

## Exercice 1 :

Factoriser à l'aide de l'identité remarquable :  $(a + b)^2 = a^2 + 2ab + b^2$ .

a)  $x^2 + 2x + 1$   
 $= (x + 1)^2$

f)  $x^2 + 10x + 25$   
 $= (x + 5)^2$

k)  $9x^2 + 54x + 81$   
 $= (3x + 9)^2$

p)  $1 + 6a + 9a^2$   
 $= (1 + 3a)^2$

b)  $x^2 + 6x + 9$   
 $= (x + 3)^2$

g)  $4x^2 + 4x + 1$   
 $= (2x + 1)^2$

l)  $121x^2 + 154x + 49$   
 $= (11x + 7)^2$

q)  $\frac{1}{4}x^2 + x + 1$   
 $= (\frac{1}{2}x + 1)^2$

c)  $x^2 + 8x + 16$   
 $= (x + 4)^2$

h)  $36x^2 + 36x + 9$   
 $= (6x + 3)^2$

m)  $49x^2 + 70xy + 25y^2$   
 $= (9x + 5y)^2$

r)  $\frac{25}{4}x^2 + x + \frac{1}{25}$   
 $= (\frac{5}{4}x + \frac{1}{5})^2$

d)  $x^2 + 18x + 81$   
 $= (x + 9)^2$

i)  $9x^2 + 12x + 4$   
 $= (3x + 2)^2$

n)  $9x^2 + 42xy + 49y^2$   
 $= (3x + 7y)^2$

s)  $\frac{4}{9}x^2 + \frac{16}{3}x + 16$   
 $= (\frac{2}{3}x + 4)^2$

e)  $x^2 + 14x + 49$   
 $= (x + 7)^2$

j)  $25x^2 + 40x + 16$   
 $= (5x + 4)^2$

o)  $81b^2 + 25a^2 + 90ab$   
 $= (9b + 5a)^2$

t)  $\frac{x^2}{9} + \frac{16}{3}x + 64$   
 $= (\frac{x}{3} + 8)^2$

## Exercice 2 :

Factoriser à l'aide de l'identité remarquable :  $(a - b)^2 = a^2 - 2ab + b^2$ .

a)  $x^2 - 2x + 1$   
 $= (x - 1)^2$

f)  $x^2 - 10x + 25$   
 $= (x - 5)^2$

k)  $9x^2 - 54x + 81$   
 $= (3x - 9)^2$

p)  $1 - 6a + 9a^2$   
 $= (1 - 3a)^2$

b)  $x^2 - 6x + 9$   
 $= (x - 3)^2$

g)  $4x^2 - 4x + 1$   
 $= (2x - 1)^2$

l)  $121x^2 - 154x + 49$   
 $= (11x - 7)^2$

q)  $\frac{1}{4}x^2 - x + 1$   
 $= (\frac{1}{2}x - 1)^2$

c)  $x^2 - 8x + 16$   
 $= (x - 4)^2$

h)  $36x^2 - 36x + 9$   
 $= (6x - 3)^2$

m)  $49x^2 - 70xy + 25y^2$   
 $= (7x - 5y)^2$

r)  $\frac{25}{4}x^2 - x + \frac{1}{25}$   
 $= (\frac{5}{2}x - \frac{1}{5})^2$

d)  $x^2 - 18x + 81$   
 $= (x - 9)^2$

i)  $9x^2 - 12x + 4$   
 $= (3x - 2)^2$

n)  $9x^2 - 42xy + 49y^2$   
 $= (3x - 7y)^2$

s)  $\frac{4}{9}x^2 - \frac{16}{3}x + 16$   
 $= (\frac{2}{3}x - 4)^2$

e)  $x^2 - 14x + 49$   
 $= (x - 7)^2$

j)  $25x^2 - 40x + 16$   
 $= (5x - 4)^2$

o)  $81b^2 + 25a^2 - 90ab$   
 $= (9b - 5a)^2$

t)  $\frac{x^2}{9} - \frac{16}{3}x + 64$   
 $= (\frac{x}{3} - 8)^2$

## Exercice 3 :

Factoriser à l'aide de l'identité remarquable :  $(a - b)(a + b) = a^2 - b^2$ .

