

Fractions et calcul littéral 3e, 2nde

Exercice 1 : Calculer

$$A = \frac{1}{2}x + \frac{x}{3} = \frac{1}{2} \times \frac{x}{1} + \frac{x}{3} = \frac{1 \times x}{2 \times 1} + \frac{x}{3} = \frac{x}{2} + \frac{x}{3} = \frac{x \times 3}{2 \times 3} + \frac{x \times 2}{3 \times 2} = \frac{3x + 2x}{6} = \frac{5x}{6}$$

$$B = \frac{2x}{5} + \frac{3x}{4} = \frac{2x \times 4 + 3x \times 5}{5 \times 4} = \frac{8x + 15x}{20} = \frac{23x}{20}$$

$$C = \frac{6}{7x} - \frac{7}{4}x = \frac{6}{7x} - \frac{7x}{4} = \frac{6 \times 4 - 7x \times 7x}{7x \times 4} = \frac{24 - 49x^2}{28x}$$

$$D = -\frac{7}{6x} - \frac{8}{5x} = -\frac{7 \times 5}{6x \times 5} - \frac{8 \times 6}{5x \times 6} = \frac{-35 - 48}{6 \times 5 \times x} = \frac{-83}{30x}$$

$$E = -\frac{9}{8}x + \frac{6x}{7} = \frac{-9x \times 7 + 6x \times 8}{8 \times 7} = \frac{-63x + 48x}{56} = \frac{-15x}{56}$$

$$F = -\frac{10}{3}x - \frac{5}{6x^2} = -\frac{10x \times 2x^2}{3 \times 2x^2} - \frac{5}{6x^2} = -\frac{20x^3}{6x^2} - \frac{5}{6x^2} = \frac{-20x^3 - 5}{6x^2}$$

Exercice 2 : Calculer

$$A = \frac{2}{3}x \times \frac{1}{4} = \frac{2 \times x \times 1}{3 \times 1 \times 4} = \frac{2 \times x}{3 \times 2 \times 2} = \frac{x}{3 \times 2} = \frac{x}{6}$$

$$B = \frac{4x}{3} \times \left(-\frac{9}{2}\right) = \frac{2 \times 2 \times x \times (-3) \times 3}{3 \times 2} = -6x$$

$$C = \left(-\frac{12}{5}x\right) \times \frac{10x}{3} = \frac{-3 \times 2 \times 2 \times x \times 5 \times 2 \times x}{5 \times 3} = -8x^2$$

$$D = \left(-\frac{15}{4}x^2\right) \times \frac{8}{3} \times \left(-\frac{2}{5x}\right) = \frac{-3 \times 5 \times x \times x \times 4 \times 2 \times (-2)}{2 \times 2 \times 3 \times 5 \times x} = 4x$$

$$E = \frac{16x}{21} \times \left(-\frac{7}{4}x\right) \times \frac{9x}{12} = \frac{4 \times 4 \times x \times (-7) \times x \times 3 \times 3 \times x}{7 \times 3 \times 4 \times 4 \times 3} = -x^3$$

$$F = -\frac{9}{4}x^2 \times \frac{1}{3x} \times \frac{8x^3}{15} = \frac{-3 \times 3 \times x \times x \times 4 \times 2 \times x \times x \times x}{4 \times 3 \times x \times 3 \times 5} = -\frac{2x^4}{5}$$

Exercice 3 : Calculer

$$A = \frac{\frac{4}{3}x}{\frac{1}{2}} = \frac{4}{3}x \times \frac{2}{1} = \frac{4 \times x \times 2}{3 \times 1} = \frac{8x}{3}$$

$$B = \frac{\frac{9}{5}}{\frac{3}{10}x} = \frac{9}{5} \times \frac{10}{3x} = \frac{3 \times 3 \times 5 \times 2}{5 \times 3 \times x} = \frac{3 \times 2}{x} = \frac{6}{x}$$

$$C = \frac{-\frac{8}{7x}}{\frac{2}{21}} = -\frac{8}{7x} \times \frac{21}{2} = -\frac{4 \times 2 \times 7 \times 3}{7 \times x \times 2} = -\frac{4 \times 3}{x} = -\frac{12}{x}$$

$$D = \frac{-\frac{16}{5}}{-\frac{4}{3x}} = -\frac{16}{5} \times \left(-\frac{3x}{4}\right) = \frac{4 \times 4 \times 3 \times x}{5 \times 4} = \frac{4 \times 3 \times x}{5} = \frac{12x}{5}$$

