

Exercice N°1 :

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

$$\begin{aligned}B &= (2x + 8)(x + 5) \\ &= 2x^2 + 10x + 8x + 40 \\ &= 2x^2 + 18x + 40\end{aligned}$$

$$\begin{aligned}C &= (4x - 1)(x + 2) \\ &= 4x^2 + 8x - x - 2 \\ &= 4x^2 + 7x - 2\end{aligned}$$

$$\begin{aligned}D &= (5x + 4)(4x + 7) \\ &= 20x^2 + 35x + 16x + 28 \\ &= 20x^2 + 51x + 28\end{aligned}$$

$$\begin{aligned}E &= (4x + 3)(3x - 2) \\ &= 12x^2 - 8x + 9x - 6 \\ &= 12x^2 + x - 6\end{aligned}$$

$$\begin{aligned}F &= (7x - 4)(2x - 1) \\ &= 14x^2 - 7x - 8x + 4 \\ &= 14x^2 - 15x + 4\end{aligned}$$

Exercice N°2 :

$$\begin{aligned}A &= (4x + 3)^2 \\ &= (4x)^2 + 2 \times 4x \times 3 + 3^2 \\ &= 16x^2 + 24x + 9\end{aligned}$$

$$\begin{aligned}B &= (6x - 7)^2 \\ &= (6x)^2 - 2 \times 6x \times 7 + 7^2 \\ &= 36x^2 - 84x + 49\end{aligned}$$

$$\begin{aligned}C &= (5x + 4)(5x - 4) \\ &= (5x)^2 - 4^2 \\ &= 25x^2 - 16\end{aligned}$$

$$\begin{aligned}D &= (3x + 7)^2 \\ &= (3x)^2 + 2 \times 3x \times 7 + 7^2 \\ &= 9x^2 + 42x + 49\end{aligned}$$

$$\begin{aligned}E &= (7x - 5)^2 \\ &= (7x)^2 - 2 \times 7x \times 5 + 5^2 \\ &= 49x^2 - 70x + 25\end{aligned}$$

$$\begin{aligned} F &= (3x - 5)(3x + 5) \\ &= (3x)^2 - 5^2 \\ &= 9x^2 - 25 \end{aligned}$$

$$\begin{aligned} G &= (7 - 4x)^2 \\ &= 7^2 - 2 \times 7 \times 4x + (4x)^2 \\ &= 49 - 56x + 16x^2 \end{aligned}$$

$$\begin{aligned} H &= (2x + 9)^2 \\ &= (2x)^2 + 2 \times 2x \times 9 + 9^2 \\ &= 4x^2 + 36x + 81 \end{aligned}$$

$$\begin{aligned} I &= (6 - 2x)(6 + 2x) \\ &= 6^2 - (2x)^2 \\ &= 36 - 4x^2 \end{aligned}$$

Exercice N°3 :

$$\begin{aligned} A &= \left(x + \frac{1}{3}\right)^2 \\ &= x^2 + 2 \times x \times \frac{1}{3} + \left(\frac{1}{3}\right)^2 \\ &= x^2 + \frac{2}{3}x + \frac{1}{9} \end{aligned}$$

$$\begin{aligned} B &= \left(2x - \frac{1}{2}\right)^2 \\ &= (2x)^2 - 2 \times 2x \times \frac{1}{2} + \left(\frac{1}{2}\right)^2 \\ &= 4x^2 - 2x + \frac{1}{4} \end{aligned}$$

$$\begin{aligned} C &= \left(6x + \frac{2}{5}\right) \left(6x - \frac{2}{5}\right) \\ &= (6x)^2 - \left(\frac{2}{5}\right)^2 \\ &= 36x^2 - \frac{4}{25} \end{aligned}$$

$$\begin{aligned} D &= \left(3x + \frac{7}{6}\right)^2 \\ &= (3x)^2 + 2 \times 3x \times \frac{7}{6} + \left(\frac{7}{6}\right)^2 \\ &= 9x^2 + 7x + \frac{49}{36} \end{aligned}$$

$$\begin{aligned} E &= \left(3x - \frac{4}{3}\right)^2 \\ &= (3x)^2 - 2 \times 3x \times \frac{4}{3} + \left(\frac{4}{3}\right)^2 \\ &= 9x^2 - 8x + \frac{16}{9} \end{aligned}$$

$$\begin{aligned}
 F &= \left(\frac{7}{4}x + \frac{1}{2}\right) \left(\frac{7}{4}x - \frac{1}{2}\right) \\
 &= \left(\frac{7}{4}x\right)^2 - \left(\frac{1}{2}\right)^2 \\
 &= \frac{49}{16}x^2 - \frac{1}{4}
 \end{aligned}$$

