DESCOMPUNERI IN FACTORI

I . Metoda factorului comun

1. $ax - ay + az =$
2. $4a^2 + 2ab - 6ac =$
3. $9x^2 - 6xy - 3y^2 =$
4. $4x^3 + 8x^2 - 2x =$
5. $18x^3y - 6xy^2 - 12xy =$
6. $10a^4 - 5a^3 =$
7. $20a^3b^2 - 15a^2b^4 + 10ab^2 =$
8. $a(x + y) + b(x + y) =$
9. $x(a - b) - y(a - b) =$
10. $2a^2(a - b) + 4a(a - b) =$
11. $6x^2(a + b) - 3x(a + b) =$
12. $a^2(x - y) - ab(x - y) - a(x - y) =$
13. $x^2(a + b) - xy(a + b) + xz(a + b) =$
14. $4a^2(x + y) + 6ab(x + y) - 2a(x + y) =$
15. $(a + b)^2 + 3a(a + b) =$
16. $(x - y)^2 - 2y(x - y) =$
17. $(a - b)^2 + 3a(a - b) - 2b(a - b) =$
18. $(x + y)^2 - 4x(x + y) + 3y(x + y) =$

Temã :

1. $ax + bx - cx =$
2. $6x^2 - 4xy + 8xz =$
3. $7a^2 + 14ab - 28ac =$
4. $8a^3 - 16a^2 - 24a =$
5. $18a^3b^2 - 36ab^3 + 27a^2b =$
6. $15x^4 - 20x^3 =$
7. $30x^3y^4 + 18x^2y^3 - 24xy^2 =$
8. $x(a - b) + y(a - b) =$
9. $a(x + y) - b(x + y) =$
10. $a^2(x - y) - ab(x - y) =$
11. $2x^2(a + b) + 4x(a + b) =$
12. $x^2(a - b) + xy(a - b) - xz(a - b) =$
13. $a^2(x + y) - ab(x + y) - ac(x + y) =$
14. $6x^2(x - y) - 9xy(x - y) + 3x(x - y) =$
15. $2a^2(a - b) + 4ab(a - b) - 6a(a - b) =$
16. $(x - y)^2 - 3x(x - y) =$
17. $(a + b)^2 + 3a(a + b) - 2b(a + b) =$
18. $(x - y)^2 - 4x(x - y) - 2y(x - y) =$

II . Metoda grupării (asocierii)

1. $a(x + y) + x + y =$
2. $x(a - b) + a - b =$
3. $2a(x - y) + bx - by =$
4. $4x(a + b) - ay - by =$
5. $a(x - y) - x + y =$
6. $x(a - b) - ay + by=$
7. $a(x - y - z) - bx + by + bz =$
8. $x(a + b - c) - ay - by + cy =$
9. $a(x - y) - b(y - x) =$
10. $x(a + b) - ay - by =$
11. $y(a - b) - ax + bx =$
12. $x(a - b) - y(b - a) + az - bz =$
13. $a(x - y) + b(y - x) - cx + cy =$
14. $x(a - 1) - y(1 - a) - az + z =$
15. $a^2(a - b) - b(b - a) - a^2 + ab =$
16. $x(x - y) + y(y - x) - xz + yz =$
17. $(2a - b)(a + b) - (2a - b)(2a + 3b) =$
18. $(x - y)(x + y) + (2x + y)(y - x) =$

Temã :

1. $x(a + b) + a + b =$
2. $a(x + y) - x - y =$
3. $x(x - y) + xz - yz =$
4. $a(b - c) - b^2 + bc =$
5. $x(y + z) - yz - z^2 =$
6. $y(b - c) - bx + cx =$
7. $a(a + b - c) - ab - b^2 + bc =$
8. $x(x - y + z) - xy + y^2 - yz =$
9. $a(x - y) + b(y - x) =$
10. $x(b + c) - by - cy =$
11. $x(x - y) - xz + yz =$
12. $a(a - b) - b(b - a) - ac + bc =$
13. $x(x + y) - xy - y^2 + xz + yz =$
14. $x(x - z) - y(z - x) + z(z - x) =$
15. $a(a - 3) + b(3 - a) - ac + 3c =$
16. $a(a - b) + b(b - a) - bc + ac =$
17. $x(x - y) - y(y - x) - xz + yz =$
18. $(a - b)(a - 2b) + (a - b)(2a - b) =$
19. $(x + y)(x - 2y) - (x + 2y)(x - 2y) =$

