3ème Révisions – Factorisations

Exercice 1

Factoriser :

A = $6x + 6y$ B = $20 - 30a$ C = $15a - 25b$

D = $9a^2 + 12a$ E = $15x^2 + 5x$ F = $16x^2 + 24x$

Exercice 2

Factoriser les expressions suivantes :

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

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

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

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

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

Exercice 3 (Mélange)

Factoriser les expressions suivantes :

A = $2 + 2x$

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

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

D = $2ab + 8b^2$

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

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

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

Exercice 4

Factoriser chaque expression.

A = $x^2 + 8x + 16$ B = $x^2 - 10x + 25$ C = $9 - x^2$

D = $49x^2 - 14x + 1$ E = $7x^2 + 21x + 14$ F = $4x^2 - 81$

G = $4x^2 + 9 + 12x$ H = $49x^2 - 36$ I = $4x^2 + 16$

J = $(x + 1)^2 - 25$ K = $(x + 2)(3x - 1) + (5x - 4)(3x - 1)$ L = $(2x - 1)^2 - (3x + 2)^2$

Exercice 5 (Brevet)

On donne Y = $(3x + 2)^2 - (3x + 2)(x + 7)$

1) Développer et réduire Y.
2) Factoriser Y.
3) Calculer Y pour $x = \frac{2}{7}$.

Exercice 6 (Brevet)

On donne Z = $(12x + 3)(2x - 7) - (2x - 7)^2$

1) Développer et réduire Z.
2) Factoriser Z.
3) Calculer Z pour $x = 2$.
4) Calculer Z pour $x = -1$.

3ème Révisions – Factorisations - Correction

Exercice 1

A = $6x + 6y$ B = $20 – 30a$ C = $15a – 25b$ D = $9a^2 + 12a$ E = $15x^2 + 5x$ F = $16x^2 + 24x$

A = $6(x + y)$ B = $10(2 – 3a)$ C = $5(3a – 5b)$ D = $3a(3a + 4)$ E = $5x(3x + 1)$ F = $8x(2x + 3)$

Exercice 2

A = $\underline{(6x + 3)}(4x – 5) + (3x + 1)\underline{(6x + 3)}$
A = $\underline{(6x + 3)}[(4x – 5) + (3x + 1)]$
A = $(6x + 3)[4x – 5 + 3x + 1]$
A = $(6x + 3)(7x – 4)$

B = $(4x – 5)(2 – x) + (4x – 5)^2$
B = $\underline{(4x – 5)}(2 – x) + \underline{(4x – 5)}(4x – 5)$
B = $\underline{(4x – 5)}[(2 – x) + (4x – 5)]$
B = $(4x – 5)[2 – x + 4x – 5]$
B = $(4x – 5)(3x – 3)$

C = $\underline{(3x + 5)}(3 – 2x) – \underline{(3x + 5)}(2 + 5x)$
C = $\underline{(3x + 5)}[(3 – 2x) – (2 + 5x)]$
C = $(3x + 5)[3 – 2x – 2 – 5x]$
C = $(3x + 5)(-7x + 1)$

D = $(3x + 4)^2 – (3x + 4)(5x + 6)$
D = $\underline{(3x + 4)}(3x + 4) – \underline{(3x + 4)}(5x + 6)$
D = $\underline{(3x + 4)}[(3x + 4) – (5x + 6)]$
D = $(3x + 4)[3x + 4 – 5x – 6]$
D = $(3x + 4)(-2x – 2)$

E = $\underline{(4x + 3)}(3 – 2x) – \underline{(4x + 3)}(5 – 4x)$
E = $\underline{(4x + 3)}[(3 – 2x) – (5 – 4x)]$
E = $(4x + 3)[3 – 2x – 5 + 4x]$
E = $(4x + 3)(2x – 2)$

Exercice 3

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

B = $(2x + 1)^2 + (2x + 1)(x + 3)$
B = $\underline{(2x + 1)}(2x + 1) + \underline{(2x + 1)}(x + 3)$
B = $\underline{(2x + 1)}[(2x + 1) + (x + 3)]$
B = $(2x + 1)[2x + 1 + x + 3]$
B = $(2x + 1)(3x + 4)$

C = $(x – 3)^2 – (x – 3)(4x + 1)$
C = $\underline{(x – 3)}(x – 3) – \underline{(x – 3)}(4x + 1)$
C = $\underline{(x – 3)}[(x – 3) – (4x + 1)]$
C = $(x – 3)[x – 3 – 4x – 1]$
C = $(x – 3)(-3x – 4)$

D = $2ab + 8b^2$
D = $2 \times a \times b + 2 \times 4 \times b \times b$
D = $2b(a + 4b)$

E = $(x + 1)\underline{(x + 2)} – 5\underline{(x + 2)}$
E = $\underline{(x + 2)}[(x + 1) – 5]$
E = $(x + 2)[x + 1 – 5]$
E = $(x + 2)(x – 4)$

