

Effectuer, réduire. Factoriser.

Faire disparaître les parenthèses et réduire :

1. $a^2 - (b^2 - c^2) + b^2 - (a^2 + c^2) - c^2 - (a^2 - b^2)$
2. $(4a^3 - 2a^2 + a + 1) - (-a^2 + 3a^3 - a - 7) - (a^3 - 4a^2 + 8 + 2a)$
3. $(2a - 3b + 4c) - (5c - 5a - 4b) + (b + c - 7a)$
4. $6a + 3b - (5a + 2b + 3c) + (-4a - 3b)$
5. $(6a + 5b) - (4a + b - 3c) - (2c + 5a + 3b)$
6. $3a^2b^2 + 4b^4 - (a^3b - 4a^2b^2 - 3ab^3 + 2b^4) - ab^3 - (4a^2b^2 + 3b^4) + 3a^4$
7. $a^2 - (b^2 - c^2) - [b^2 - (c^2 - a^2)] - [c^2 - (b^2 - a^2)]$
8. $[a^3 + b^3 - (3a^2b + 3ab^2)] - [(a^3 - 3a^2b) - (3ab^2 - b^3)]$
9. $(a + 2b - 6a) - [3b - (6a - 6b)] - [(a - 3b) - (2a + 5b)]$
10. $7x - [-3x - [4x - (5x - 2y)] - (-3y + 2x)]$
11. $2x - (3y + 3z) - [5y - (6z - 6y) + 5z - [4x - (2z - 5y)]]$

Effectuer et réduire :

1. $91x^2y^2z^2 - 7x^2y(13yz^2 - 9y^2z) - 21y^3z(3x^2 - 2z^2)$
2. $9x^2yz(2xy^2z^2 - 4x^5y^6z^6) - 3x^3y^5z^7(x^8y^6z^4 - 13x^4y^2)$
3. $13x^2b^2(8x^5b^7 - 2x^4b^9) - 2x^4b^5(9x^3b^4 - 13x^2b^6)$
4. $(x + y - z)z + (x - y + z)y + (-x + y + z)x - 2[x(y - x) + y(z - y) + z(x - z)]$
5. $[a^2 + (n - 1)a + 1]a + [a^2 - (n - 1)a + 1]a$
6. $a[2a + b - (a + 2b)] + a[3a - 2b - (2a - 3b)] - a[a + 3b - (2a + 2b)]$
7. $15a^2 + 24b^2 - (3a + 2b)(5a + 6b)$
8. $2ab + a(9a + 8b) - (8a - 9b)(5a + 7b) - (3a - 2b)(5a + 8b)$
9. $(3a - 6b)(4a - 3b) - [(2a - 5b)(6a - 11b) - (37b^2 - 6ab)]$
10. $(3a^3 - 2a^2 + a - 1)(5a^2 - 4a - 1) - (15a^4 - 12a^3 + 3a^2 - a - 1)(a - 1)$

11. $(a^2 - b^2)(2a^3 - 4a^2b - 5ab^2) - (b^2 - a^2)(4a^3 + 8a^2b + 5ab^2)$
12. $[(x - y)a^2 - (x - y)a + (x - y)][(x + y)a^2 + (x + y)a + (x + y)]$
13. $(x^2 - y^2)(2x - 3y + 5z) + (y - x)(3x^2 + 4yz - 5xz) + (y^2 - x^2)(4x - 3y + z)$

Factoriser les expressions suivantes :

1. $xy + y$
2. $mx + xp$
3. $x^3a^2 - x^2a^3$
4. $4xz - 2xy$
5. $6x^2y + 4xy$
6. $24y^3z^5 - 36yz^2$
7. $3x^3y^4 - 12x^2y^3$
8. $15x^7y^2 - 10x^5y^3$
9. $3x^2yz^2 - xyz^3$
10. $b(y - x) - a(y - x)$
11. $x(a^2 + b^2) - y(a^2 + b^2)$
12. $2yz^5 - 6y^2z^4 + 6y^3z^3 - 2y^4z^2$
13. $2x^3y^2 + 8x^3y^3 - 6x^4y$
14. $3a^3b^2c - 9a^2b^3c^2 + 18a^4b^2c^2$
15. $x(y - z) - y(y - z) + z(y - z)$
16. $10xz^2 + 15x^2z$
17. $12a^2b^2 - 18ab^3 + 24a^3b$
18. $12x^2a^3 - 30x^3a^2 + 18xa^4$
19. $x(a + b) + y(a + b)$
20. $(x - y) + a(x - y)$

