

**INTERRO DE COURS**

**Exercice 1** – Donner l'écriture des nombres suivants sous la forme d'un entier ou d'une fraction irréductible.

1.  $A = \frac{2}{3} + \frac{1}{4} - \frac{1}{2}$

**Solution :**

$$\begin{aligned} A &= \frac{2}{3} + \frac{1}{4} - \frac{1}{2} \\ &= \frac{8}{12} + \frac{3}{12} - \frac{6}{12} \\ &= \frac{5}{12} \end{aligned}$$

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

**Solution :**

$$\begin{aligned} B &= 2\left(\frac{1}{2} - \frac{1}{3}\right) - \left(1 + \frac{1}{5}\right) \\ &= 2\left(\frac{3}{6} - \frac{2}{6}\right) - \left(\frac{5}{5} + \frac{1}{5}\right) \\ &= 2 \times \frac{1}{6} - \frac{6}{5} \\ &= \frac{1}{3} - \frac{6}{5} \\ &= \frac{5}{15} - \frac{18}{15} \\ &= -\frac{13}{15} \end{aligned}$$

3.  $C = \left(1 - \frac{1}{3}\right) \times \left(-1 + \frac{5}{6}\right) \div \left(\frac{4}{5} - \frac{2}{3}\right)$

**Solution :**

$$\begin{aligned} C &= \left(1 - \frac{1}{3}\right) \times \left(-1 + \frac{5}{6}\right) \div \left(\frac{4}{5} - \frac{2}{3}\right) \\ &= \left(\frac{3}{3} - \frac{1}{3}\right) \times \left(\frac{-6}{6} + \frac{5}{6}\right) \div \left(\frac{12}{15} - \frac{10}{15}\right) \\ &= \frac{2}{3} \times \frac{-1}{6} \div \frac{2}{15} \\ &= \frac{2}{3} \times \frac{-1}{6} \times \frac{15}{2} \\ &= \frac{-5}{6} \end{aligned}$$

$$4. D = \frac{1 + \frac{1}{2} \times \frac{2}{3}}{1 - \frac{1}{3} \times \frac{3}{2}}$$

**Solution :**

$$\begin{aligned} D &= \frac{1 + \frac{1}{2} \times \frac{2}{3}}{1 - \frac{1}{3} \times \frac{3}{2}} \\ &= \frac{1 + \frac{1}{3}}{1 - \frac{1}{2}} \\ &= \frac{\frac{4}{3}}{\frac{1}{2}} \\ &= \frac{4}{3} \times \frac{2}{1} \\ &= \frac{8}{3} \end{aligned}$$

**Exercice 2 –** Simplifier les nombres suivants.

$$1. A = 2^3 \times 2^{-1} \times 2^4 \times 2$$

**Solution :**  $A = 2^3 \times 2^{-1} \times 2^4 \times 2 = 2^{3-1+4+1} = 2^7$

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

**Solution :**  $B = \frac{3^2 \times 3^{-4}}{3 \times 3^{-3}} = \frac{3^{2-4}}{3^{1-3}} = \frac{3^{-2}}{3^{-2}} = 3^{-2+2} = 3^0 = 1$

$$3. C = \frac{81^{-2} \times 3^4}{27^2 \times 9^{-1}}$$

**Solution :**  $C = \frac{(3^4)^{-2} \times 3^4}{(3^3)^2 \times (3^2)^{-1}} = \frac{3^{-8} \times 3^4}{3^6 \times 3^{-2}} = \frac{3^{-4}}{3^4} = 3^{-4-4} = 3^{-8}$

$$4. D = \frac{(2 \times 3^4)^{-2}}{4 \times 9}$$

**Solution :**  $D = \frac{(2 \times 3^4)^{-2}}{4 \times 9} = \frac{2^{-2} \times 3^{-8}}{2^2 \times 3^2} = 2^{-2-2} \times 3^{-8-2} = 2^{-4} \times 3^{-10}$

**Exercice 3 –** Développer, réduire et ordonner les expressions suivantes.

$$1. A(x) = 4(-2x + 1)$$

**Solution :**  $A(x) = 4(-2x + 1) = -8x + 4$

$$2. B(x) = (-2x + 1)(x + 5)$$

**Solution :**  $B(x) = (-2x + 1)(x + 5) = -2x^2 - 10x + x + 5 = -2x^2 - 9x + 5$

3.  $C(x) = (3 - 8x)(11x + 3)$

**Solution :**  $C(x) = 33x + 9 - 88x^2 - 24x = -88x^2 + 9x + 9$

4.  $D(x) = (4 - 5x)^2$

**Solution :**  $D(x) = 4^2 - 2 \times 4 \times 5x + (5x)^2 = 16 - 40x + 25x^2 = 25x^2 - 40x + 16$

5.  $E(x) = (3 - 2x)(3 + 2x) + (1 - 2x)^2$

**Solution :**

$$\begin{aligned} E(x) &= (3 - 2x)(3 + 2x) + (1 - 2x)^2 \\ &= 3^2 - (2x)^2 + 1^2 - 2 \times 1 \times 2x + (2x)^2 \\ &= 9 - 4x^2 + 1 - 4x + 4x^2 \\ &= -4x + 10 \end{aligned}$$

**Exercice 4 –** Factoriser **au maximum** les expressions suivantes.

1.  $A(x) = 4x - 8$

**Solution :**  $A(x) = 4x - 8 = 4 \times x - 4 \times 2 = 4(x - 2)$

2.  $B(x) = (5 - 4x)(x - 3) + (6 + 2x)(5 - 4x)$

**Solution :**  $B(x) = (5 - 4x)(x - 3 + 6 + 2x) = (5 - 4x)(3x + 3) = 3(5 - 4x)(x + 1)$

3.  $C(x) = (2x + 1)^2 - (2x + 1)(x - 3)$

**Solution :**

$$\begin{aligned} C(x) &= (2x + 1)(2x + 1) - (2x + 1)(x - 3) \\ &= (2x + 1)(2x + 1 - (x - 3)) \\ &= (2x + 1)(2x + 1 - x + 3) \\ &= (2x + 1)(x + 4) \end{aligned}$$

4.  $D(x) = 4x^2 - 40x + 100$

**Solution :**  $D(x) = (2x)^2 - 2 \times 2x \times 10 + 10^2 = (2x - 10)^2$

5.  $E(x) = (x - 1)(2x - 3) - (4x^2 - 12x + 9)$

**Solution :**

$$\begin{aligned} E(x) &= (x-1)(2x-3) - ((2x)^2 - 2 \times 2x \times 3 + 3^2) \\ &= (x-1)(2x-3) - (2x-3)^2 \\ &= (x-1)(2x-3) - (2x-3)(2x-3) \\ &= (2x-3)(x-1-(2x-3)) \\ &= (2x-3)(x-1-2x+3) \\ &= (2x-3)(-x+2) \end{aligned}$$