III. Metoda restrângerii

Se folosesc formulele :

$$a^2 + 2ab + b^2 = (a + b)^2$$
$$a^2 - 2ab + b^2 = (a - b)^2$$
$$a^3 + 3a^2b + 3ab^2 + b^3 = (a + b)^3$$
$$a^3 - 3a^2b + 3ab^2 - b^3 = (a - b)^3$$

1. $x^2 + 6xy + 9y^2 =$
2. $4x^2 + 4xy + y^2 =$
3. $9a^2 - 12ab + 4b^2 =$
4. $4x^2 + 16xy + 16y^2 =$
5. $4a^2 - 24ab + 36b^2 =$
6. $16x^2 + 40xy + 25y^2$
7. $a^4 + 2a^2b + b^2 =$
8. $x^4 - 10x^2 + 25 =$
9. $a^4 - 14a^2b^2 + 49b^4 =$
10. $x^4 + 12x^2 + 36 =$
11. $a^3 + 6a^2 + 12a + 8 =$
12. $8x^3 - 12x^2 + 6x - 1 =$
13. $27a^3 + 27a^2 + 9a + 1 =$
14. $x^3 - 9x^2 + 27x - 27 =$
15. $27a^3 + 54a^2b + 36ab^2 + 8b^3 =$
16. $64x^3 - 48x^2y + 12xy^2 - y^3 =$
17. $a^3 + 15a^2 + 75a + 125 =$
18. $8x^3 - 36x^2y + 54xy^2 - 27y^3 =$

Temă :

1. $x^2 + 8xy + 16y^2 =$
2. $4a^2 + 12ab + 9b^2 =$
3. $9x^2 - 6x + 1 =$
4. $25a^2 - 30ab + 9b^2 =$
5. $9x^2 + 12xy + 4y^2 =$
6. $9a^2 - 24ab + 16b^2 =$
7. $16x^2 + 16x + 4 =$
8. $a^4 + 6a^2b + 9b^2 =$
9. $x^4 + 2x^2y^2 + y^4 =$
10. $4a^4 - 4a^2b^2 + b^4 =$
11. $x^3 - 6x^2y + 12xy^2 - 8y^3 =$
12. $8x^3 + 12x^2y + 6xy^2 + y^3 =$
13. $27a^3 - 27a^2b + 9ab^2 - b^3 =$
14. $x^3 + 9x^2y + 27xy^2 + 27y^3 =$
15. $8y^3 + 36xy^2 + 54x^2y + 27x^3 =$
16. $64a^3 + 48a^2b + 12ab^2 + b^3 =$
17. $x^3 - 15x^2y + 75xy^2 - 125y^3 =$
18. $27a^3 - 108a^2b + 144ab^2 - 64b^3 =$

IV. Metoda formulelor de descompunere în factori

Se folosesc formulele :

$$a^2 - b^2 = (a - b)(a + b)$$
$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$
$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

1. $a^2 - 4b^2 =$
2. $4x^2 - y^2 =$
3. $9a^2 - b^2 =$
4. $4x^2 - 9y^2 =$
5. $a^2 - 16b^2 =$
6. $16x^2 - y^2 =$
7. $9a^2 - 16b^2 =$
8. $a^4 - 1 =$
9. $x^4 - y^4 =$
10. $16a^4 - b^4 =$
11. $x^4 - 81y^4 =$
12. $(x + 2)^2 - 1 =$
13. $4 - (x - 1)^2 =$
14. $(x + 1)^2 - (2x - 3)^2 =$
15. $4(x - 1)^2 - (x + 2)^2 =$
16. $9(x + 1)^2 - 4(x - 1)^2 =$
17. $27x^3 - 8y^3 =$
18. $8a^3 + 125b^3 =$
19. $a^6 - b^6 =$

Temã :

1. $4x^2 - 25 =$
2. $9a^2 - 16 =$
3. $25x^2 - 9y^2 =$
4. $16a^2 - 25b^2 =$
5. $4x^2 - 25y^2 =$
6. $36a^2 - 25b^2 =$
7. $49x^2 - 36y^2 =$
8. $x^4 - 1 =$
9. $a^4 - b^4 =$
10. $x^4 - 16y^4 =$
11. $81a^4 - b^4 =$
12. $(a + 1)^2 - 1 =$
13. $9 - (a - 2)^2 =$
14. $4(x - 2)^2 - 9(x + 1)^2 =$
15. $9(a - 1)^2 - 25(a + 1)^2 =$
16. $16(x - 3)^2 - 9(x + 1)^2 =$
17. $8a^3 - 27b^3 =$
18. $64x^3 + 27y^3 =$

