7}{8^7}$	$B = \frac{(-15)^{-3}}{5^{-3}}$
$C = 6^3 \times \left(\frac{1}{2}\right)^3$	$D = \left(-\frac{7}{3}\right)^{-9} \times \left(\frac{6}{14}\right)^{-9}$
$E = \frac{4^4 \times 3^4}{2^4 \times 12^4} \times 6^4$	$F = \frac{7^{-3} \times 10^3 \times 14^3 \times 2^{-3}}{3^3 \times 5^3 \times 6^{-3}}$

CORRIGE – M. QUET

EXERCICE 1 :

$$A = 3 \left(\frac{1}{2} \right)^3 = 3 \times \frac{1^3}{2^3}$$

$$= 3 \times \frac{1}{8} = \frac{3}{8}$$

$$B = 5 \left(-\frac{3}{4} \right)^2 = 5 \times \frac{3^2}{4^2}$$

$$= 5 \times \frac{9}{16} = \frac{45}{16}$$

$$C = \frac{2}{3} \left(\frac{3}{2} \right)^3 = \frac{2}{3} \times \frac{3^3}{2^3}$$

$$= \frac{2 \times 3^3}{3 \times 2^3} = \frac{3^3}{3} \times \frac{2}{2^3}$$

$$= 3^{3-1} \times 2^{1-3} = 3^2 \times 2^{-2}$$

$$D = -\frac{5}{2} \left(-\frac{4}{5} \right)^2 = -\frac{5}{2} \times \frac{4^2}{5^2}$$

$$= -\frac{5}{2} \times \frac{16}{25} = -\frac{\boxed{5} \times 4 \times 4}{2 \times 5 \times \boxed{5}}$$

$$= -\frac{\boxed{2} \times 2 \times 4}{\boxed{2} \times 5} = -\frac{8}{5}$$

$$E = -\frac{7}{3} \left(-\frac{2}{3} \right)^{-2}$$

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

$$= -\frac{7 \times 3 \times \boxed{3}}{\boxed{3} \times 2 \times 2} = -\frac{21}{4}$$

$$F = \left(-\frac{2}{3} \right)^3 \left(-\frac{1}{4} \right)^2$$

$$= -\frac{2^3}{3^3} \times \frac{1^2}{4^2} = -\frac{8}{27} \times \frac{1}{16}$$

$$= -\frac{\boxed{8} \times 1}{27 \times \boxed{8} \times 2} = -\frac{1}{54}$$

EXERCICE 2

$$A = \left(\frac{1}{2} \right)^3 - \left(\frac{3}{4} \right)^3$$

$$= \frac{1^3}{2^3} - \frac{3^3}{4^3} = \frac{1}{8} - \frac{27}{64}$$

$$= \frac{1 \times 8}{8 \times 8} - \frac{27}{64}$$

$$= \frac{8}{64} - \frac{27}{64} = -\frac{19}{64}$$

$$B = 5 \left(\frac{2}{3} \right)^3 - 2 \left(\frac{1}{9} \right)^2$$

$$= 5 \times \frac{2^3}{3^3} - 2 \times \frac{1^2}{9^2}$$

$$= 5 \times \frac{8}{27} - 2 \times \frac{1}{81}$$

$$= \frac{5 \times 8}{27} - \frac{2 \times 1}{81} = \frac{40}{27} - \frac{2}{81}$$

$$= \frac{40 \times 3}{27 \times 3} - \frac{2}{81} = \frac{120}{81} - \frac{2}{81}$$

$$= \frac{118}{81}$$

$$C = \frac{5}{4} \left(\frac{2}{3} \right)^2 - \frac{1}{9} \left(\frac{5}{2} \right)^2$$

$$= \frac{5}{4} \times \frac{2^2}{3^2} - \frac{1}{9} \times \frac{5^2}{2^2}$$

$$= \frac{5}{4} \times \frac{4}{9} - \frac{1}{9} \times \frac{25}{4}$$

$$= \frac{5 \times 4}{4 \times 9} - \frac{1 \times 25}{9 \times 4}$$

$$= \frac{20}{36} - \frac{25}{36} = -\frac{5}{36}$$

$$D = -\frac{4}{5} \left(\frac{10}{3} \right)^2 - \frac{7}{3} \left(-\frac{3}{2} \right)^3$$

$$= -\frac{4}{5} \times \frac{10^2}{3^2} - \frac{7}{3} \times \left(-\frac{3^3}{2^3} \right)$$

