

EXERCICE 1

Développer les expressions suivantes en utilisant une des identités remarquable

$$\begin{aligned} A &= (x + 2)^2 \\ B &= (3 + x)^2 \\ C &= (x + 5)^2 \\ D &= (2x + 1)^2 \\ E &= (1 + 3x)^2 \\ F &= (3x + 2)^2 \\ G &= (5x + 3)^2 \\ H &= (x^2 + 1)^2 \\ I &= (3 + 4x)^2 \\ J &= (3x^2 + 4)^2 \end{aligned}$$

$$\begin{aligned} A &= (x - 2)^2 \\ B &= (5 - x)^2 \\ C &= (1 - 3x)^2 \\ D &= (3 - x)^2 \\ E &= (2x - 1)^2 \\ F &= (3 - 5x)^2 \\ G &= (3x - 2)^2 \\ H &= (4x - 3)^2 \\ I &= (1 - x^2)^2 \\ J &= (4 - 3x^2)^2 \end{aligned}$$

$$\begin{aligned} A &= (x + 2)(x - 2) \\ B &= (5 - x)(5 + x) \\ C &= (x + 3)(x - 3) \\ D &= (3x - 1)(3x + 1) \\ E &= (2x + 1)(2x - 1) \\ F &= (5 + 3x)(5 - 3x) \\ G &= (3x - 2)(3x + 2) \\ H &= (3 + 4x)(3 - 4x) \\ I &= (x + 1)(x - 1) \\ J &= (4x^2 + 3)(4x^2 - 3) \end{aligned}$$

EXERCICE 2

Développer les expressions suivantes en utilisant l'identité remarquable qui convient :

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

$$\begin{aligned} B &= (2 - x)^2 \\ E &= (3 - 2x)^2 \\ H &= (4 - 8x)^2 \end{aligned}$$

$$\begin{aligned} C &= (x + 1)(x - 1) \\ F &= (7x + 5)^2 \\ I &= (3 + 4x)(3 - 4x) \end{aligned}$$

EXERCICE 3

Développer et réduire

$$\begin{aligned} A &= (x + 1)^2 + (x - 3)^2 \\ B &= (3 - x)^2 + (x + 5)^2 \\ C &= (x - 2)^2 + (x + 4)(x - 4) \\ D &= (x + 1)(x - 1) + (x + 4)^2 \\ E &= (x - 5)^2 + (2x + 7)(2x - 7) \end{aligned}$$

$$\begin{aligned} A &= (2x + 1)^2 - (x + 3)^2 \\ B &= (2x + 3)^2 - (x - 7)(x + 7) \\ C &= (x + 2)(x - 2) - (x - 3)^2 \\ D &= (x - 5)^2 - (2x - 7)(x - 5) \\ E &= (3x + 1)(x - 2) - (2x - 3)^2 \end{aligned}$$

EXERCICE 4Souligner le **facteur commun** dans chaque expression:

A = 3x + 3y

C = -3a + 3b

E = 7x + 12x

B = -6(3x - 2) - (3x - 2)(x - 4)

D = (x + 2)(x + 1) + (x + 2)(7x - 5)

F = (2x + 1)^2 + (2x + 1)(x + 3)

G = (x + 1)(2x - 3) + (x + 1)(5x + 1)

H = (3x - 4)(2 - x) - (3x - 4)^2

I = (6x + 4)(2 + 3x) + (2 + 3x)(7 - x)

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

EXERCICE 5

Factoriser chaque expression en utilisant la formule « ka + kb = k(a + b) » :

A = 4x + 4y

B = 6 · 9 + 6 · 3

C = 8a + 8b

D = 5 · 3 + 3 · 14

E = 2 + 2x

F = 7a + 7

G = 4x^2 + 4x

H = 6y + 6y^2

I = 3x^2 + 5x

J = 2ab + b^2

EXERCICE 6

Écrire le terme souligné sous forme d'un produit puis factoriser l'expression :

A = 4A + 12

= 4A + 4 · 3

= 4(A + 3)