F = $\underline{(x + 2)}(x + 1) + \underline{(x + 2)}(7x – 5)$
F = $\underline{(x + 2)}[(x + 1) + (7x – 5)]$
F = $(x + 2)[x + 1 + 7x – 5]$
F = $(x + 2)(8x – 4)$

G = $(x – 6)\underline{(2 – x)} – \underline{(2 – x)}(3 + 4x)$
G = $\underline{(2 – x)}[(x – 6) – (3 + 4x)]$
G = $(2 – x)(x – 6 – 3 – 4x)$
G = $(2 – x)(-3x – 9)$

Exercice 4

A = $x^2 + 8x + 16$
A = $x^2 + 2 \times x \times 4 + 4^2$
A = $(x + 4)^2$

B = $x^2 – 10x + 25$
B = $x^2 – 2 \times x \times 5 + 5^2$
B = $(x – 5)^2$

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

D = $49x^2 – 14x + 1$
D = $(7x)^2 – 2 \times 7x \times 1 + 1^2$
D = $(7x – 1)^2$

E = $7x^2 + 21x + 14$
E = $7 \times x^2 + 7 \times 3x + 7 \times 2$
E = $7(x^2 + 3x + 2)$

F = $4x^2 – 81$
F = $(2x)^2 – 9^2$
F = $(2x + 3)(2x – 3)$

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

H = $49x^2 – 36$
H = $(7x)^2 – 6^2$
H = $(7x + 6)(7x – 6)$

I = $4x^2 + 16$
I = $4 \times x^2 + 4 \times 4$
I = $4(x^2 + 4)$

$J = (x + 1)^2 - 25$
$J = (x + 1)^2 - 5^2$
$J = [(x + 1) - 5]\,[(x + 1) + 5]$
$J = [x + 1 - 5]\,[x + 1 + 5]$
$J = [x - 4]\,[x + 6]$

$K = (x + 2)\underline{(3x - 1)} + (5x - 4)\underline{(3x - 1)}$
$K = \underline{(3x - 1)}\,[(x + 2) + (5x - 4)]$
$K = \underline{(3x - 1)}\,[x + 2 + 5x - 4]$
$K = \underline{(3x - 1)}\,[6x - 2]$

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

Exercice 5

On donne $Y = (3x + 2)^2 - (3x + 2)(x + 7)$

1) Développer et réduire Y.

$Y = (3x + 2)^2 - (3x + 2)\,(x + 7)$
$Y = (9x^2 + 12x + 4) - (3x^2 + 21x + 2x + 14)$
$Y = 9x^2 + 12x + 4 - 3x^2 - 21x - 2x - 14$
$Y = 6x^2 - 11x - 10$

2) Factoriser Y.

$Y = (3x + 2)^2 - (3x + 2)(x + 7)$
$Y = \underline{(3x + 2)}(3x + 2) - \underline{(3x + 2)}(x + 7)$
$Y = (3x + 2)[(3x + 2) - (x + 7)]$
$Y = (3x + 2)[3x + 2 - x - 7]$
$Y = (3x + 2)[2x - 5]$

3) Calculer Y pour $x = \frac{2}{7}$.

$Y = 6 \times (\frac{2}{7})^2 - 11 \times \frac{2}{7} - 10$

$Y = 6 \times \frac{4}{49} - \frac{22}{7} - 10$

$Y = \frac{24}{49} - \frac{154}{49} - \frac{490}{49}$

$Y = \frac{-620}{49}$

Exercice 6

On donne $Z = (12x + 3)(2x - 7) - (2x - 7)^2$

1) Développer et réduire Z.

$Z = (12x + 3)(2x - 7) - (2x - 7)^2$
$Z = (24x^2 - 84x + 6x - 21) - (4x^2 - 28x + 49)$
$Z = 24x^2 - 84x + 6x - 21 - 4x^2 + 28x - 49$
$Z = 20x^2 - 50x - 70$

2) Factoriser Z.

$Z = (12x + 3)(2x - 7) - (2x - 7)^2$
$Z = (12x + 3)\underline{(2x - 7)} - \underline{(2x - 7)}(2x - 7)$
$Z = \underline{(2x - 7)}\,[(12x + 3) - (2x - 7)]$
$Z = (2x - 7)\,[12x + 3 - 2x + 7]$
$Z = \underline{(2x - 7)}\,[10x + 10]$

3) Calculer Z pour $x = 2$.

$Z = 20 \times 2^2 - 50 \times 2 - 70$
$Z = 20 \times 4 - 100 - 70$
$Z = 80 - 100 - 70$
$Z = -90$

4) Calculer Z pour $x = -1$.

$Z = 20 \times (-1)^2 - 50 \times (-1) - 70$
$Z = 20 \times 1 + 50 - 70$
$Z = 20 + 50 - 70$
$Z = 0$