$$\begin{aligned} \text{a)} \quad & x^2 - 1 \\ & = (x - 1)(x + 1) \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & x^2 - 9 \\ & = (x - 3)(x + 3) \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & x^2 - 16 \\ & = (x - 4)(x + 4) \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & x^2 - 81 \\ & = (x - 9)(x + 9) \end{aligned}$$

$$\begin{aligned} \text{e)} \quad & x^2 - 49 \\ & = (x - 7)(x + 7) \end{aligned}$$

$$\begin{aligned} \text{f)} \quad & x^2 - 25 \\ & = (x - 5)(x + 5) \end{aligned}$$

$$\begin{aligned} \text{g)} \quad & 4x^2 - 1 \\ & = (2x - 1)(2x + 1) \end{aligned}$$

$$\begin{aligned} \text{h)} \quad & 36x^2 - 9 \\ & = (6x - 3)(6x + 3) \end{aligned}$$

$$\begin{aligned} \text{i)} \quad & 9x^2 - 4 \\ & = (3x - 2)(3x + 2) \end{aligned}$$

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

$$\begin{aligned} \text{k)} \quad & 9x^2 - 81 \\ & = (3x - 9)(3x + 9) \end{aligned}$$

$$\begin{aligned} \text{l)} \quad & 121x^2 - 49 \\ & = (11x - 7)(11x + 7) \end{aligned}$$

$$\begin{aligned} \text{m)} \quad & 49^2 - 25y^2 \\ & = (7x - 5y)(7x + 5y) \end{aligned}$$

$$\begin{aligned} \text{n)} \quad & 9x^2 - 49y^2 \\ & = (3x - 7y)(3x + 5y) \end{aligned}$$

$$\begin{aligned} \text{o)} \quad & 81b^2 - 25a^2 \\ & = (9b - 5a)(9b + 5a) \end{aligned}$$

$$\begin{aligned} \text{p)} \quad & 1 - 9a^2 \\ & = (1 - 9a)(1 + 3a) \end{aligned}$$

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

$$\begin{aligned} \text{r)} \quad & \frac{25}{4}x^2 - \frac{1}{25} \\ & = \left(\frac{5}{2}x - \frac{1}{5}\right)\left(\frac{5}{2}x + \frac{1}{5}\right) \end{aligned}$$

$$\begin{aligned} \text{s)} \quad & \frac{4}{9}x^2 - 16 \\ & = \left(\frac{2}{3}x - 4\right)\left(\frac{2}{3}x + 4\right) \end{aligned}$$

$$\begin{aligned} \text{t)} \quad & \frac{x^2}{9} - 64 \\ & = \left(\frac{x}{3} - 6\right)\left(\frac{x}{3} + 6\right) \end{aligned}$$

$$\begin{aligned} \text{u)} \quad & (x + 2)^2 - 16 \\ & = (x + 2 - 4)(x + 2 + 4) \\ & = (x - 2)(x + 6) \end{aligned}$$

$$\begin{aligned} \text{v)} \quad & (x + 1)^2 - 9 \\ & = (x + 1 - 3)(x + 1 + 3) \\ & = (x - 2)(x + 4) \end{aligned}$$

$$\begin{aligned} \text{w)} \quad & (2x + 1)^2 - (3x + 2)^2 \\ & = [(2x + 1) - (3x + 2)][(2x + 1) + (3x + 2)] \\ & = (2x + 1 - 3x - 2)(2x + 1 + 3x + 2) \\ & = (-x - 1)(5x + 3) \end{aligned}$$

$$\begin{aligned} \text{x)} \quad & (x - 5)^2 - (5x + 7)^2 \\ & = [(x - 5) - (5x + 7)][(x - 5) + (5x + 7)] \\ & = (x - 5 - 5x - 7)(x - 5 + 5x + 7) \\ & = (-4x - 12)(6x + 2) \end{aligned}$$