B = 5x + 10

C = 6x - 24

D = 36 - 4x

E = 7x + 14

F = 35 - 5x

G = 8x - 24

H = 12x + 18

I = 6 - 15x

J = 30x - 42

EXERCICE 7

Factoriser les expressions suivantes :

A = 13(x + 2) + 5(x + 2)

B = 7(2x - 3) + 2(2x - 3)

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

D = 4(x + 3) + 9x(x + 3)

E = 7x(3x + 1) - 10x(3x + 1)

F = (x - 3)(2x + 1) + 7(2x + 1)

G = (x + 1)(x + 2) - 5(x + 2)

H = (3 - x)(4x + 1) - 8(4x + 1)

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

J = -6(3x - 2) - (3x - 2)(x - 4)

A = (x + 1)(3 - x) + (x + 1)(2 + 5x)

B = (x + 2)(x + 1) + (x + 2)(7x - 5)

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

D = (2x + 1)(x - 5) - (3x + 1)(2x + 1)

E = (x - 6)(2 - x) - (2 - x)(3 + 4x)

A = (x + 1)^2 + (x + 1)(3x + 1)

B = (2x + 1)^2 + (2x + 1)(x + 3)

C = (x - 3)^2 - (x - 3)(4x + 1)

D = (x + 1)(2x - 5) + (2x - 5)^2

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

EXERCICE 8

Transformer l'expression soulignée, pour faire apparaître le facteur commun, puis factoriser :

$$A = (x + 1)(x + 2) + \underline{(2x + 2)}(3x - 4)$$

$$B = (x - 1)(2x + 1) + \underline{(6x + 3)}(3 - x)$$

$$C = \underline{(10x - 5)}(x + 2) + (1 - x)(2x - 1)$$

$$D = (3x + 1)\underline{(2x + 6)} - (x + 3)(5x - 1)$$

$$E = (x + 1)(2x + 3) - \underline{(8x + 12)}(x + 2)$$

$$F = \underline{(4x + 4)}(1 - 2x) + (x + 1)^2$$

$$G = (2x + 1)^2 - (x + 3)\underline{(10x + 5)}$$

EXERCICE 9

Retrouver l'expression dont on connaît le carré :

$$4x^2 = (2x)^2$$

$$9x^2 = (\dots)^2$$

$$49x^2 = (\dots)^2$$

$$36x^2 = (\dots)^2$$

$$81x^2 = (\dots)^2$$

EXERCICE 10

Factoriser en utilisant la bonne identité remarquable :

$$A = x^2 + 10x + 25$$

$$A = x^2 - 2x + 1$$

$$A = 4x^2 - 9$$

$$B = x^2 + 6x + 9$$

$$B = 4x^2 - 20x + 25$$

$$B = 16 - 9x^2$$

$$C = 36 + 12x + x^2$$

$$C = 9 - 6x + x^2$$

$$C = 16x^2 - 25$$

$$D = 4x^2 + 12x + 9$$

$$D = 36x^2 - 12x + 1$$

$$D = 49x^2 - 36$$

$$E = 16x^2 + 40x + 25$$

$$E = 100 - 40x + 4x^2$$

$$E = 4 - 64x^2$$

$$A = 4x^2 - 9$$

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

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

$$B = 16 - 9x^2$$

$$B = (x + 2)^2 - 9$$

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

$$C = 16x^2 - 25$$

$$C = (2x + 1)^2 - 25$$

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

$$D = 49x^2 - 36$$

$$D = 16 - (3x + 2)^2$$

$$D = (3x - 4)^2 - (6x + 1)^2$$

$$E = 4 - 64x^2$$

$$E = 36 - (4 - 3x)^2$$

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

EXERCICE 11

Factoriser d'abord l'expression soulignée pour retrouver le facteur commun :

$$A = (x + 2)(3x - 1) + \underline{x^2 - 4}$$

$$B = (x + 4)(2x - 1) + \underline{x^2 - 16}$$

$$C = (x - 3)(x + 1) - \underline{(x^2 - 9)}$$

$$D = (2x + 1)(x - 2) - \underline{(x^2 - 4)}$$

$$E = \underline{25 - x^2} - (x - 5)(2x + 3)$$

$$F = (x + 3)^2 + (x + 3)(x + 1) + \underline{x^2 - 9}$$

$$G = (7 + 3x)(x + 1) - (x + 1)^2 + \underline{x^2 - 1}$$

$$A = (x + 2)(3x - 1) + 7(x + 2)$$

$$B = (x - 3)^2 - 25$$

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

$$D = 9 - (2 - 3x)^2$$

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

EXERCICE 12

Écrire chaque nombre comme une somme puis utiliser l'identité remarquable adaptée pour calculer :