$$= -\frac{4}{5} \times \frac{100}{9} + \frac{7}{3} \times \frac{27}{8}$$

$$= -\frac{4 \times 20 \times \boxed{5}}{\boxed{5} \times 9} + \frac{7 \times 9 \times \boxed{3}}{\boxed{3} \times 8}$$

$$= -\frac{80}{9} + \frac{93}{8} = -\frac{80 \times 8}{9 \times 8} + \frac{93 \times 9}{8 \times 9}$$

$$= -\frac{640}{72} + \frac{837}{72} = \frac{197}{72}$$

EXERCICE 3 :

$$A = 2^7 \times 5^7 = (2 \times 5)^7$$

$$= 10^7$$

$$B = 4^3 \times 5^3 = (4 \times 5)^3$$

$$= 20^3$$

$$C = 5^{-3} \times 2^{-3} = (5 \times 2)^{-3}$$

$$= 10^{-3}$$

$$D = 0,5^{-13} \times 2^{-13}$$

$$= (0,5 \times 2)^{-13} = 1^{-13} = 1$$

$$E = 2^{-6} \times 10^6 \times (-5)^{-6}$$

$$= 2^{-6} \times (-5)^{-6} \times 10^6$$

$$= [2 \times (-5)]^{-6} \times 10^6$$

$$= (-10)^{-6} \times 10^6$$

$$= \frac{1}{(-10)^6} \times 10^6$$

$$= \frac{1}{10^6} \times 10^6 = 1$$

$$F = (-20)^3 \times 100^{-3} \times 5^3$$

$$= (-20)^3 \times 5^3 \times 100^{-3}$$

$$= [(-20) \times 5]^3 \times 100^{-3}$$

$$= (-100)^3 \times 100^{-3}$$

$$= -100^3 \times 100^{-3}$$

$$= -1$$

EXERCICE 4 :

$$A = \frac{4^7}{8^7} = \left(\frac{4}{8} \right)^7$$

$$= \left(\frac{\boxed{4} \times 1}{\boxed{4} \times 2} \right)^7$$

$$= \left(\frac{1}{2} \right)^7 = 2^{-7}$$

$$B = \frac{(-15)^{-3}}{5^{-3}} = \left(\frac{-15}{5} \right)^{-3}$$

$$= (-3)^{-3} = \frac{1}{(-3)^3} = -\frac{1}{3^3}$$

$$C = 6^3 \times \left(\frac{1}{2} \right)^3$$

$$= \left(6 \times \frac{1}{2} \right)^3 = 3^3$$

$$D = \left(-\frac{7}{3} \right)^{-9} \times \left(\frac{6}{14} \right)^{-9}$$

$$= \left(-\frac{7}{3} \times \frac{6}{14} \right)^{-9}$$

$$= \left(-\frac{\boxed{7} \times \boxed{3} \times \boxed{2}}{\boxed{3} \times \boxed{7} \times \boxed{2}} \right)^{-9} = -1^{-9} = -1$$

$$\begin{aligned}
 E &= \frac{4^4 \times 3^4}{2^4 \times 12^4} \times 6^4 \\
 &= \frac{(4 \times 3)^4 \times 6^4}{2^4 \times 12^4} \\
 &= \frac{12^4 \times 6^4}{(2 \times 12)^4} \\
 &= \frac{(12 \times 6)^4}{(2 \times 12)^4} \\
 &= \left(\frac{\boxed{12} \times 6}{2 \times \boxed{12}} \right)^4 \\
 &= 3^4
 \end{aligned}$$

$$\begin{aligned}
 F &= \frac{7^{-3} \times 10^3 \times 14^3 \times 2^{-3}}{3^3 \times 5^3 \times 6^{-3}} \\
 &= \frac{10^3 \times 14^3 \times 6^{+3}}{7^{+3} \times 2^{+3} \times 3^3 \times 5^3} \\
 &= \frac{(10 \times 14 \times 6)^3}{(7 \times 2 \times 3 \times 5)^3} \\
 &= \left(\frac{10 \times 14 \times 6}{7 \times 2 \times 3 \times 5} \right)^3 \\
 &= \left(\frac{\boxed{5} \times \boxed{2} \times \boxed{7} \times 2 \times \boxed{3} \times 2}{\boxed{7} \times \boxed{2} \times \boxed{3} \times \boxed{5}} \right)^3 \\
 &= 4^3
 \end{aligned}$$