Exercice 4 : Résoudre les équations suivantes

$$\frac{1}{2}x + 3 = 5$$

$$\Leftrightarrow \frac{1}{2}x + 3 - 3 = 5 - 3$$

$$\Leftrightarrow \frac{1}{2}x = 2$$

$$\Leftrightarrow \frac{\frac{1}{2}x}{\frac{1}{2}} = \frac{2}{\frac{1}{2}} = 2 \times \frac{2}{1} = 4$$

$$\Leftrightarrow x = 4$$

$$\begin{aligned}
& -\frac{2}{3}x - \frac{1}{4} = 2x - \frac{1}{3} \\
& \Leftrightarrow -\frac{2}{3}x - \frac{1}{4} - 2x = 2x - \frac{1}{3} - 2x \\
& \Leftrightarrow -\frac{2}{3}x - \frac{1}{4} - 2x = -\frac{1}{3} \\
& \Leftrightarrow -\frac{2}{3}x - \frac{1}{4} - 2x + \frac{1}{4} = -\frac{1}{3} + \frac{1}{4} \\
& \Leftrightarrow -\frac{2}{3}x - 2x = \frac{-1 \times 4}{3 \times 4} + \frac{1 \times 3}{4 \times 3} \\
& \Leftrightarrow -\frac{2}{3}x - \frac{6x}{3} = \frac{-4+3}{12} \\
& \Leftrightarrow \frac{-8x}{3} = -\frac{1}{12} \\
& \Leftrightarrow \frac{-8x}{3} = \frac{-1}{12} \\
& \Leftrightarrow \frac{-8}{3} = \frac{-8}{3} \\
& \Leftrightarrow x = \frac{1}{12} \times \frac{3}{8} = \frac{1 \times 3}{4 \times 3 \times 8} = \frac{1}{32}
\end{aligned}$$

$$\begin{aligned}
& \frac{1}{5}(2x-3) + x = -\frac{2}{3}x - \frac{1}{4} \\
& \Leftrightarrow \frac{1}{5} \times 2x - \frac{1}{5} \times 3 + x = -\frac{2}{3}x - \frac{1}{4} \\
& \Leftrightarrow \frac{2x}{5} - \frac{3}{5} + x = -\frac{2}{3}x - \frac{1}{4} \\
& \Leftrightarrow \frac{2x}{5} - \frac{3}{5} + x + \frac{2}{3}x = -\frac{2}{3}x - \frac{1}{4} + \frac{2}{3}x \\
& \Leftrightarrow \frac{2x \times 3 + x \times 5 \times 3 + 2x \times 5}{5 \times 3} - \frac{3}{5} = -\frac{1}{4} \\
& \Leftrightarrow \frac{6x + 15x + 10x}{15} - \frac{3}{5} + \frac{3}{5} = -\frac{1}{4} + \frac{3}{5} \\
& \Leftrightarrow \frac{31x}{15} = \frac{-5 + 3 \times 4}{5 \times 4} \\
& \Leftrightarrow \frac{31x}{15} = \frac{7}{20} \\
& \Leftrightarrow \frac{31x}{15} = \frac{7}{20} \\
& \Leftrightarrow \frac{31}{15} = \frac{31}{15} \\
& \Leftrightarrow x = \frac{7}{20} \times \frac{15}{31} = \frac{7 \times 3 \times 5}{4 \times 5 \times 31} = \frac{7 \times 3}{4 \times 31} = \frac{21}{124}
\end{aligned}$$

$$\begin{aligned}
& \frac{-x+4}{3} - \frac{2x+3}{4} = \frac{5}{6} \\
\Leftrightarrow & \frac{(-x+4) \times 4}{3 \times 4} - \frac{(2x+3) \times 3}{4 \times 3} = \frac{5 \times 2}{6 \times 2} \\
\Leftrightarrow & \frac{(-4x+16) - (6x+9)}{12} = \frac{10}{12} \\
\Leftrightarrow & \frac{-4x-6x+16-9}{12} = \frac{10}{12} \\
\Leftrightarrow & \frac{-10x+5}{12} = \frac{10}{12} \\
\Leftrightarrow & \frac{(-10x+5) \times 12}{12} = \frac{10 \times 12}{12} \\
\Leftrightarrow & -10x+5=10 \\
\Leftrightarrow & -10x+5-5=10-5 \\
\Leftrightarrow & -10x=5 \\
\Leftrightarrow & \frac{-10x}{-10} = \frac{5}{-10} \\
\Leftrightarrow & x = -\frac{5}{10} = -\frac{5}{2 \times 5} = -\frac{1}{2}
\end{aligned}$$