

Esercitazione (soluzione)

Raccoglimento a fattor comune, quadrato di binomio, differenza di due quadrati

1. $5a^3 - 10a^2x + 5ax^2 = 5a(a^2 - 2ax + x^2) = 5a(a-x)^2$
2. $-8x^3y - 8x^2y^2 - 2xy^3 = -2xy(4x^2 + 4xy + y^2) = -2xy(2x+y)^2$
3. $4x^{n+2} - 4x^{n+1} + x^n = x^n(4x^2 - 4x + 1) = x^n(2x-1)^2$
4. $a^{n+2}b^4 - 2a^{n+1}b^3 + a^nb^2 = a^nb^2(a^2b^2 - 2ab + 1) = a^nb^2(ab-1)^2$
5. $9 - x^2 + 2ax - a^2 = 3^2 - (x-a)^2 = (3+x-a)(3-x+a)$
6. $a^3x^2 - ax^2(x-1)^2 = ax^2[a^2 - (x-1)^2] = ax^2(a+x-1)(a-x+1)$
7. $a^{n+4}x^m - 4a^{n+2}x^{m+1} + 4a^n x^{m+2} = a^n x^m(a^4 - 4a^2x + 4x^2) = a^n x^m(a^2 - 2x)^2$
8. $a^3 - ax^2 - (a-x)^3 = a(a+x)(a-x) - (a-x)^3 = (a-x)[a(a+x) - (a-x)^2] = (a-x)(a^2 + ax - a^2 + 2ax - x^2) = x(a-x)(3a-x)$
9. $x^2 - 4xy + 4y^2 - (3x+y)^2 = (x-2y)^2 - (3x+y)^2 = \dots = (y-4x)(2x+3y)$
10. $a^{3m+1} + a^{2m+1} - a^{m+1} - a = a(a^{3m} + a^{2m} - a^m - 1) = a[a^{2m}(a^m+1) - (a^m+1)] = a(a^m+1)(a^{2m}-1) = a(a^m+1)^2(a^m-1)$

Raccoglimento a fattor comune, somma e differenza di due cubi

1. $3a^5b - 3a^2b = 3a^2b(a^3 - 1) = 3a^2b(a-1)(a^2 + a + 1)$
2. $a^4b^3 - ab^6 = ab^3(a^3 - b^3) = ab^3(a-b)(a^2 + ab + b^2)$
3. $a^5b^5 + a^2b^{20} = a^2b^5(a^3 + b^{15}) = a^2b^5(a^3 + (b^5)^3) = a^2b^5(a+b^5)(a^2 - ab^5 + b^{10})$
4. $(a-b)^3 - 8(a+b)^3 = (a-b)^3 - [2(a+b)]^3 = [(a-b) - 2(a+b)][(a-b)^2 + 2(a-b)(a+b) + 4(a+b)^2] \dots = (-4-3b)(7a^2 + 6ab + 3b^2)$
5. $x^5 + 27x^2 = x^2(x^3 + 3^3) = x^2(x+3)(x^2 - 3x + 9)$
6. $\frac{1}{8}a^{3n} + b^3 = \left(\frac{1}{2}a^n\right)^3 + b^3 = \left(\frac{1}{2}a^n + b\right)\left(\frac{1}{4}a^{2n} - \frac{1}{2}a^nb + b^2\right)$
7. $a^{n+3}b^4 - a^nb^{3n-2} = a^nb(a^3b^3 - b^{3n-3}) = a^nb(ab - b^{n-1})(a^2b^2 + ab^n + b^{2n-2})$
8. $0,01x^5y^3 - 10x^2y^9 = 10^{-2}x^5y^3 - 10x^2y^9 = 10x^2y^3(10^{-3}x^3 - y^6) = 10x^2y^3(10^{-1}x - y^2)(10^{-2}x^2 + 10^{-1}xy^2 + y^4)$
9. $x^{4n}y^{-n} + x^ny^{5n} = x^ny^{-n}(x^{3n} + y^{6n}) = x^ny^{-n}(x^n + y^{2n})(x^{2n} - x^ny^{2n} + y^{4n})$
10. $x^{6n} - y^{6n} = (x^{3n} + y^{3n})(x^{3n} - y^{3n}) = (x^n + y^n)(x^{2n} - x^ny^n + y^{2n})(x^n - y^n)(x^{2n} + x^ny^n + y^{2n})$