V. Metoda scindării

1. $x^2 + 5x + 4 =$
2. $x^2 + 7x + 10 =$
3. $x^2 + 10x + 21 =$
4. $x^2 - 8x + 15 =$
5. $x^2 - 11x + 28 =$
6. $x^2 - 9x + 14 =$
7. $x^2 + x - 12 =$
8. $x^2 - x - 12 =$
9. $x^2 + 2x - 8 =$
10. $12x^2 + 7x + 1 =$
11. $10x^2 + 7x + 1 =$
12. $6x^2 - 5x + 1 =$
13. $5x^2 - 6x + 1 =$
14. $18x^2 - 11x + 1=$
15. $2x^2 - 5x + 3 =$
16. $2x^2 - 3x - 5 =$
17. $2x^2 - 5x + 2 =$
18. $2x^2 + x - 6 =$

Temã :

1. $x^2 + 8x + 15 =$
2. $x^2 + 9x + 18 =$
3. $x^2 + 8x + 7 =$
4. $x^2 - 3x + 2 =$
5. $x^2 - 7x + 6 =$
6. $x^2 - 10x + 16 =$
7. $x^2 + x - 12 =$
8. $x^2 - x - 12 =$
9. $x^2 - 4x - 12 =$
10. $x^2 + 3x - 18 =$
11. $15x^2 + 8x + 1 =$
12. $14x^2 - 9x + 1 =$
13. $16x^2 + 10x + 1 =$
14. $12x^2 - 8x + 1 =$
15. $2x^2 + x - 3 =$
16. $2x^2 - 5x - 7 =$
17. $2x^2 - 3x - 2 =$
18. $2x^2 - 7x + 6 =$
19. $2x^2 - 9x + 9 =$

Metode combinate (I - V)

1. $9a^2 - 4b^2 =$
2. $x^4 - 81 =$
3. $x^2 + 8x + 16 =$
4. $x^2 + 8x + 15 =$
5. $x^3 - 5x^2 + 6x =$
6. $xy + x + y + 1 =$
7. $xy - x + y - 1 =$
8. $xy + x - y - 1 =$
9. $xy - x - y + 1 =$
10. $x^3 + 2x^2 - x - 2 =$
11. $x^3 - x^2 - 4x + 4 =$
12. $x^2 + xy - 6y^2 =$
13. $x^2 - y^2 - 2x + 1 =$
14. $x^2 - y^2 - 2y - 1 =$
15. $x^2 - y^2 + z^2 - 2xz =$
16. $a^2 - b^2 - c^2 + 2bc =$
17. $25x^2 - 4y^2 + 12yz - 9z^2 =$
18. $x^3 - 9x^2 + 27x - 27 =$
19. $x^3 - 8y^3 =$

Temã :

1. $4x^2 - 25y^2 =$
2. $a^4 - 16 =$
3. $x^2 + 4x + 4 =$
4. $x^2 + 5x + 4 =$
5. $a^3 - 7a^2 + 12a =$
6. $xy - xz - y + z =$
7. $ab + a + b + 1 =$
8. $ab - a + b - 1 =$
9. $ab + a - b - 1 =$
10. $ab - a - b + 1 =$
11. $x^3 - 4x^2 - x + 4 =$
12. $x^3 - x^2 - 4x + 4 =$
13. $x^2 - y^2 - 4x + 4 =$
14. $x^2 - y^2 - 4y - 4 =$
15. $a^2 - b^2 + c^2 - 2ac =$
16. $x^2 + y^2 - z^2 + 2xy =$
17. $x^3 - 6x^2 + 12x - 8 =$
18. $8x^3 - 27y^3 =$

VI. Metoda substituţiei

1. $(x^2 - 3x - 5)(x^2 - 3x + 3) + 7 =$
2. $(x^2 + 2x - 5)(x^2 + 2x - 6) - 6 =$
3. $(x^2 + x - 2)(x^2 + x - 3) - 12 =$
4. $(x^2 + x)^2 + 2(x^2 + x) - 8 =$
5. $(x^2 + 2x)^2 - 7(x^2 + 2x) - 8 =$
6. $(x^2 - x)(x^2 - x + 3) + 2 =$
7. $(x^2 - 2x + 4)(x^2 - 2x + 7) + 2 =$
8. $(x + y + 2z)(x + y + 5z) + 2z^2 =$
9. $(a + b + 3c)(a + b - c) - 5c^2 =$
10. $(a + 1)(a + 3)(a + 5)(a + 7) + 15 =$
11. $x(x - a)(x + a)(x + 2a) + a^4 =$
12. $(a + 1)(a + 2)(a + 3)(a + 4) + 1 =$
13. $(x + 2a)(x + 4a)(x + 6a)(x + 8a) + 16a^4 =$
14. $(a^2 + 3a + 2)(a^2 + 11a + 30) - 12 =$