## Exercice 4 :

Factoriser les expressions littérale suivantes :

$$A = (x + 2)^2 - (x + 2)$$

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

$$A = (x + 2)(x + 1)$$

$$B = (5x + 3)^2 - 5x - 3$$

$$B = (5x + 3)^2 - (5x + 3)$$

$$B = (5x + 3)(5x + 3 - 1)$$

$$B = (5x + 3)(5x + 2)$$

$$C = (x^2 - 6x + 9) - (x - 3)(3x + 4)$$

$$C = (x - 3)^2 - (x - 3)(3x + 4)$$

$$C = (x - 3)[(x - 3) - (3x + 4)]$$

$$C = (x - 3)(x - 3 - 3x - 4)$$

$$C = (x - 3)(-2x - 7)$$

$$D = (16x^2 - 9) + (4x - 3)(5x + 4) - (16x^2 - 24x + 9)$$

$$D = (4x - 3)(4x + 3) + (4x - 3)(5x + 4) - (4x - 3)^2$$

$$D = (4x - 3)[(4x + 3) + (5x + 4) - (4x - 3)]$$

$$D = (4x - 3)(4x + 3 + 5x + 4 - 4x + 3)$$

$$D = (4x - 3)(5x + 10)$$

$$E = (4x^2 + 4x + 1) - 3x(x + 2)(2x + 1) + (2x + 1)$$

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

$$E = (2x + 1)[(2x + 1) - 3x(x + 2) + 1]$$

$$E = (2x + 1)(2x + 1 - 3x \times x - 3x \times 2 + 1)$$

$$E = (2x + 1)(2x + 1 - 3x^2 - 6x + 1)$$

$$E = (2x + 1)(-3x^2 - 4x + 2)$$

$$F = (x^2 - 4x + 4) + (x^2 - 4) - (x - 2)(6x + 7)$$

$$F = (x - 2)^2 + (x - 2)(x + 2) - (x - 2)(6x + 7)$$

$$F = (x - 2)[(x - 2) + (x + 2) - (6x + 7)]$$

$$F = (x - 2)(x - 2 + x + 2 - 6x - 7)$$

$$F = (x - 2)(-4x - 7)$$

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

$$G = (4x - 6)(3x + 5) - 2 \times 2x - 2 \times (-3)$$

$$G = (4x - 6)(3x + 5) - 4x + 6$$

$$G = (4x - 6)(3x + 5) - (4x - 6)$$

$$G = (4x - 6)[(3x + 5) - 1]$$

$$G = (4x - 6)(3x + 5 - 1)$$

$$G = (4x - 6)(3x + 4)$$

$$H = (3x - 5)(x + 2) + 18x^2 - 60x + 50$$

$$H = (3x - 5)(x + 2) + 2(9x^2 - 30x + 25)$$

$$H = (3x - 5)(x + 2) + 2(3x - 5)^2$$

$$H = (3x - 5)[(x + 2) + 2(3x - 5)]$$

$$H = (3x - 5)(x + 2 + 2 \times 3x - 2 \times 5)$$

$$H = (3x - 5)(x + 2 + 6x - 10)$$

$$H = (3x - 5)(7x - 8)$$

$$I = (x^2 - 2x + 1) - (x - 1)(3x + 4)$$

$$I = (x - 1)^2 - (x - 1)(3x + 4)$$

$$I = (x - 1)[(x - 1) - (3x + 4)]$$

$$I = (x - 1)(x - 1 - 3x - 4)$$

$$I = (x - 1)(-2x - 5)$$

$$J = (4x^2 - 9) + (2x - 3)(5x - 4) - (4x^2 - 12x + 9)$$

$$J = (2x - 3)(2x + 3) + (2x - 3)(5x - 4) - (2x - 3)^2$$

$$J = (2x - 3)[(2x + 3) + (5x - 4) - (2x - 3)]$$

$$J = (2x - 3)(2x + 3 + 5x - 4 - 2x + 3)$$

$$J = (2x - 3)(5x + 2)$$

$$K = (2x + 5)^2 - (3x - 2)^2$$

$$K = [(2x + 5) - (3x - 2)][(2x + 5) + (3x - 2)]$$

$$K = (2x + 5 - 3x + 2)(2x + 5 + 3x - 2)$$

$$K = (-x + 7)(5x + 3)$$

## Exercice 5 :

Factoriser les expressions littérale suivantes :