Exemple : $A = 101^2 = (100 + 1)^2 = 100^2 + 200 + 1 = 10\,000 + 200 + 1 = 10\,201$

$$B = 102^2 \quad C = 51^2 \quad D = 1005^2 \quad E = 201^2 \quad F = 109^2$$

$$B = 98^2 \quad C = 49^2 \quad D = 990^2 \quad E = 199^2 \quad F = 91^2$$

$$B = 105 \times 95 \quad C = 51 \times 49 \quad D = 107 \times 93 \quad E = 498 \times 502$$

$$B = 105^2 - 95^2 \quad C = 235^2 - 234^2 \quad D = 47^2 - 53^2 \quad E = 9876^2 - 9875^2$$

EXERCICE 13

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

Montrer, en détaillant les calculs, que D peut s'écrire : $D = (2x - 3)(7x + 1)$

EXERCICE 14

On considère l'expression : $E = (x - 3)^2 - (x - 1)(x - 2)$

a. Développer et réduire E.

b. Comment peut-on en déduire, sans calculatrice, le résultat de : $99\,997^2 - 99\,999 \times 99\,998$

c. Factoriser l'expression : $F = (4x + 1)^2 - (4x + 1)(7x - 6)$

EXERCICE 15

On donne l'expression algébrique : $D = (3x + 1)(6x - 9) - (2x - 3)^2$

1. Montrer que D peut s'écrire sous la forme développée et réduite : $D = 14x^2 - 9x - 18$

2. Calculer la valeur de D pour $x = \frac{3}{2}$.

3. Factoriser $6x - 9$ puis factoriser D.

EXERCICE 1 Développer les expressions suivantes en utilisant une des identités remarquable

$$A = (x + 2)^2 = x^2 + 4x + 4$$

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

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

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

$$E = (1 + 3x)^2 = 1 + 6x + 9x^2$$

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

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

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

$$I = (3 + 4x)^2 = 9 + 24x + 16x^2$$

$$J = (3x^2 + 4)^2 = 9x^4 + 24x^2 + 16$$

$$A = (x - 2)^2 = x^2 - 4x + 4$$

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

$$C = (1 - 3x)^2 = 1 - 6x + 9x^2$$

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

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

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

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

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

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

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

$$A = (x + 2)(x - 2) = x^2 - 4$$

$$B = (5 - x)(5 + x) = 25 - x^2$$

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

$$D = (3x - 1)(3x + 1) = 9x^2 - 1$$

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

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

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

$$H = (3 + 4x)(3 - 4x) = 9 - 16x^2$$

$$I = (x^3 + 1)(x^3 - 1) = x^6 - 1$$

$$J = (4x^2 + 3)(4x^2 - 3) = 16x^4 - 9$$

EXERCICE 2 Développer les expressions suivantes en utilisant l'identité remarquable qui convient :

$$A = (x + 4)^2 = x^2 + 8x + 16 \quad B = (2 - x)^2 = 4 - 4x + x^2 \quad C = (x + 1)(x - 1) = x^2 - 1$$

$$D = (2x + 1)^2 = 4x^2 + 4x + 1 \quad E = (3 - 2x)^2 = 9 - 12x + 4x^2 \quad F = (7x + 5)^2 = 49x^2 + 70x + 25$$

$$G = (5x + 6)(5x - 6) = 25x^2 - 36 \quad H = (4 - 8x)^2 = 16 - 64x + 64x^2 \quad I = (3 + 4x)(3 - 4x) = 9 - 16x^2$$