Solutions

- $a^2 - (b^2 - c^2) + b^2 - (a^2 + c^2) - c^2 - (a^2 - b^2) = -a^2 + b^2 - c^2$
- $(4a^3 - 2a^2 + a + 1) - (-a^2 + 3a^3 - a - 7) - (a^3 - 4a^2 + 8 + 2a) = 3a^2$
- $(2a - 3b + 4c) - (5c - 5a - 4b) + (b + c - 7a) = 2b$
- $6a + 3b - (5a + 2b + 3c) + (-4a - 3b) = -3a - 2b - 3c$
- $(6a + 5b) - (4a + b - 3c) - (2c + 5a + 3b) = -3a + b + c$
- $3a^2b^2 + 4b^4 - (a^3b - 4a^2b^2 - 3ab^3 + 2b^4) - ab^3 - (4a^2b^2 + 3b^4) + 3a^4$
 $= 3a^2b^2 - b^4 - a^3b + 2ab^3 + 3a^4$
- $a^2 - (b^2 - c^2) - [b^2 - (c^2 - a^2)] - [c^2 - (b^2 - a^2)] = a^2 - b^2 + c^2$
- $[a^3 + b^3 - (3a^2b + 3ab^2)] - [(a^3 - 3a^2b) - (3ab^2 - b^3)] = 0$
- $(a + 2b - 6a) - [3b - (6a - 6b)] - [(a - 3b) - (2a + 5b)] = 2a + b$
- $7x - [-3x - [4x - (5x - 2y)] - (-3y + 2x)] = 11x - y$
- $2x - (3y + 3z) - [5y - (6z - 6y) + 5z - [4x - (2z - 5y)]] = 6x - 9y - 4z$

Effectuer et réduire :

- $91x^2y^2z^2 - 7x^2y(13yz^2 - 9y^2z) - 21y^3z(3x^2 - 2z^2) = 42y^3z^3$
- $9x^2yz(2xy^2z^2 - 4x^5y^6z^6) - 3x^3y^5z^7(x^8y^6z^4 - 13x^4y^2) = 18x^3y^3z^3 + 3x^7y^7z^7 - 3x^{11}y^{11}z^{11}$
- $13x^2b^2(8x^5b^7 - 2x^4b^9) - 2x^4b^5(9x^3b^4 - 13x^2b^6) = 86x^7b^9$
- $(x + y - z)z + (x - y + z)y + (-x + y + z)x - 2[x(y - x) + y(z - y) + z(x - z)] = z^2 + y^2 + x^2$
- $[a^2 + (n - 1)a + 1]a + [a^2 - (n - 1)a + 1]a = 2a^3 + 2a$
- $a[2a + b - (a + 2b)] + a[3a - 2b - (2a - 3b)] - a[a + 3b - (2a + 2b)] = 3a^2 - ab$
- $15a^2 + 24b^2 - (3a + 2b)(5a + 6b) = 12b^2 - 28ab$
- $2ab + a(9a + 8b) - (8a - 9b)(5a + 7b) - (3a - 2b)(5a + 8b) = -15ab - 46a^2 + 79b^2$
- $(3a - 6b)(4a - 3b) - [(2a - 5b)(6a - 11b) - (37b^2 - 6ab)] = 13ab$
- $(3a^3 - 2a^2 + a - 1)(5a^2 - 4a - 1) - (15a^4 - 12a^3 + 3a^2 - a - 1)(a - 1) = 5a^4 - 5a^3 - 3a^2 + 3a$
- $(a^2 - b^2)(2a^3 - 4a^2b - 5ab^2) - (b^2 - a^2)(4a^3 + 8a^2b + 5ab^2) = 6a^5 + 4a^4b - 6a^3b^2 - 4b^3a^2$

12. $[(x - y)a^2 - (x - y)a + (x - y)][(x + y)a^2 + (x + y)a + (x + y)]$
 $= x^2 - y^2 + x^2a^4 + x^2a^2 - a^4y^2 - a^2y^2$
13. $(x^2 - y^2)(2x - 3y + 5z) + (y - x)(3x^2 + 4yz - 5xz) + (y^2 - x^2)(4x - 3y + z)$
 $= -5x^3 + 3x^2y + 9x^2z + 2y^2x - 9xyz$

Factoriser les expressions suivantes :

1. $xy + y = y(x + 1)$
2. $mx + xp = x(m + p)$
3. $x^3a^2 - x^2a^3 = a^2x^2(x - a)$
4. $4xz - 2xy = 2x(2z - y)$
5. $6x^2y + 4xy = 2xy(3x + 2)$
6. $24y^3z^5 - 36yz^2 = 12yz^2(2z^3y^2 - 3)$
7. $3x^3y^4 - 12x^2y^3 = 3x^2y^3(xy - 4)$
8. $15x^7y^2 - 10x^5y^3 = 5x^5y^2(3x^2 - 2y)$
9. $3x^2yz^2 - xyz^3 = xyz^2(-z + 3x)$
10. $b(y - x) - a(y - x) = (x - y)(a - b)$
11. $x(a^2 + b^2) - y(a^2 + b^2) = (a^2 + b^2)(x - y)$
12. $2yz^5 - 6y^2z^4 + 6y^3z^3 - 2y^4z^2 = 2yz^2(z^3 - 3yz^2 + 3y^2z - y^3)$
13. $2x^3y^2 + 8x^3y^3 - 6x^4y = 2x^3y(4y^2 + y - 3x)$
14. $3a^3b^2c - 9a^2b^3c^2 + 18a^4b^2c^2 = 3a^2b^2c(-3bc + 6ca^2 + a)$
15. $x(y - z) - y(y - z) + z(y - z) = (y - z)(x - y + z)$
16. $10xz^2 + 15x^2z = 5xz(2z + 3x)$
17. $12a^2b^2 - 18ab^3 + 24a^3b = 6ab(2ab - 3b^2 + 4a^2)$
18. $12x^2a^3 - 30x^3a^2 + 18xa^4 = 6xa^2(3a + 5x)(-x + a)$
19. $x(a + b) + y(a + b) = (x + y)(a + b)$
20. $(x - y) + a(x - y) = (x - y)(a + 1)$