Temã :

1. $(x^2 + 3x + 1)(x^2 + 3x + 2) - 12 =$
2. $(x^2 - x)(x^2 - x + 1) - 2 =$
3. $(a - 2b + 2c)(a - 2b - 3c) - 6c^2 =$
4. $(x - 2y + 3z)(x - 2y + 2z) - 6z^2 =$
5. $(a^2 + 4ab + b^2)(a^2 - ab + b^2) - 6a^2b^2 =$
6. $(x^2 + 3x)^2 + 3(x^2 + 3x) + 2 =$
7. $(a^2 - a)(a^2 - a - 5) + 6 =$
8. $(x^2 - 2x)(x^2 - 2x + 5) + 4 =$
9. $(a^2 + a + 1)^2 - 6(a^2 + a + 1) + 8 =$
10. $(a + 3)(a + 6)(a + 9)(a + 12) + 81 =$
11. $(x + y)(x + 2y)(x + 3y)(x + 4y) + y^4 =$
12. $(a^2 + 5a + 4)(a^2 + 13a + 40) + 20 =$
13. $(a^2 + 5a + 4)(a^2 + 9a + 18) + 8 =$
14. $(y^2 + 7y + 10)(y^2 + 5y + 4) - 4 =$

VII. Schema lui Horner

1. $x^3 + 2x^2 - 5x - 6 =$
2. $x^3 - 3x^2 - 6x + 8 =$
3. $x^3 + 2x^2 - 11x - 12 =$
4. $x^3 - x^2 - x - 2 =$
5. $x^3 + 2x^2 - 2x + 3 =$
6. $x^3 - 2x - 4 =$
7. $x^3 + 2x^2 - 3 =$
8. $x^4 + x^3 - 7x^2 - x + 6 =$
9. $x^4 - 5x^{2`} + 4 =$
10. $x^5 - 2x^4 - 10x^3 + 20x^2 + 9x - 18 =$
11. $x^5 - 3x^4 - 5x^3 + 15x^2 + 4x - 12 =$
12. $x^6 + x^5 - 17x^4 - 5x^3 + 64x^2 + 4x - 48 =$
13. $x^3 - (m + 3)x^2 + (3m + 2)x - 2m =$
14. $x^3 - 6x^2y + 11xy^2 - 6y^3 =$
15. $x^4 - 13a^2x^3 + 36a^4 =$
16. $x^5 + 3x^4y - 5x^3y^2 - 15x^2y^3 + 4xy^4 + 12y^5 =$
17. $x^4 - ax^3 - 6a^2x^2 + 4a^3x + 8a^4 =$
18. $x^4 - 10x^3y + 35x^2y^2 - 50xy^3 + 24y^4 =$

Temã :

1. $x^3 - 6x^2 + 11x - 6 =$
2. $x^3 + 2x^2 + 3x - 6 =$
3. $x^3 + 6x^2 + 11x + 6 =$
4. $x^3 + 4x^2 + x - 6 =$
5. $x^3 - 9x^2 + 26x - 24 =$
6. $x^3 - 8x - 3 =$
7. $x^4 - x^3 - 6x^2 + 4x + 8 =$
8. $x^4 + 2x^3 + 5x^2 + 4x - 12 =$
9. $x^4 - 10x^3 + 35x^2 - 50x - 24 =$
10. $x^4 - 10x^2 + 9 =$
11. $x^5 - 2x^4 - 10x^3 + 20x^2 + 9x - 18 =$
12. $x^5 + 3x^4 - 5x^3 - 15x^2 + 4x + 12 =$
13. $x^3 + (m - 4)x^2 + (3 - 4m)x + 3m =$
14. $x^3 - 4x^2y + 5xy^2 - 2y^3 =$
15. $x^4 - 5a^2x^2 + 4a^4$
16. $x^5 - x^4 - 13x^3 + 13x^2 + 36x - 36 =$
17. $x^4 + 2x^3y + 5x^2y^2 + 4xy^3 - 12y^4 =$
18. $x^5 - 3x^4y - 5x^3y^2 + 15x^2y^3 + 4xy^4 - 12y^5 =$

VIII. Metoda factorului comun forţat

Teorema lui Bézout :