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

EXERCICE 3 Développer et réduire

$$\begin{aligned} A &= (x + 1)^2 + (x - 3)^2 \\ &= x^2 + 2x + 1 + x^2 - 6x + 9 \\ &= 2x^2 - 4x + 10 \end{aligned}$$

$$\begin{aligned} B &= (3 - x)^2 + (x + 5)^2 \\ &= 9 - 6x + x^2 + x^2 + 10x + 25 \\ &= 2x^2 + 4x + 34 \end{aligned}$$

$$\begin{aligned} C &= (x - 2)^2 + (x + 4)(x - 4) \\ &= x^2 - 4x + 4 + x^2 - 16 \\ &= 2x^2 - 4x - 12 \end{aligned}$$

$$\begin{aligned} D &= (x + 1)(x - 1) + (x + 4)^2 \\ &= x^2 - 1 + x^2 + 8x + 16 \\ &= 2x^2 + 8x + 15 \end{aligned}$$

$$\begin{aligned} E &= (x - 5)^2 + (2x + 7)(2x - 7) \\ &= x^2 - 10x + 25 + (4x^2 - 49) \\ &= 5x^2 - 10x - 24 \end{aligned}$$

$$\begin{aligned} A &= (2x + 1)^2 - (x + 3)^2 \\ &= 4x^2 + 4x + 1 - (x^2 + 6x + 9) \\ &= 4x^2 + 4x + 1 - x^2 - 6x - 9 = 3x^2 + 10x - 8 \end{aligned}$$

$$\begin{aligned} B &= (2x + 3)^2 - (x - 7)(x + 7) \\ &= 4x^2 + 12x + 9 - (x^2 - 49) \\ &= 4x^2 + 12x + 9 - x^2 + 49 = 3x^2 + 12x + 58 \end{aligned}$$

$$\begin{aligned} C &= (x + 2)(x - 2) - (x - 3)^2 \\ &= x^2 - 4 - (x^2 - 6x + 9) \\ &= x^2 - 4 - x^2 + 6x - 9 = 6x - 13 \end{aligned}$$

$$\begin{aligned} D &= (x - 5)^2 - (2x - 7)(x - 5) \\ &= x^2 - 10x + 25 - (2x^2 - 10x - 7x + 35) \\ &= x^2 - 10x + 25 - 2x^2 + 17x - 35 \\ &= -x^2 + 7x - 10 \end{aligned}$$

$$\begin{aligned} E &= (3x + 1)(x - 2) - (2x - 3)^2 \\ &= 3x^2 - 6x + x - 2 - (4x^2 - 12x + 9) \\ &= 3x^2 - 6x + x - 2 - 4x^2 + 12x - 9 \\ &= -x^2 + 7x - 11 \end{aligned}$$

EXERCICE 4 Souligner le **facteur commun** dans chaque expression:

$$A = \underline{3}x + \underline{3}y$$

$$C = \underline{-3}a + \underline{3}b$$

$$E = \underline{7}x + \underline{12}x$$

$$B = \underline{-6(3x - 2)} - \underline{(3x - 2)}(x - 4)$$

$$D = \underline{(x + 2)}(x + 1) + \underline{(x + 2)}(7x - 5)$$

$$F = \underline{(2x + 1)^2} + \underline{(2x + 1)}(x + 3)$$

$$G = \underline{(x + 1)}(2x - 3) + \underline{(x + 1)}(5x + 1)$$

$$H = \underline{(3x - 4)}(2 - x) - \underline{(3x - 4)^2}$$

$$I = \underline{(6x + 4)}\underline{(2 + 3x)} + \underline{(2 + 3x)}\underline{(7 - x)}$$

$$J = \underline{(3 + x)}\underline{(5x + 2)} + \underline{(x + 3)^2}$$

EXERCICE 5 Factoriser chaque expression en utilisant la formule « $ka + kb = k(a + b)$ » :

$$A = 4x + 4y = 4(x + y)$$

$$B = 6 \cdot 9 + 6 \cdot 3 = 6(9 + 3)$$

$$C = 8a + 8b = 8(a + b)$$

$$D = 5 \cdot 3 + 3 \cdot 14 = 3(5 + 14)$$

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

$$F = 7a + 7 = 7(a + 1)$$

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

$$H = 6y + 6y^2 = 6y(1 + y)$$

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

$$J = 2ab + b^2 = b(2a + b)$$

EXERCICE 6 Écrire le terme souligné sous forme d'un produit puis factoriser l'expression :

