

## Esercitazione(soluzione)

### Raccoglimento a fattor comune

1.  $3a^2b - 6abx + 9a^2x = 3a(ab - 2bx + 3ax)$
2.  $3a^2b^3 - 12a^3b^2 - 6a^2b^2x = 3a^2b^2(b - 4a - 2x)$
3.  $\frac{3}{4}ax^2 - \frac{9}{16}a^3x^4 + \frac{27}{64}a^5x^6 = \frac{3}{4}ax^2\left(1 - \frac{3}{4}a^2x^2 + \frac{9}{16}a^4x^4\right)$
4.  $a^2b(a-b) - ab^2(a-b) = ab(a-b)(a-b) = ab(a-b)^2$
5.  $5a(a+2b) - 10a(a-b) = 5a((a+2b) - 2(a-b)) = 5a(4b-a)$
6.  $5x(a-b) - 7x(a+b) = x(5(a-b) - 7(a+b)) = x(5a - 5b - 7a - 7b) = x(-2a - 12b) = -2x(a+6b)$
7.  $6x^2(a+b) - 10x^2(a-b) = 2x^2(3(a+b) - 5(a-b)) = 2x^2(-2a+8b)$
8.  $\frac{1}{2}xy(a+2b) - \frac{3}{2}xy(-3a+6b) = \frac{1}{2}xy((a+2b) - 3(-3a+6b)) = \frac{1}{2}xy(10a-16b) = \frac{1}{2}xy \cdot 2(5a-8b) = xy(5a-8b)$
9.  $(2a+3b)^2 - 5a(2a+3b) = (2a+3b)((2a+3b) - 5a) = (2a+3b)(-3a+3b) = -3(2a+3b)(a-b)$
10.  $x^{2n-1} - x^{n-3}, n \in \mathbb{N} \wedge n \geq 3 \rightarrow x^{2n-1} - x^{n-3} = x^{n-3}(x^{n+2} - 1)$

### Raccoglimenti parziali e successivi, differenza di due quadrati

11.  $x^3 - x^2 + ax - a = x^2(x-1) + a(x-1) = (x-1)(x^2 + a)$
12.  $x^n + x^{n-1} + ax + a = x^{n-1}(x+1) + a(x+1) = (x+1)(x^{n-1} + a)$
13.  $ax - x^2 + ay - xy = x(a-x) + y(a-x) = (a-x)(x+y)$
14.  $x^2 + xy + 2x + 2y = x(x+y) + 2(x+y) = (x+y)(x+2)$
15.  $x - xy^2 = x(1 - y^2) = x(1-y)(1+y)$
16.  $x^2 - 1 + x^2y - y = (x^2 - 1) + y(x^2 - 1) = (x^2 - 1)(1+y) = (x+1)(x-1)(1+y)$
17.  $xy - x^3y^3 = xy(1 - x^2y^2) = xy(1-xy)(1+xy)$
18.  $a^{2n} - b^4 = (a^n)^2 - (b^2)^2 = (a^n - b^2)(a^n + b^2)$
19.  $a^{2p+3} - 4a^{2p-1} = a^{2p-1}(a^4 - 4) = a^{2p-1}(a^2 + 2)(a^2 - 2)$
20.  $a^{n+2} - 9a^n = a^n(a^2 - 9) = a^n(a-3)(a+3)$
21.  $3x^2(x+1)^3 - 12x^3(x+1)^2 = 3x^2(x+1)^2(x+1-4x) = 3x^2(x+1)^2(1-3x)$
22.  $16x^6y^{8+p} - 81x^2y^p = x^2y^p(16x^4y^8 - 81) = x^2y^p(4x^2y^4 - 9)(4x^2y^4 + 9) = x^2y^p(2xy^2 - 3)(2xy^2 + 3)(4x^2y^4 + 9)$
23.  $3a^{2n+1} - 27a = 3a(a^{2n} - 9) = 3a(a^n - 3)(a^n + 3)$