

Exercice 1. Factoriser (*Mise en évidence*).

$$a) \frac{3}{10}x - \frac{9}{10} = \underline{\frac{3}{10}(x-3)}$$

$$b) \frac{5x}{9} - \frac{5}{3} = \underline{\frac{5x}{9} - \frac{15}{9}} = \underline{\frac{5}{9}(x-3)}$$

$$c) 3,4 - 0,2x = \underline{0,2(1,7-x)} \quad \text{ou} \quad \underline{-0,2(x-1,7)}$$

$$d) -4z^8 + 12z^7 = \underline{-4z^7(x-3)} \quad \text{ou} \quad \underline{4z^7(-x+3)}$$

$$e) (x-4)(x+3) + (x+5)(x+3) = \underline{(x+3)(x-4+x+5)} = \underline{(x+3)(2x+1)}$$

$$f) (x-5)(x+6) - (x+6)(2x-8) = \underline{(x+6)[x-5-(2x-8)]} = \underline{(x+6)(x-5-2x+8)} \\ = \underline{(x+6)(-x+3)} \quad \text{ou} \quad \underline{-(x+6)(x-3)}$$

$$g) (x+2)(y+2) - (x+2) = \underline{(x+2)(y+2-1)} = \underline{(x+2)(y+1)}$$

$$h) (x-3)^2(x+7)^2 + (x+7)^3(x-3) = \underline{(x-3)(x+7)^2(x-3+x+7)} = \underline{(x-3)(x+7)^2(2x+4)} \\ = \underline{2(x-3)(x+7)^2(x+2)}$$

$$i) (x-1)(x+8) - \underbrace{(1-x)}_{+(x-1)}(x+4) = \underline{(x-1)(x+8+x+4)} \\ = \underline{(x-1)(2x+12)} = \underline{2(x-1)(x+6)}$$

$$j) (x-2y)(a-b) - \underbrace{(b-a)}_{+(a-b)}(2x+y) = \underline{(a-b)(x-2y+2x+y)} = \underline{(a-b)(3x-y)}$$

$$k) (a+b)(x-y) + (x-y) + \underbrace{3a(y-x)}_{-3a(x-y)} = \underline{(x-y)(a+b+1-3a)} = \underline{(x-y)(-2a+b+1)}$$

$$l) 3(2a-b)(4x-5) - \underbrace{(2x+1)(b-2a)}_{+(2x+1)(2a-b)} = \underline{(2a-b)[3(4x-5)+2x+1]} = \underline{(2a-b)(12x-15+2x+1)} \\ = \underline{(2a-b)(14x-14)} = \underline{14(2a-b)(x-1)}$$

$$m) \underbrace{(4a-2b)}_{2(2a-b)}(2x-3y) + \underbrace{(3y-2x)(b-2a)}_{+(2x-3y)(2a-b)} = \underline{(2a-b)(2x-3y)(2+1)} = \underline{3(2a-b)(2x-3y)}$$

Exercice 2. Factoriser (*Produits remarquables 2^e degré*).

$$a) 4x^2 + 20x + 25 = \underline{(2x+5)^2}$$

$$A^2 + 2AB + B^2$$

$$b) 9x^2 - 48x + 64 = \underline{(3x-8)^2}$$

$$A^2 - 2AB + B^2$$

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

$$A^2 - B^2$$

$$d) 16 + 40x + 25x^2 = \underline{(4+5x)^2} = \underline{(5x+4)^2}$$

$$A^2 + 2AB + B^2$$

$$e) 36x^2 - 96x + 64 = \underbrace{4(9x^2 - 24x + 16)}_{A^2 - 2AB + B^2} = \underline{4(3x-4)^2}$$

$$f) 81x^4 - 16 = \underbrace{(9x^2+4)(9x^2-4)}_{A^2 - B^2} = \underline{(9x^2+4)(3x+2)(3x-2)}$$

$$g) x^4 - 8x^2 + 16 = \underbrace{(x^2-4)^2}_{A^2 - B^2} = \underline{[(x+2)(x-2)]^2 = (x+2)^2(x-2)^2}$$

$$h) 8x^2 + 24xy + 18y^2 = \underbrace{2(4x^2 + 12xy + 9y^2)}_{A^2 + 2AB + B^2} = \underline{2(2x+3y)^2}$$

$$i) 32x^5 - 400x^3 + 1250x = 2x(16x^4 - 200x^2 + 625) = 2x(\underbrace{4x^2 - 25}_{A^2 - B^2})^2 \\ = 2x[(2x-5)(2x+5)]^2 = \underline{2x(2x-5)^2(2x+5)^2}$$

$$j) (x^2 - 9)^2 - 49 = \underbrace{(x^2-9-7)(x^2-9+7)}_{A^2 - B^2} = (x^2-16)(x^2-2) = \underline{(x-4)(x+4)(x-\sqrt{2})(x+\sqrt{2})}$$



$$k) \underbrace{(x^2 - 6x + 9)}_{A^2 - 2AB + B^2} - y^2 = \underline{(x-3)^2 - y^2 = (x-3-y)(x-3+y) = (x-y-3)(x+y-3)}$$

Exercice 3. Factoriser (*Produits remarquables 3^e degré*).

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

$$A^3 - 3A^2B + 3AB^2 - B^3$$

$$b) x^3 + 9x^2 + 27x + 27 = \underline{(x+3)^3}$$

$$A^3 + 3A^2B + 3AB^2 + B^3$$

$$c) 216x^3 + 108x^2 + 18x + 1 = \underline{(6x+1)^3}$$

$$A^3 + 3A^2B + 3AB^2 + B^3$$

$$d) 64x^3 - 144x^2 + 108x - 27 = \underline{(4x-3)^3}$$

$$A^3 - 3A^2B + 3AB^2 - B^3$$

$$e) 1 - 8x^3 = \underline{(1-2x)(1+2x+4x^2)}$$

$$A^3 - B^3$$

$$f) 8x^3 - 12x^2 + 6x - 1 = \underline{(2x-1)^3}$$

$$A^3 - 3A^2B + 3AB^2 - B^3$$

$$g) 125x^3 + 27 = \underline{(5x+3)(25x^2-15x+9)}$$

$$A^3 + B^3$$

$$h) 2x^4 + 12x^3 + 24x^2 + 16x = 2x(\underbrace{x^3 + 6x^2 + 12x + 8}_{A^3 + 3A^2B + 3AB^2 + B^3}) = \underline{2x(x+2)^3}$$

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

$$A^3 + B^3$$

$$j) 64 - 8x^3 = \underline{8(2-x)(4+2x+x^2)}$$

$$A^3 - B^3$$

$$k) 24x^3 + 108x^2 + 162x + 81 = \underline{3(8x^3 + 36x^2 + 54x + 27) = 3(2x+3)^3}$$

$$A^3 + 3A^2B + 3AB^2 + B^3$$

$$l) a^3x^3 - b^3 = \underline{(ax-b)(a^2x^2 + abx + b^2)}$$

$$A^3 - B^3$$