$$A = 4A + \underline{12} = 4A + 4 \cdot 3 = 4(A + 3)$$

$$B = 5x + \underline{10}$$

$$C = 6x - \underline{24} = 6(x - 4)$$

$$D = \underline{36} - 4x = 4(9 - x)$$

$$E = 7x + \underline{14} = 7(x + 2)$$

$$F = \underline{35} - 5x = 5(7 - x)$$

$$G = 8x - \underline{24} = 8(x - 3)$$

$$H = \underline{12x} + \underline{18} = 6(2x + 3)$$

$$I = \underline{6} - \underline{15x} = 3(2 - 5x)$$

$$J = \underline{30x} - \underline{42} = 6(5x - 7)$$

EXERCICE 7 Factoriser les expressions suivantes :

$$A = 13(x + 2) + 5(x + 2)$$

$$= (13+5)(x + 2)$$

$$B = 7(2x - 3) + 2(2x - 3)$$

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

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

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

$$D = 4(x + 3) + 9x(x + 3)$$

$$= (4+9x)(x + 3)$$

$$E = 7x(3x + 1) - 10x(3x + 1)$$

$$= (7x-10x)(3x + 1)$$

$$F = (x - 3)(2x + 1) + 7(2x + 1)$$

$$= [(x - 3)+7](2x + 1) = (x+4)(2x + 1)$$

$$G = (x + 1)(x + 2) - 5(x + 2)$$

$$= [(x + 1)-5](x + 2) = (x-4)5(x + 2)$$

$$H = (3 - x)(4x + 1) - 8(4x + 1)$$

$$= (-5 - x)(4x + 1)$$

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

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

$$J = -6(3x - 2) - (3x - 2)(x - 4) = [-6-(x-4)](3x - 2) = [-2-x](3x - 2)$$

$$A = (x + 1)(3 - x) + (x + 1)(2 + 5x)$$

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

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

$$B = (x + 2)(x + 1) + (x + 2)(7x - 5)$$

$$= (x + 2)[(x + 1) + (7x - 5)]$$

$$= (x + 2)[8x - 4] = (x+2)(2x-1)4$$

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

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

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

$$D = (2x + 1)(x - 5) - (3x + 1)(2x + 1)$$

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

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

$$E = (x - 6)(2 - x) - (2 - x)(3 + 4x) = (2 - x)[(x - 6) - (3 + 4x)] = (2 - x)[-3x-9]$$

$$A = (x + 1)^2 + (x + 1)(3x + 1)$$

$$= (x + 1)[(x + 1) + (3x + 1)]$$

$$= (x + 1)[4x + 2]$$

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

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

$$= (2x + 1)(3x + 4)$$

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

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

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

$$D = (x + 1)(2x - 5) + (2x - 5)^2$$

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

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

$$E = (3x - 4)(2 - x) - (3x - 4)^2 = [(3x - 4) - (2 - x)](3x - 4) = [4x - 6](3x - 4)$$

EXERCICE 8

Transformer l'expression soulignée, pour faire apparaître le facteur commun, puis factoriser :

$$A = (x + 1)(x + 2) + 2(x + 1)(3x - 4)$$

$$= (x+1)[(x+2)+2(3x-4)]$$

$$= (x + 1)[x + 2 + 6x - 8] = (x + 1)[7x - 6]$$

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

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

$$= (2x + 1)[x - 1 + 9 - 3x] = (2x + 1)(8 - 2x)$$

$$C = 5(2x - 1)(x + 2) + (1 - x)(2x - 1)$$

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

$$= (2x - 1)[5x + 10 + 1 - x]$$

$$= (2x - 1)[4x + 11]$$

$$D = (3x + 1)2(x + 3) - (x + 3)(5x - 1)$$

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

$$= (x + 3)[6x + 2 - 5x + 1]$$

$$= (x + 3)[x + 3] = (x + 3)^2$$

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

$$= (2x + 3)[(x + 1) - 4(x + 2)]$$

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

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

$$= (x + 1)[4(1 - 2x) + (x + 1)]$$

$$= (x + 1)[5 - 7x]$$

$$G = (2x + 1)^2 - (x + 3)5(2x + 1) = (2x + 1)[(2x + 1) - (x + 3)5] = (2x + 1)[-3x - 14]$$

