

Exercice n°1

$$A = \frac{4}{3} - \frac{2}{3} \times \frac{5}{8}$$

$$= \frac{4}{3} - \frac{2 \times 5}{3 \times 8}$$

$$= \frac{4 \times 8}{3 \times 8} - \frac{10}{24}$$

$$= \frac{32}{24} - \frac{10}{24}$$

$$= \frac{22}{24}$$

$$A = \frac{11}{12}$$

$$B = \frac{5}{18} \times \left(\frac{6}{15} + \frac{1 \times 5}{3 \times 5} \right)$$

$$= \frac{5}{18} \times \left(\frac{6}{15} + \frac{5}{15} \right)$$

$$= \frac{5}{18} \times \frac{11}{15}$$

$$= \frac{5 \times 11}{18 \times 15}$$

$$= \frac{11}{18 \times 3}$$

$$B = \frac{11}{54}$$

$$C = \frac{8}{3} \div \left(\frac{4 \times 3}{5 \times 3} - \frac{2 \times 5}{3 \times 5} \right)$$

$$= \frac{8}{3} \div \left(\frac{12}{15} - \frac{10}{15} \right)$$

$$= \frac{8}{3} \div \frac{2}{15}$$

$$= \frac{8}{3} \times \frac{15}{2}$$

$$C = \frac{8 \times 15}{3 \times 2}$$

$$= \frac{4 \times 15}{3}$$

$$= 4 \times 5$$

$$C = 20$$

$$\begin{aligned}
 D &= \frac{-\frac{1 \times 3}{2 \times 3} - \frac{2 \times 2}{3 \times 2}}{\frac{3 \times 3}{2 \times 3} - \frac{2 \times 2}{3 \times 2}} \\
 &= \frac{-\frac{3}{6} - \frac{4}{6}}{\frac{9}{6} - \frac{4}{6}} \\
 &= \frac{-\frac{7}{6}}{\frac{5}{6}}
 \end{aligned}$$

$$= -\frac{7}{6} \times \frac{6}{5}$$

$$= \frac{-7 \times 6}{6 \times 5}$$

$$D = -\frac{7}{5}$$

$$E = \frac{3}{5} - \frac{2}{5} \times \frac{7}{6}$$

$$= \frac{3 \times 6}{5 \times 6} - \frac{14}{30}$$

$$= \frac{18}{30} - \frac{14}{30}$$

$$\begin{aligned}
 F &= \frac{-\frac{3 \times 7}{4 \times 7} + \frac{5 \times 4}{7 \times 4}}{\frac{2 \times 4}{3 \times 4} + \frac{3 \times 3}{4 \times 3}} \\
 &= \frac{-\frac{21}{28} + \frac{20}{28}}{\frac{8}{12} + \frac{9}{12}} \\
 &= \frac{-\frac{1}{28}}{\frac{17}{12}}
 \end{aligned}$$

$$= -\frac{1}{28} \times \frac{12}{17}$$

$$= \frac{-6}{14 \times 17}$$

$$= \frac{-3}{7 \times 17}$$

$$F = \frac{-3}{119}$$

$$E = \frac{4}{30}$$

$$E = \frac{2}{15}$$

$$\begin{aligned}
 G &= \frac{\frac{4 \times 3}{5 \times 3} - \frac{2 \times 5}{3 \times 5}}{\frac{2 \times 3}{5 \times 3} - \frac{4 \times 5}{3 \times 5}} \\
 &= \frac{\frac{12}{15} - \frac{10}{15}}{\frac{6}{15} - \frac{20}{15}} \\
 &= \frac{\frac{2}{15}}{-\frac{14}{15}}
 \end{aligned}$$

$$= \frac{2}{15} \times \left(-\frac{15}{14}\right)$$

$$= -\frac{2}{14}$$

$$G = -\frac{1}{7}$$

Exercise n°2:

