

I Développer les expressions suivantes

A) Développements simples

« penser à réduire et à ordonner suivant les puissances décroissantes de x ».

1.
$$\begin{array}{l|l} a(x) = 12(x+6) & b(x) = x(x+6) \\ c(x) = x^2(x+3) & d(x) = 5x(3x+2) \end{array}$$
2.
$$\begin{array}{l|l} a(x) = (x+1)(x+2) & b(x) = (x+4)(x+5) \\ c(x) = (2x+3)(x+12) & d(x) = (3x+5)(4x+2) \end{array}$$
3.
$$\begin{array}{l|l} a(x) = 6(3x-5) & b(x) = x(8x-3) \\ c(x) = 3x^2(2x-5) & d(x) = 5x(-x-12) \end{array}$$
4.
$$\begin{array}{l|l} a(x) = -3(6x+5) & b(x) = -x(x-4) \\ c(x) = -(x^2+x-4) & d(x) = -6x^2(x^3-5x-2) \end{array}$$
5.
$$\begin{array}{l|l} a(x) = (x-1)(2x-3) & b(x) = (-x+2)(-x-7) \\ c(x) = (1-x^2)(-3x+15) & d(x) = (3x-5y)(2x+3y) \end{array}$$
6.
$$\begin{array}{l|l} a(x) = (-x^2-4)(-3x-6) & b(x) = -(-x+7)(6x-3) \\ c(x) = -3x(-x^2+5)(-3x-5) & d(x) = -(-x-1)(-x-2)(-x-3) \end{array}$$

B) Développements utilisant les produits remarquables

1.
$$\begin{array}{l|l} a(x) = (x+1)^2 & b(x) = (x+2)^2 \\ c(x) = (x+3)^2 & d(x) = (x+5)^2 \end{array}$$
2.
$$\begin{array}{l|l} a(x) = (2x+1)^2 & b(x) = (2x+3)^2 \\ c(x) = (2x+y)^2 & d(x) = (x^2+4)^2 \end{array}$$

3.
$$\begin{array}{l|l} a(x) = (x-1)^2 & b(x) = (x-2)^2 \\ c(x) = (x-1,5)^2 & d(x) = (x-6)^2 \end{array}$$
4.
$$\begin{array}{l|l} a(x) = (2x-3)^2 & b(x) = (3x-5)^2 \\ c(x) = (5x-2y)^2 & d(x) = (4-x^2)^2 \end{array}$$
5.
$$\begin{array}{l|l} a(x) = (x-1)(x+2)^2 & b(x) = (x+3)^2(2x-1) \\ c(x) = \left(x-\frac{1}{2}\right)^2(x-2) & d(x) = (3x+1)^2(2x+4)^2 \end{array}$$
6.
$$\begin{array}{l|l} a(x) = (x+1)(x-1) & b(x) = (x+2)(x-2) \\ c(x) = (x+3)(x-3) & d(x) = (5-x)(x+5) \end{array}$$
7.
$$\begin{array}{l|l} a(x) = (2x+1)^2 - (2x-1)^2 & b(x) = (x+4)^2 + (4-x)^2 \\ c(x) = (x+2)(x-2) - (x+2)^2 & d(x) = (x^2-11)(x^2+11) \end{array}$$
8.
$$\begin{array}{l|l} a(x) = x^3(3x-5)^2 & b(x) = (x+2)^2 - (x+5)(x-1) \\ c(x) = (5x+1)^2(x^3+x^2+x+1) & d(x) = x(x+1)^2(x-1)^2 \end{array}$$

II Factoriser les expressions suivantes

A) Factoriser : « le facteur commun est évident ».

1.
$$\begin{array}{l|l} a(x) = 3x+6 & b(x) = 30-5x \\ c(x) = 3x^2-9x & d(x) = 2xy+8xy^2 \end{array}$$
2.
$$\begin{array}{l|l} a(x) = -x^2-3x & b(x) = 12x-18x^2 \\ c(x) = x^2-x & d(x) = 8x-12x^2+16x^3 \end{array}$$

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

$$3. \quad b(x) = (2x-3)(x+4) - (x+5)(x+4)$$

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

$$a(x) = (3x-4)^2 - (3x-4)$$

$$4. \quad b(x) = (2x+5)^2 + 3(2x+5)$$

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

B) Factoriser : « un produit remarquable ».

$$1. \quad \begin{array}{l} a(x) = x^2 - 2x + 1 \\ c(x) = 16x^2 - 81 \end{array} \left| \begin{array}{l} b(x) = 4x^2 + 12x + 9 \\ d(x) = x^2 + 2x + 1 \end{array} \right.$$

$$2. \quad \begin{array}{l} a(x) = x^2 + 4x + 4 \\ c(x) = 25x^2 - \frac{1}{9} \end{array} \left| \begin{array}{l} b(x) = \frac{1}{4}x^2 - x + 1 \\ d(x) = 4x^2 - 44x + 121 \end{array} \right.$$

$$3. \quad \begin{array}{l} a(x) = 6x^2 + 36x + 54 \\ c(x) = -16x^2 + \frac{1}{16} \end{array} \left| \begin{array}{l} b(x) = -x^2 + 6x - 9 \\ d(x) = \frac{1}{2}x^2 + x + \frac{1}{2} \end{array} \right.$$

$$4. \quad \begin{array}{l} a(x) = x^2 + 2\sqrt{2}x + 2 \\ c(x) = 4x^2 - 5 \end{array} \left| \begin{array}{l} b(x) = 2x^2 - 1 \\ d(x) = 5x^2 - 4 \end{array} \right.$$

C) Factoriser : « le facteur commun est caché ».

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

$$1. \quad b(x) = x^2 - 1 - (x+3)(x-1)$$

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

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

$$2. \quad b(x) = x^4 - 16 - (x^2 + 4)(x^2 + 3)$$

$$c(x) = x^2 + 2\sqrt{3}x + 9 - (x^2 - 3)$$

$$a(x) = 4x^2 + 24x + 36 - x^2 + 9$$

$$3. \quad b(x) = (x-1)^2 - x^2 + 1$$

$$c(x) = 25x^2 - 4 + (5x+2)(4x-7)$$

$$a(x) = x^2 - 16 + (x+4)\left(x - \frac{1}{2}\right)$$

$$4. \quad b(x) = 4x^2 - 12x + 9 - (x+1)(3-2x)$$

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

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

$$5. \quad b^*(x) = (3x-1)(3x-5) - (3x-2)^2$$

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

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

$$6. \quad b^*(x) = x(5x-3) + 2(x-1)^2 - 2$$

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

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

$$7. \quad b^*(x) = (x+1)^2 + 1 - 2(x+1)$$

$$c^*(x) = 5(1-x)^2 - 45x^2$$