

# Fiche 2 bis — Exercices sur les identités remarquables

## I. Exercices

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### ■ Exercice 1 — Compléter les égalités

$$(x - \dots)^2 = \dots - 2x + \dots$$

$$(x - \dots)^2 = \dots - 4x + \dots$$

$$(x - \dots)^2 = \dots - 8x + \dots$$

$$(2x + \dots)^2 = \dots + 4x + \dots$$

$$(3x + \dots)^2 = \dots + 12x + \dots$$

$$(x - \dots)^2 = \dots - 10x + \dots$$

$$(x - \dots)(x + \dots) = \dots - 4$$

$$(x - \dots)(x + \dots) = \dots - 49$$

### ■ Exercice 2 — Développer

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

$$(x + 7)^2 = \dots$$

$$(x + 5)(x - 5) = \dots$$

$$(1 - 3x)^2 = \dots$$

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

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

$$(8 - x)(x + 8) = \dots$$

$$(-1 + x)^2 = \dots$$

### ■ Exercice 3 — Factoriser

$$x^2 - 2x + 1 = \dots$$

$$x^2 + 12x + 36 = \dots$$

$$x^2 - 16 = \dots$$

$$4x^2 - 1 = \dots$$

$$25x^2 + 20x + 4 = \dots$$

$$x^2 - 1 = \dots$$

$$x^2 - 6x + 9 = \dots$$

$$1 - 8x + 16x^2 = \dots$$

## ■ Exercice 4 — Factorisations

$$(2x - 3)(1 - 4x) - (2x - 3)^2 = \dots$$

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

$$(x + 1)^2 - (x - 1)^2 = \dots$$

## ■ Exercice 5 — Développements délicats

$$(2x - 3)^2 - 3(x + 1)(2 - 5x) = \dots$$

$$4\left(x - \frac{1}{2}\right)^2 - 3(x + 1)\left(2 - \frac{x}{3}\right) = \dots$$

$$9\left(x - \frac{1}{3}\right)^2 - \left(x - \frac{1}{2}\right)\left(x + \frac{1}{2}\right) = \dots$$

## ■ Exercice 6 (\*) — Astuces

Développer :

$$A_1(x) = (-x - 3)^2$$

$$A_2(x) = x - (-2x + 5)^2$$

$$A_3(x) = (-x - 1)^2 - (-x + 2)^2$$

$$A_4(x) = -(-x + 1)^2$$

Factoriser :

$$B_1(x) = (2x + 4)^2 - (x + 2)(x + 3)$$

$$B_2(x) = x^2 + 2x + 1 - (2x + 2)(x + 3)$$

$$B_3(x) = 4x^2 + 4x + 1 - (6x + 3)(x + 1)$$

$$B_4(x) = x^2 + 2x - 3$$

## ■ Exercice 7 — Identités remarquables

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

Montrer que :

$$B(x) = 3x^2 + 6x \quad \text{et} \quad B(x) = 3x(x + 2)$$

Calculer :  $B(2)$ ,  $B(-1)$ ,  $B\left(-\frac{2}{3}\right)$

### ■ Exercice 8 — Choisir une forme adaptée de $A(x)$

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

Montrer que :

$$A(x) = -5x^2 - 9x - 4 \quad \text{et} \quad A(x) = (x + 1)(-5x - 4)$$

Calculer :  $A(2)$ ,  $A(-1)$ ,  $A\left(-\frac{2}{3}\right)$

## II. Corrigés

### ■ Corrigé – Exercice 1

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

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

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

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

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

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

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

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

### ■ Corrigé – Exercice 2

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

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

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

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

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

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

$$(8 - x)(x + 8) = 64 - x^2$$

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

### ■ Corrigé – Exercice 3

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

$$x^2 + 12x + 36 = (x + 6)^2$$

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

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

$$25x^2 + 20x + 4 = (5x + 2)^2$$

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

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

$$1 - 8x + 16x^2 = (4x - 1)^2$$

### ■ Corrigé – Exercice 4

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

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

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

### ■ Corrigé – Exercice 5

$$(2x - 3)^2 - 3(x + 1)(2 - 5x) = 19x^2 - 3x + 3$$

$$4\left(x - \frac{1}{2}\right)^2 - 3(x + 1)\left(2 - \frac{x}{3}\right) = 5x^2 - 9x - 5$$

$$9\left(x - \frac{1}{3}\right)^2 - \left(x - \frac{1}{2}\right)\left(x + \frac{1}{2}\right) = 8x^2 - 6x + \frac{5}{4}$$

### ■ Corrigé – Exercice 6 (\*)

$$A_1(x) = (-x - 3)^2 = x^2 + 6x + 9$$

$$A_2(x) = x - (-2x + 5)^2 = -4x^2 + 21x - 25$$

$$A_3(x) = (-x - 1)^2 - (-x + 2)^2 = 6x - 3$$

$$A_4(x) = -(-x + 1)^2 = -x^2 + 2x - 1$$

$$B_1(x) = (2x + 4)^2 - (x + 2)(x + 3) = (x + 2)(3x + 5)$$

$$B_2(x) = x^2 + 2x + 1 - (2x + 2)(x + 3) = (x + 1)(-x - 5)$$

$$B_3(x) = 4x^2 + 4x + 1 - (6x + 3)(x + 1) = (-x - 2)(2x + 1)$$

$$B_4(x) = x^2 + 2x - 3 = (x + 3)(x - 1)$$

### ■ Corrigé – Exercice 7

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

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

$$B(2) = 24$$

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

$$B\left(-\frac{2}{3}\right) = -\frac{8}{3}$$

### ■ Corrigé – Exercice 8

$$A(x) = (x + 1)(2 - x) - 2(x + 1)(2x + 3) = -5x^2 - 9x - 4$$

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

$$A(2) = -42$$

$$A(-1) = 0$$

$$A\left(-\frac{2}{3}\right) = -\frac{2}{9}$$