$$A = \frac{1}{3} + \frac{3}{4} \times \frac{2}{5}$$

$$= \frac{1}{3} + \frac{6}{20}$$

$$= \frac{20}{60} + \frac{18}{60}$$

$$= \frac{38}{60}$$

$$A = \frac{19}{30}$$

$$B = 5 - \frac{2}{3} \times \frac{7}{2}$$

$$B = 5 - \frac{7}{3}$$

$$= \frac{15}{3} - \frac{7}{3}$$

$$B = \frac{8}{3}$$

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

$$= \frac{5}{4} - \frac{5}{8}$$

$$= \frac{10}{8} - \frac{5}{8}$$

$$C = \frac{5}{8}$$

$$\textcircled{1} = \frac{1 + \frac{2}{5}}{4 - \frac{1}{2}}$$

$$= \frac{\frac{5}{5} + \frac{2}{5}}{\frac{8}{2} - \frac{1}{2}}$$

$$= \frac{\frac{7}{5}}{\frac{7}{2}}$$

$$= \frac{8}{5} \times \frac{2}{7}$$

$$\textcircled{1} = \frac{16}{35}$$

$$E = \frac{\frac{1}{2} + \frac{4}{3}}{\frac{3}{5} - \frac{2}{7}}$$

$$= \frac{\frac{3}{6} + \frac{8}{6}}{\frac{21}{35} - \frac{10}{35}}$$

$$= \frac{\frac{11}{6}}{\frac{11}{35}}$$

$$= \frac{11}{6} \times \frac{35}{11}$$

$$E = \frac{35}{6}$$

$$F = \frac{\frac{2}{5} \times \frac{3}{4}}{\frac{2}{5} - \frac{5}{4}}$$

$$= \frac{\frac{3}{10}}{\frac{8}{20} - \frac{25}{20}}$$

$$= \frac{\frac{3}{10}}{-\frac{17}{20}}$$

$$= \frac{3}{10} \times \left(-\frac{20}{17}\right)$$

$$= \frac{3}{1} \times \left(-\frac{2}{17}\right)$$

$$F = -\frac{6}{17}$$

$$G = \frac{\frac{3}{4} - \frac{5}{3}}{\frac{3}{4} + \frac{5}{3}}$$

$$= \frac{\frac{9}{12} - \frac{20}{12}}{\frac{9}{12} + \frac{20}{12}}$$

$$= \frac{\frac{-11}{12}}{\frac{29}{12}}$$

$$= -\frac{11}{12} \times \frac{12}{29}$$

$$G = -\frac{11}{29}$$

Exercise n°3

$$\begin{aligned}A &= \frac{2^{15}}{2^{11}} \\&= 2^{15-11} \\&= 2^4\end{aligned}$$

$$A = 16$$

$$\begin{aligned}B &= \frac{(-7)^5}{7^3} \\&= \frac{-7^5}{7^3} \\&= -7^{5-3} \\&= -7^2\end{aligned}$$

$$B = -49$$

$$\begin{aligned}C &= \frac{-3^2 \times (-3)^3 \times 3^5}{3^3 \times (-3)^4} \\&= \frac{-3^2 \times (-3^3) \times 3^5}{3^3 \times 3^4} \\&= \frac{3^2 \times \cancel{3^3} \times 3^5}{\cancel{3^3} \times 3^4} \\&= \frac{3^{2+5}}{3^4}\end{aligned}$$

$$= \frac{3^7}{3^4}$$

$$= 3^{7-4}$$

$$= 3^3$$

$$C = 27$$

$$\begin{aligned}D &= \frac{5^8 \times (5^{13})^2}{5^2 \times (5^{13})^3} \\&= \frac{5^8 \times 5^{13 \times 2}}{5^2 \times 5^{13 \times 3}} \\&= \frac{5^8 \times 5^{26}}{5^2 \times 5^{39}} \\&= \frac{5^{8+26}}{5^{2+39}}\end{aligned}$$

$$\begin{aligned}D &= \frac{5^{34}}{5^{41}} \\&= 5^{34-41}\end{aligned}$$

$$D = 5^{-7}$$

$$D = \frac{1}{5^7}$$

$$D = \left(\frac{1}{5}\right)^7$$

Exercice n°4:

$$\begin{aligned} A &= \frac{10^9 \times 6^3}{25^4 \times 3 \times 2^{11}} \\ &= \frac{(2 \times 5)^9 \times (2 \times 3)^3}{(5 \times 5)^4 \times 3 \times 2^{11}} \\ &= \frac{2^9 \times 5^9 \times 2^3 \times 3^3}{5^4 \times 5^4 \times 3 \times 2^{11}} \\ &= \frac{2^{9+3} \times 3^3 \times 5^9}{5^{4+4} \times 3 \times 2^{11}} \\ &= \frac{2^{12} \times 3^3 \times 5^9}{5^8 \times 3 \times 2^{11}} \\ &= \frac{2^{12}}{2^{11}} \times \frac{3^3}{3} \times \frac{5^9}{5^8} \\ &= 2^{12-11} \times 3^{3-1} \times 5^{9-8} \\ &= 2 \times 3^2 \times 5 \\ &= 2 \times 9 \times 5 \end{aligned}$$

$$A = 90$$

$$\begin{aligned} B &= \frac{1 \times 10}{10^{118} \times 10} - \frac{1}{10^{119}} \\ &= \frac{10}{10^{119}} - \frac{1}{10^{119}} \\ &= \frac{9}{10^{119}} \end{aligned}$$

$$B = 9 \times 10^{-119}$$

$$C = 5^{108} \times 2^{106} \times 11 \times \frac{1}{10^{107}}$$

$$= \frac{5^{108} \times 2^{106} \times 11}{(2 \times 5)^{107}}$$

$$= \frac{5^{108} \times 2^{106} \times 11}{2^{107} \times 5^{107}}$$

$$= \frac{5^{108}}{5^{107}} \times \frac{2^{106}}{2^{107}} \times 11$$

$$= 5^{108-107} \times 2^{106-107} \times 11$$

$$= 5 \times 2^{-1} \times 11$$

$$= 5 \times \frac{1}{2} \times 11$$

$$C = 27,5$$

Exercise n°5:

$$A = 4^{-3}$$
$$= \frac{1}{4^3}$$

$$A = \frac{1}{64}$$

$$B = \frac{7^9}{7^{11}}$$
$$= 7^{9-11}$$
$$= 7^{-2}$$
$$= \frac{1}{7^2}$$

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

$$C = \left(\frac{5}{4}\right)^{-2}$$
$$= \frac{1}{\left(\frac{5}{4}\right)^2}$$
$$= \frac{1}{\frac{5^2}{4^2}}$$
$$= \frac{1}{\frac{25}{16}}$$

$$C = \frac{16}{25}$$

$$D = \left(-\frac{2}{3}\right)^{-3}$$
$$= \frac{1}{\left(-\frac{2}{3}\right)^3}$$
$$= \frac{1}{-\left(\frac{2}{3}\right)^3}$$
$$= \frac{1}{-\frac{2^3}{3^3}}$$
$$D = -\frac{27}{8}$$

$$E = \frac{5^{-1}}{5^2}$$

$$= 5^{-1-2}$$

$$= 5^{-3}$$

$$= \frac{1}{5^3}$$

$$E = \frac{1}{125}$$

$$F = \frac{2^3}{2^{-2}}$$

$$= 2^{3-(-2)}$$

$$= 2^5$$

$$F = 32$$

$$G = \frac{-3^4 \times 3^{-2}}{3^2}$$

$$= \frac{-3^{4+(-2)}}{3^2}$$

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

$$G = -1$$

$$H = \frac{6^5 \times (-6)^{-4} \times 6^{-3}}{6^2 \times 6^{-5}}$$

$$= \frac{6^5 \times (-6)^{-4} \times 6^{-3}}{6^{2+(-5)}}$$

$$= \frac{6^5 \times (-6)^{-4} \times 6^{-3}}{6^{-3}}$$

$$= 6^5 \times (-6)^{-4}$$

$$= 6^5 \times \frac{1}{(-6)^4}$$

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

$$= \frac{6^5}{6^4}$$

Astuce: On va obtenir 6^{-3} au dénominateur, donc on va pouvoir simplifier

$$H = 6^{5-4}$$

$$H = 6$$

Exercice n° 6:

$$A = \sqrt{3} \times \sqrt{6}$$

$$= \sqrt{3} \times \sqrt{2 \times 3}$$

$$= \sqrt{3} \times \sqrt{2} \times \sqrt{3}$$

$$A = 3\sqrt{2}$$

$$B = \sqrt{5} \times \sqrt{20}$$

$$= \sqrt{5 \times 20}$$

$$= \sqrt{100}$$

$$B = 10$$

$$C = \sqrt{12} \times \sqrt{27}$$

$$= \sqrt{3 \times 4} \times \sqrt{3 \times 9}$$

$$= \sqrt{3} \times \sqrt{4} \times \sqrt{3} \times \sqrt{9}$$

$$= 3 \times 2 \times 3$$

$$C = 18$$

$$D = \sqrt{3} \times \sqrt{6} \times \sqrt{8}$$

$$= \sqrt{3} \times \sqrt{2 \times 3} \times \sqrt{2 \times 4}$$

$$= \sqrt{3} \times \sqrt{2} \times \sqrt{3} \times \sqrt{2} \times \sqrt{4}$$

$$= 3 \times 2 \times 2$$

$$D = 12$$

$$E = \sqrt{98} \times \sqrt{50}$$

$$= \sqrt{2 \times 49} \times \sqrt{2 \times 25}$$

$$= \sqrt{2} \times \sqrt{49} \times \sqrt{2} \times \sqrt{25}$$

$$= 2 \times 7 \times 5$$

$$E = 70$$

$$F = \sqrt{15} \times \sqrt{135}$$

$$= \sqrt{3 \times 5} \times \sqrt{5 \times 3 \times 9}$$

$$= \sqrt{3} \times \sqrt{5} \times \sqrt{5} \times \sqrt{3} \times \sqrt{9}$$

$$= 3 \times 5 \times 3$$

$$F = 45$$

Exercice n° 7:

$$A = 2\sqrt{2} \times \sqrt{50}$$

$$= 2\sqrt{2} \times \sqrt{2 \times 25}$$

$$= 2\sqrt{2} \times \sqrt{2} \times \sqrt{25}$$

$$= 2 \times 2 \times 5$$

$$A = 20$$

$$B = \sqrt{15} \times 3 \times \sqrt{10}$$

$$= \sqrt{5 \times 3} \times 3 \times \sqrt{2 \times 5}$$

$$= \sqrt{5} \times \sqrt{3} \times 3 \times \sqrt{2} \times \sqrt{5}$$

$$= 5 \times 3 \times \sqrt{2} \times \sqrt{3}$$

$$B = 15\sqrt{6}$$

$$C = 2\sqrt{27} \times 6\sqrt{3}$$

$$= 2\sqrt{3 \times 9} \times 6\sqrt{3}$$

$$= 2\sqrt{3} \times \sqrt{9} \times 6\sqrt{3}$$

$$= 2 \times 3 \times 3 \times 6$$

$$C = 108$$

$$D = 3\sqrt{2} \times \sqrt{8} \times 2\sqrt{2}$$

$$= 3\sqrt{2} \times \sqrt{4 \times 2} \times 2\sqrt{2}$$

$$= 3\sqrt{2} \times \sqrt{4} \times \sqrt{2} \times 2\sqrt{2}$$

$$= 3 \times 2 \times 2 \times 2\sqrt{2}$$

$$D = 24\sqrt{2}$$

Exercice n°8:

$$\begin{aligned}A &= 5\sqrt{7} - 5\sqrt{28} - \sqrt{63} \\&= 5\sqrt{7} - 5\sqrt{4 \times 7} - \sqrt{9 \times 7} \\&= 5\sqrt{7} - 5 \times \sqrt{4} \times \sqrt{7} - \sqrt{9} \times \sqrt{7} \\&= 5\sqrt{7} - 5 \times 2\sqrt{7} - 3\sqrt{7} \\&= 5\sqrt{7} - 10\sqrt{7} - 3\sqrt{7} \\&= -5\sqrt{7} - 3\sqrt{7}\end{aligned}$$

$$A = -8\sqrt{7}$$

$$\begin{aligned}B &= 7\sqrt{2} - \sqrt{18} - 2\sqrt{32} \\&= 7\sqrt{2} - \sqrt{9 \times 2} - 2\sqrt{16 \times 2} \\&= 7\sqrt{2} - \sqrt{9} \times \sqrt{2} - 2 \times \sqrt{16} \times \sqrt{2} \\&= 7\sqrt{2} - 3\sqrt{2} - 2 \times 4\sqrt{2} \\&= 7\sqrt{2} - 3\sqrt{2} - 8\sqrt{2}\end{aligned}$$