$$A = (3x + 7)^2 - (2x - 5)^2$$

$$A = [(3x + 7) - (2x - 5)][(3x + 7) + (2x - 5)]$$

$$A = (3x + 7 - 2x + 5)(3x + 7 + 2x - 5)$$

$$A = (x + 12)(5x + 2)$$

$$B = (x^2 - 2x + 1) - (x - 1)(3x + 4)$$

$$B = (x - 1)^2 - (x - 1)(3x + 4)$$

$$B = (x - 1)[(x - 1) - (3x + 4)]$$

$$B = (x - 1)(x - 1 - 3x - 4)$$

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

$$C = (4x^2 - 9) + (2x - 3)(5x - 4) - (4x^2 - 12x + 9)$$

$$C = (2x - 3)(2x + 3) + (2x - 3)(5x - 4) - (2x - 3)^2$$

$$C = (2x - 3)[(2x + 3) + (5x - 4) - (2x - 3)]$$

$$C = (2x - 3)(2x + 3 + 5x - 4 - 2x + 3)$$

$$C = (2x - 3)(5x - 2)$$

$$D = (x - 3)^2 - (3x - 2)^2$$

$$D = [(x - 3) - (3x - 2)][(x - 3) + (3x - 2)]$$

$$D = (x - 3 - 3x + 2)(x - 3 + 3x - 2)$$

$$D = (-2x - 1)(4x - 5)$$

$$E = (3x - 4)^2 - 49$$

$$E = (3x - 4 - 7)(3x - 4 + 7)$$

$$E = (3x - 11)(3x + 3)$$

$$F = (3x + 2)^2 - (5x - 7)^2$$

$$F = [(3x + 2) - (5x - 7)][(3x + 2) + (5x - 7)]$$

$$F = (3x + 2 - 5x + 7)(3x + 2 + 5x - 7)$$

$$F = (-2x + 9)(8x - 5)$$

$$G = 4(3x - 5)^2 - (7 - 2x)^2$$

$$G = [2(3x - 5) - (7 - 2x)][2(3x - 5) + (7 - 2x)]$$

$$G = (2 \times 3x - 2 \times 5 - 7 + 2x)(2 \times 3x - 2 \times 5 + 7 - 2x)$$

$$G = (6x - 10 - 7 + 2x)(6x - 10 + 7 - 2x)$$

$$G = (8x - 17)(4x - 3)$$

$$H = (3x - 5)^2 - 9(2x - 1)^2$$

$$H = [(3x - 5) - 3(2x - 1)][(3x - 5) + 3(2x - 1)]$$

$$H = (3x - 5 - 3 \times 2x - 3 \times (-1))(3x - 5 + 3 \times 2x + 3 \times (-1))$$

$$H = (3x - 5 - 6x + 3)(3x - 5 + 6x - 3)$$

$$H = (-3x - 2)(9x - 8)$$

$$I = (2x - 6)(x + 5) - (x - 3)^2$$

$$I = 2(x - 3)(x + 5) - (x - 3)^2$$

$$I = (x - 3)[2(x + 5) - (x - 3)]$$

$$I = (x - 3)(2 \times x + 2 \times 5 - x + 3)$$

$$I = (x - 3)(2x + 10 - x + 3)$$

$$I = (x - 3)(x + 13)$$

$$J = (x - 5)(3x - 2) + 9x^2 - 12x + 4$$

$$J = (x - 5)(3x - 2) + (3x - 2)^2$$

$$J = (3x - 2)[(x - 5) + (3x - 2)]$$

$$J = (3x - 2)(x - 5 + 3x - 2)$$

$$J = (3x - 2)(4x - 7)$$

$$K = 16(x - 5)^2 - (3 - 2x)^2$$

$$K = [4(x - 5) - (3 - 2x)][4(x - 5) + (3 - 2x)]$$

$$K = (4 \times x - 4 \times 5 - 3 + 2x)(4 \times x - 4 \times 5 + 3 - 2x)$$

$$K = (4x - 20 - 3 + 2x)(4x - 20 + 3 - 2x)$$

$$K = (6x - 23)(2x - 17)$$