

La Factorisation

Exercice 1

Factoriser les expressions suivantes :

$$3x + 21$$

$$4x - x^2$$

$$-5x + 20$$

$$5x^2 - 8x$$

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

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

$$(5x - 2)(2x + 7) - (5x - 2)$$

$$7x - 49 + 14x^2$$

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

$$(2x - 7)(x + 4) - (2x - 7)(4x + 1)$$

$$(4x - 1)^2 + (2x - 5)(4x - 1)$$

$$(x + 7)(3x - 1) + 7x + 49$$

$$16x^2 - 81$$

$$49x^2 - \frac{1}{4}$$

$$9x^2 + 30x + 25$$

$$(2x + 3)^2 - 49$$

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

$$x^3 - 16x$$

$$25x^2 - 1 - (4x - 3)(5x + 1)$$

$$x^2 + 8x + 16$$

$$4x^2 - 4x + 1$$

$$x^2 - 64$$

$$x^2 + x + 0,25$$

$$100x^2 - 1000x + 2500$$

$$16x^2 - \frac{81}{4}$$

$$x^2 - 7$$

$$2x^2 + 2$$

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



Correction

Exercice 1

- $3x + 21 = 3x + 3 \times 7 = 3(x + 7)$
 - $4x - x^2 = x(4 - x)$
 - $-5x + 20 = -5x + 5 \times 4 = 5(-x + 4)$
 - $5x^2 - 8x = x(5x - 8)$
 - $(x - 1)(2x + 3) - (x - 1)(2 - x) = (x - 1)[(2x + 3) - (2 - x)] = (x - 1)(2x + 3 - 2 + x) = (x - 1)(3x + 1)$
 - $(2x + 1)^2 + (2x + 1)(x + 3) = (2x + 1)[(2x + 1) + (x + 3)] = (2x + 1)(2x + 1 + x + 3) = (2x + 1)(3x + 4)$
 - $(5x - 2)(2x + 7) - (5x - 2) = (5x - 2)[(2x + 7) - 1] = (5x - 2)(2x + 6) = 2(5x - 2)(x + 3)$
 - $7x - 49 + 14x^2 = 7(x - 7 + 2x^2) = 7(2x^2 + x - 7)$
 - $9x^2 + 12x + 4 = (3x)^2 + 2 \times 3x \times 2 + 2^2 = (3x + 2)^2$
 - $(2x - 7)(x + 4) - (2x - 7)(4x + 1) = (2x - 7)[(x + 4) - (4x + 1)] = (2x - 7)(x + 4 - 4x - 1) = (2x - 7)(-3x + 3) = 3(2x - 7)(-x + 1)$
 - $(4x - 1)^2 + (2x - 5)(4x - 1) = (4x - 1)[(4x - 1) + (2x - 5)] = (4x - 1)(4x - 1 + 2x - 5) = (4x - 1)(6x - 6) = 6(4x - 1)(x - 1)$
 - $(x + 7)(3x - 1) + 7x + 49 = (x + 7)(3x - 1) + 7(x + 7) = (x + 7)(3x - 1 + 7) = (x + 7)(3x + 6) = 3(x + 7)(x + 2)$
 - $16x^2 - 81 = (4x)^2 - 9^2 = (4x - 9)(4x + 9)$
 - $49x^2 - \frac{1}{4} = (7x)^2 - (\frac{1}{2})^2 = (7x - \frac{1}{2})(7x + \frac{1}{2})$
 - $9x^2 + 30x + 25 = (3x)^2 + 2 \times 3x \times 5 + 5^2 = (3x + 5)^2$
 - $(2x + 3)^2 - 49 = (2x + 3)^2 - 7^2 = [(2x + 3) - 7][(2x + 3) + 7] = (2x - 4)(2x + 10) = 2(x - 2) \times 2(x + 5) = 4(x - 2)(x + 5)$
 - $(4x - 1)^2 - (2x + 3)^2 = [(4x - 1) - (2x + 3)][(4x - 1) + (2x + 3)] = (4x - 1 - 2x - 3)(4x - 1 + 2x + 3) = (2x - 4)(6x + 2) = 2(x - 2) \times 2(3x + 1) = 4(x - 2)(3x + 1)$
 - $x^3 - 16x = x(x^2 - 16) = x(x^2 - 4^2) = x(x - 4)(x + 4)$
 - $25x^2 - 1 - (4x - 3)(5x + 1) = (5x)^2 - 1 - (4x - 3)(5x + 1) = (5x - 1)(5x + 1) - (4x - 3)(5x + 1) = (5x + 1)[(5x - 1) - (4x - 3)] = (5x + 1)(5x - 1 - 4x + 3) = (5x + 1)(x + 2)$
 - $x^2 + 8x + 16 = x^2 + 2 \times x \times 4 + 4^2 = (x + 4)^2$
 - $4x^2 - 4x + 1 = (2x)^2 - 2 \times 2x \times 1 + 1^2 = (2x - 1)^2$
 - $x^2 - 64 = x^2 - 8^2 = (x - 8)(x + 8)$
 - $x^2 + x + 0,25 = x^2 + 2 \times x \times 0,5 + 0,5^2 = (x + 0,5)^2$
 - $100x^2 - 1000x + 2500 = (10x)^2 - 2 \times 10x \times 50 + 50^2 = (10x - 50)^2$
- Remarque :** on peut encore poursuivre la factorisation, en effet : $(10x - 50)^2 = [10(x - 5)]^2 = 10^2(x - 5)^2 = 100(x - 5)^2$

- $16x^2 - \frac{81}{4} = (4x)^2 - \left(\frac{9}{2}\right)^2 = \left(4x - \frac{9}{2}\right) \left(4x + \frac{9}{2}\right)$

- $x^2 - 7 = x^2 - (\sqrt{7})^2 = (x - \sqrt{7})(x + \sqrt{7})$

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

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