EXERCICE 9

Retrouver l'expression dont on connaît le carré :

$$4x^2 = (2x)^2$$

$$9x^2 = (3x)^2$$

$$49x^2 = (7x)^2$$

$$36x^2 = (6x)^2$$

$$81x^2 = (9x)^2$$

EXERCICE 10 Factoriser en utilisant la bonne identité remarquable :

$$A = x^2 + 10x + 25$$

$$= (x + 5)^2$$

$$B = x^2 + 6x + 9$$

$$= (x + 3)^2$$

$$C = 36 + 12x + x^2$$

$$= (6 + x)^2$$

$$D = 4x^2 + 12x + 9$$

$$= (2x + 3)^2$$

$$E = 16x^2 + 40x + 25$$

$$= (4x + 5)^2$$

$$A = x^2 - 2x + 1$$

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

$$B = 4x^2 - 20x + 25$$

$$= (2x - 5)^2$$

$$C = 9 - 6x + x^2$$

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

$$D = 36x^2 - 12x + 1$$

$$= (6x - 2)^2$$

$$E = 100 - 40x + 4x^2$$

$$= (10 - 2x)^2$$

$$A = 4x^2 - 9$$

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

$$B = 16 - 9x^2$$

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

$$C = 16x^2 - 25$$

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

$$D = 49x^2 - 36$$

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

$$E = 4 - 64x^2$$

$$= (2 - 8x)(2 + 8x)$$

$$A = 4x^2 - 9$$

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

$$B = 16 - 9x^2$$

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

$$C = 16x^2 - 25$$

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

$$D = 49x^2 - 36$$

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

$$E = 4 - 64x^2$$

$$= (2 - 8x)(2 + 8x)$$

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

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

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

$$B = (x + 2)^2 - 9$$

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

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

$$C = (2x + 1)^2 - 25$$

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

$$= [2x - 4][2x + 6]$$

$$D = 16 - (3x + 2)^2$$

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

$$= [2 - 3x][6 + 3x]$$

$$E = 36 - (4 - 3x)^2$$

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

$$= [2 + 3x][10 - 3x]$$

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

$$= [(x + 1) - (2x + 3)][(x + 1) + (2x + 3)] = [-x - 2][3x + 4]$$

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

$$= [(2x - 1) - (5 + x)][(2x - 1) + (5 + x)] = (x - 6)(3x - 4)$$

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

$$= [(4x - 1) - (3x + 4)][(4x - 1) + (3x + 4)] = (x - 5)(7x + 3)$$

$$D = (3x - 4)^2 - (6x + 1)^2$$

$$= [3x - 4 - (6x + 1)][3x - 4 + (6x + 1)] = (-3x - 5)(9x - 3)$$

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

$$= [(x + 6) - (3x - 1)][(x + 6) + (3x - 1)] = (-2x + 7)(4x + 5)$$

EXERCICE 11 Factoriser d'abord l'expression soulignée pour retrouver le facteur commun :

$$A = (x + 2)(3x - 1) + \underline{x^2 - 4}$$

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

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

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

$$C = (x - 3)(x + 1) - \underline{(x^2 - 9)}$$

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

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

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

$$E = \underline{25 - x^2} - (x - 5)(2x + 3)$$

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

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

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

$$= (5 - x)(3x + 8)$$

$$G = (7 + 3x)(x + 1) - (x + 1)^2 + \underline{x^2 - 1}$$

$$= (7 + 3x)(x + 1) - (x + 1)^2 + (x + 1)(x - 1) = (x + 1)[(7 + 3x) - (x + 1) + (x - 1)]$$