$$\begin{aligned}
 G &= \left(2x - \frac{5}{2}\right)^2 \\
 &= (2x)^2 - 2 \times 2x \times \frac{5}{2} + \left(\frac{5}{2}\right)^2 \\
 &= 4x^2 - 10x + \frac{25}{4}
 \end{aligned}$$

$$\begin{aligned}
 H &= \left(3x - \frac{7}{3}\right)^2 \\
 &= (3x)^2 - 2 \times 3x \times \frac{7}{3} + \left(\frac{7}{3}\right)^2 \\
 &= 9x^2 - 14x + \frac{49}{9}
 \end{aligned}$$

Exercice N°4 :

$$\begin{aligned}
 A &= (3x + 1)(4x + 2) - 5(2x - 3) \\
 &= 12x^2 + 6x + 4x + 2 - (10x - 15) \\
 &= 12x^2 + 10x + 2 - 10x + 15 \\
 &= 12x^2 + 17
 \end{aligned}$$

$$\begin{aligned}
 B &= (4x - 1)(5x - 3) + 7(3x - 1) \\
 &= 20x^2 - 12x - 5x + 3 + 21x - 7 \\
 &= 20x^2 + 4x - 4
 \end{aligned}$$

$$\begin{aligned}
 C &= (5x - 4)(3x + 7) + (4x - 2)(5x + 9) \\
 &= 15x^2 + 35x - 12x - 28 + 20x^2 + 36x - 10x - 18 \\
 &= 35x^2 + 49x - 46
 \end{aligned}$$

$$\begin{aligned}
 D &= (x - 2)(x + 2) - (2x + 1)(3x - 2) \\
 &= x^2 - 2^2 - (6x^2 - 4x + 3x - 2) \\
 &= x^2 - 4 - (6x^2 - x - 2) \\
 &= x^2 - 4 - 6x^2 + x + 2 \\
 &= -5x^2 + x - 2
 \end{aligned}$$

$$\begin{aligned}
 E &= 4(3x + 1)^2 - (2x + 3)(2x - 3) \\
 &= 4((3x)^2 + 2 \times 3x \times 1 + 1) - ((2x)^2 - 3^2) \\
 &= 4(9x^2 + 6x + 1) - (4x^2 - 9) \\
 &= 36x^2 + 24x + 4 - 4x^2 + 9 \\
 &= 32x^2 + 24x + 13
 \end{aligned}$$

Exercice N°5 :

$$A = 2x(x + 3) = \mathbf{2x^2 + 6x}$$

$$B = -7y^2(-5 - 2y^2) = \mathbf{35y^2 + 14y^4}$$

$$C = (x + 5)(x + 1) = x^2 + x + 5x + 5 = \mathbf{x^2 + 6x + 5}$$

$$D = (2x - 5)(x + 4) = 2x^2 + 8x - 5x - 20 = \mathbf{2x^2 + 3x - 20}$$

$$E = (4 - a)^2 = 4^2 - 2 \times 4 \times a + a^2 = \mathbf{16 - 8a + a^2}$$

$$F = (2x + 3)^2 = (2x)^2 + 2 \times 2x \times 3 + 3^2 = \mathbf{4x^2 + 12x + 9}$$

$$G = (4 - 7x)(4 + 7x) = 4^2 - (7x)^2 = \mathbf{16 - 49x^2}$$

$$\begin{aligned} H &= (x + 4)(x - 6) + (-1 + x)(x - 7) = (x^2 - 6x + 4x - 24) + (-x + 7 + x^2 - 7x) \\ &= (x^2 - 2x - 24) + (x^2 - 8x + 7) = x^2 - 2x - 24 + x^2 - 8x + 7 = \mathbf{2x^2 - 10x - 17} \end{aligned}$$

$$\begin{aligned} I &= -3(a^2 + 2) - (a - 3)(2a + 7) = (-3a^2 - 6) - (2a^2 + 7a - 6a - 21) \\ &= (-3a^2 - 6) - (2a^2 + a - 21) = -3a^2 - 6 - 2a^2 - a + 21 = \mathbf{-5a^2 - a + 15} \end{aligned}$$

$$\begin{aligned} J &= 4 - (2x + 1)^2 = 4 - [(2x)^2 + 2 \times 2x \times 1 + 1^2] = 4 - (4x^2 + 4x + 1) \\ &= 4 - 4x^2 - 4x - 1 = \mathbf{3 - 4x^2 - 4x} \end{aligned}$$