$$B = -4\sqrt{2}$$

$$\begin{aligned}C &= 2\sqrt{12} - 4\sqrt{75} + 3\sqrt{27} \\&= 2\sqrt{3 \times 4} - 4\sqrt{25 \times 3} + 3\sqrt{3 \times 9} \\&= 2\sqrt{3} \times \sqrt{4} - 4 \times \sqrt{25} \times \sqrt{3} + 3 \times \sqrt{3} \times \sqrt{9} \\&= 2 \times \sqrt{3} \times 2 - 4 \times 5 \times \sqrt{3} + 3 \times \sqrt{3} \times 3 \\&= 4\sqrt{3} - 20\sqrt{3} + 9\sqrt{3}\end{aligned}$$

$$C = -7\sqrt{3}$$

$$\begin{aligned}D &= \sqrt{8} - \sqrt{32} + \sqrt{50} \\&= \sqrt{4 \times 2} - \sqrt{16 \times 2} + \sqrt{2 \times 25} \\&= \sqrt{4} \times \sqrt{2} - \sqrt{16} \times \sqrt{2} + \sqrt{2} \times \sqrt{25} \\&= 2\sqrt{2} - 4\sqrt{2} + 5\sqrt{2}\end{aligned}$$

$$D = 3\sqrt{2}$$

Exercise 3

$$A = \sqrt{\frac{8}{27}} \times \sqrt{\frac{3}{50}}$$

$$= \frac{\sqrt{8}}{\sqrt{27}} \times \frac{\sqrt{3}}{\sqrt{50}}$$

$$= \frac{\sqrt{8} \times \sqrt{3}}{\sqrt{27} \times \sqrt{50}}$$

$$= \frac{\sqrt{2 \times 4} \times \sqrt{3}}{\sqrt{27} \times \sqrt{50}}$$

$$= \frac{\sqrt{2 \times 4} \times \sqrt{3}}{\sqrt{3 \times 9} \times \sqrt{25 \times 2}}$$

$$= \frac{\sqrt{2} \times \sqrt{4} \times \sqrt{3}}{\sqrt{3} \times \sqrt{9} \times \sqrt{25} \times \sqrt{2}}$$

$$= \frac{\sqrt{2} \times 2 \times \sqrt{3}}{\sqrt{3} \times 3 \times 5 \times \sqrt{2}}$$

$$A = \frac{2}{15}$$

$$B = 2 \sqrt{\frac{2}{27}} \times \sqrt{\frac{3}{8}}$$

$$= 2 \times \frac{\sqrt{2}}{\sqrt{27}} \times \frac{\sqrt{3}}{\sqrt{8}}$$

$$= \frac{2 \times \sqrt{2} \times \sqrt{3}}{\sqrt{27} \times \sqrt{8}}$$

$$= \frac{2 \times \sqrt{2} \times \sqrt{3}}{\sqrt{3 \times 9} \times \sqrt{4 \times 2}}$$

$$= \frac{2 \times \sqrt{2} \times \sqrt{3}}{\sqrt{3} \times \sqrt{9} \times \sqrt{4} \times \sqrt{2}}$$

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

$$B = \frac{1}{3}$$

$$C = \sqrt{\frac{8}{5}} \times \sqrt{40}$$

$$= \frac{\sqrt{8}}{\sqrt{5}} \times \sqrt{40}$$

$$= \frac{\sqrt{8}}{\sqrt{5}} \times \sqrt{8 \times 5}$$

$$= \frac{\sqrt{8}}{\sqrt{5}} \times \sqrt{8} \times \sqrt{5}$$

$$= \sqrt{8} \times \sqrt{8}$$

$$C = 8$$

$$D = \sqrt{\frac{9}{10}} \times \frac{\sqrt{40}}{\sqrt{81}}$$

$$= \frac{\sqrt{9}}{\sqrt{10}} \times \frac{\sqrt{40}}{\sqrt{81}}$$

$$= \frac{3}{\sqrt{10}} \times \frac{\sqrt{4 \times 10}}{\sqrt{9^2}}$$

$$= \frac{3}{\sqrt{10}} \times \frac{\sqrt{4} \times \sqrt{10}}{9}$$

$$= \frac{3 \times \sqrt{4}}{9}$$

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

$$D = \frac{2}{3}$$