1. $P(x) = x^3 + x^2 - 14x - 24 =$

2. $P(x) = x^4 - 8x^3 + 14x^2 + 8x - 15 =$

3. $P(x) = x^4 - 13x^2 + 36 =$

4. $P(x) = x^3 - 7xy^2 - 6y^3 =$

5. $P(x) = x^4 - x^3 - 6x^2 + 4x + 8 =$

6. $P(x) = x^5 + 3x^4 - 5x^3 - 15x^2 + 4x + 12 =$

Factor comun forţat : $x^2 + x + 1$

7. $x^4 + x^2 + 1 =$

8. $x^5 + x + 1 =$

9. $x^8 + x + 1 =$

10. $x^3 + 2x^2 + 2x + 1 =$

11. $x^4 + x^3 + 2x^2 + x + 1 =$

Factor comun forţat : $x^2 - x + 1$

12. $x^4 + x^2 + 1 =$

13. $x^4 - x^3 + 2x^2 - x + 1 =$

14. $x^4 - 2x^3 + x^2 - 1 =$

15. $x^4 - x^3 + 2x - 1 =$

16. $x^5 - x^4 + 2x^2 - 2x + 1 =$

Temã : *Teorema lui Bézout :*

1. $P(x) = x^3 - 7x - 6 =$

2. $P(x) = x^4 - 6x^3 + x^2 + 24x - 20 =$

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

4. $P(x) = x^3 - 2xy^3 - 4y^3 =$

5. $P(x) = x^4 + 2x^3 + 5x^2 + 4x - 12 =$

6. $P(x) = x^5 - 2x^4 - 10x^3 + 20x^2 + 9x - 18 =$

Factor comun forţat : $a^2 + a + 1$

7. $a^4 + a^2 + 1 =$

8. $a^5 + a^4 + 1 =$

9. $a^8 + a^7 + 1 =$

10. $a^4 + 2a^3 + a^2 - 1 =$

11. $a^3 + 2a^2 + 2a + 1 =$

Factor comun forţat : $x^2 - x + 1$

12. $x^3 - 2x^2 + 2x - 1 =$

13. $x^4 - x^3 + x - 1 =$

14. $x^5 + x - 1 =$

15. $x^5 - x^4 - 1 =$

16. $x^5 - x^4 + 2x^3 - 2x^2 + 2x - 1 =$

IX. Descompunerea în factori a polinoamelor simetrice si omogene

1. $a^2b + ab^2 + b^2c + bc^2 + a^2c + ac^2 + 3abc =$
2. $a^2b + ab^2 + b^2c + bc^2 + a^2c + ac^2 + 2abc =$
3. $(a + b)(b + c)(a + c) + abc =$
4. $a^2b + b^2c + c^2a - ab^2 - bc^2 - ca^2 =$
5. $a^3(b - c) + b^3(c - a) + c^3(a - b) =$
6. $a^3(b^2 - c^2) + b^3(c^2 - a^2) + c^3(a^2 - b^2) =$
7. $(a - b)^3 + (b - c)^3 + (c - a)^3 =$
8. $(a + b + c)^3 - a^3 - b^3 - c^3 =$
9. $a^3 + b^3 + c^3 - 3abc =$
10. $a(b + c)^2 + b(a + c)^2 + c(a + b)^2 - 4abc =$
11. $a^2 + b^2 + c^2 + 2ab + 2bc + 2ac =$
12. $a^4 + b^4 + c^4 + 2a^2b^2 + 2b^2c^2 + 2a^2c^2 =$
13. $a^2b^2 + b^2c^2 + a^2c^2 + 2abc(a + b + c) =$
14. $a^3 + b^3 + c^3 + a^2b + ab^2 + b^2c + bc^2 + a^2c + ac^2 =$
15. $a^3b + ab^3 + b^3c + bc^3 + a^3c + ac^3 + abc(a + b + c) =$
16. $(a^2 - bc)^2 + (b^2 - ac)^2 + (c^2 - ab)^2 =$
17. $(a - b)^2(a - c)^2 + (b - c)^2(b - a)^2 + (c - a)^2(c - b)^2 =$
18. $2(a^2b^2 + b^2c^2 + a^2c^2) - (a^4 + b^4 + c^4) =$
19. $ab(a - b) + bc(b - c) + ca(c - a) =$
20. $(a - b)(a + b)^2 + (b - c)(b + c)^2 + (c - a)(c + a)^2 =$
21. $(a - b)(a + b)^3 + (b - c)(b + c)^3 + (c - a)(c + a)^3 =$
22. $a^3(b - c)^3 + b^3(c - a)^3 + c^3(a - b)^3 =$
23. $(abc + a + b + c)^2 - (ab + bc + ac + 1)^2 =$
24. $abc(a + b + c) - (ab + bc + ac) - a^2b^2c^2 + 1 =$
25. $(cx + by)(ax + cy)(bx + ay) - (bx + cy)(cx + ay)(ax + by) =$