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

$$A = (x + 2)(3x - 1) + 7(x + 2)$$

$$= (x + 2)[(3x - 1) + 7]$$

$$= (x + 2)(3x + 6) = (x + 2)3(x + 2)$$

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

$$= (x - 4)[(2x - 1) + (x - 4)]$$

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

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

$$B = (x + 4)(2x - 1) + \underline{x^2 - 16}$$

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

$$= (x + 4)[(2x - 1) + (x - 4)]$$

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

$$D = (2x + 1)(x - 2) - \underline{(x^2 - 4)}$$

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

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

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

$$F = (x + 3)^2 + (x + 3)(x + 1) + \underline{x^2 - 9}$$

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

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

$$= (x + 3)(3x + 1)$$

$$B = (x - 3)^2 - 25$$

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

$$= [x - 8][x + 2]$$

$$D = 9 - (2 - 3x)^2$$

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

$$= [1 + 3x][5 - 3x]$$

EXERCICE 12 Écrire chaque nombre comme une somme puis utiliser l'identité remarquable adaptée pour calculer :

Exemple : $A = 101^2 = (100 + 1)^2 = 100^2 + 200 + 1 = 10\,000 + 200 + 1 = 10\,201$

$B = 102^2 = (100 + 2)^2 = (100^2 + 2 \times 100 \times 2 + 2^2) = 10\,404$

$C = 51^2 = (50 + 1)^2 = 2\,500 + 100 + 1 = 2\,601$

$D = 1005^2 = 1\,010\,025$ $E = 201^2 = 40\,401$ $F = 109^2 = 11\,881$

$B = 98^2 = (100 - 2)^2 = 10\,000 - 2 \times 100 \times 2 + 2^2 = 9\,604$

$C = 49^2 = (50 - 1)^2 = 2\,500 - 100 + 1 = 2\,401$

$D = 990^2 = 980\,100$ $E = 199^2 = 39\,601$ $F = 91^2 = 8\,281$

$B = 105 \times 95 = (100 + 5)(100 - 5) = 100^2 - 5^2 = 9\,975$

$C = 51 \times 49 = 2\,499$ $D = 107 \times 93 = 9\,951$ $E = 498 \times 502 = 249\,996$

$B = 105^2 - 95^2 = (105 - 95)(105 + 95) = 10 \times 200 = 2\,000$

$C = 235^2 - 234^2 = 469$ $D = 47^2 - 53^2 = -600$ $E = 9876^2 - 9875^2 = 1 \times 19\,571$

EXERCICE 13

$D = (2x - 3)(5x + 4) + (2x - 3)^2 = (2x - 3)[(5x + 4) + (2x - 3)] = (2x - 3)(7x + 1)$

EXERCICE 14

On considère l'expression : $E = (x - 3)^2 - (x - 1)(x - 2)$

a. $E = x^2 - 6x + 9 - (x^2 - 2x - x + 2) = x^2 - 6x + 9 - x^2 + 2x + x - 2 = -3x + 7$

b. $99\,997^2 - 99\,999 \times 99\,998$ correspond à E avec $x = 100\,000$ donc on a $-3 \times 100\,000 + 7 = -299\,993$

c. $F = (4x + 1)^2 - (4x + 1)(7x - 6) = (4x + 1)[(4x + 1) - (7x - 6)] = (4x + 1)[-3x + 7]$

EXERCICE 15

On donne l'expression algébrique : $D = (3x + 1)(6x - 9) - (2x - 3)^2$

1. $D = (3x + 1)(6x - 9) - (2x - 3)^2 = 18x^2 - 27x + 6x - 9 - (4x^2 - 12x + 9)$

$= 18x^2 - 27x + 6x - 9 - 4x^2 + 12x - 9 = 14x^2 - 9x - 18$

2. Avec $x = \frac{3}{2}$, on a $D = \left(3 \frac{3}{2} + 1\right) \left(6 \frac{3}{2} - 9\right) - \left(2 \frac{3}{2} - 3\right)^2 = \left(\frac{9}{2} + 1\right) (9 - 9) - (3 - 3)^2 = 0$

3. $6x - 9 = 3(2x - 3)$ donc $D = (3x + 1) 3(2x - 3) - (2x - 3)^2 = (2x - 3)[3(3x + 1) - (2x - 3)]$
 $= (2x - 3)[9x + 3 - 2x + 3] = (2x - 3)[7x + 6]$