

Calcolare le **somme algebriche** dei seguenti polinomi e ridurre i termini simili:

42. $(x - ay) - (3y + 2ax) + (ay - y) - (ax - ay) + 4y$. [x + ay - 3ax]
43. $(4y - 3x) + (2x - 3y) - (6x - 4y) - (5y - 2x)$. [-5x]
44. $(2x^2 - 3x + 2) - (x^2 + 2x - 3) + (x - 3x^2 - 1)$. [-2x^2 - 4x + 4]
45. $(3a^2 - 2ab) - (2b^2 + 5ab) + (a^2 + 2ab - 3b^2)$. [4a^2 - 5ab - 5b^2]
46. $(3a^2b^2 - 5a^3b + 2ab^3) - (-3a^3b + ab^3 - ab) - (2ab + 2a^2b^2 + ab^3)$. [-2a^3b + a^2b^2 - ab]
47. $x - y - \{x - [y - z + (x - y - z)] - y\}$. [x - 2z]
48. $\frac{17}{4}n - \left[\frac{2}{3}p - \left(\frac{1}{2}p - 2,75n \right) + p \right] - \left[2p - (0,25p - n) + \frac{7}{12}p \right]$. [$\frac{1}{2}n - \frac{7}{2}p$]
49. $3a - \{b - [a - (b - 2a) + 3b] - 2a\} - [-(-5a)]$. [3a + b]
50. $2c - [-(-3c)] - \{-[-(-4c)]\} - [5c - (6c - 7c) - 2c] - 8c + 15c$. [6c]
51. $3x^3 + y^2 - [5xy - (2x^3 + 10xy + 3y^2)] - [4x^3 - (10y^2 + 5xy)]$. [x^3 + 10xy + 14y^2]
52. $5rs - \{[(2r^2 - 3rs) + (5rs - 3s^2) - (5r^2 - rs - s^2)] - 3rs\}$. [3r^2 + 5rs + 2s^2]
53. $a^4 - \{4a^3 - [6a^2 - (4a - 11)]\} - [a^4 + (4a^3 + 6a^2) - (4a - 11)]$. [-8a^3]
54. $(4a^2 - 5a + 1) - (3a^2 + 1) + (a - 3) - (a^2 + a + 1)$. [-5a - 4]
55. $6m - 7n - \{[8n - (2m + 4n) - 22n] - 4m\} - \{7n - [(3n + 4m) - 9m - 8n] + 6m\}$. [m - n]
56. $a - \{2b + [3x - 3a - (a + b)] + 2a - [-(-b - c)]\}$. [3a - 3x + c]
57. $a^4 - \{4a^3 - [6a^2 - (4a - 1)]\} - [a^4 + 3a^3 - (6a^2 - 2a - 1)]$. [-7a^3 + 12a^2 - 6a]
58. $\left(-\frac{2}{3}a^2b + \frac{1}{4}ab^2 + b^3 \right) + \left(-\frac{1}{5}a^3 + \frac{1}{6}a^2b - 2b^3 \right) - \left(\frac{1}{2}ab^2 - b^3 - 0,2a^3 \right)$. [$-\frac{1}{2}a^2b - \frac{1}{4}ab^2$]
59. $\frac{3}{4}x^3y - \left(-x^4 + \frac{1}{2}x^3y - y^4 \right) + xy^3 - \left(x^4 + \frac{1}{4}x^3y - 2x^2y^2 \right) + (-2x^2y^2 - y^4)$. [xy^3]
60. $4x - 3y - \{-[-(-2x - 4y)] + 3x + [y - 9x - (2y - x) - (y - x)]\}$. [10x + 3y]
61. $11x - \{7x - [8x - (9x - 12a + 6x)]\} - \{-[-(-3x)]\}$. [12a]
62. $\left(3x^3 + 2ay - \frac{1}{5} \right) + \left(\frac{1}{2}x^3 - ay + \frac{7}{3} \right) - \left\{ - \left[- \left(-\frac{1}{15} + \frac{7}{2}x^3 + ay \right) \right] \right\}$. [$\frac{11}{5}$]
63. $(3a^2m^5 - 2bm^6 - m^7) - \left[\left(\frac{1}{2}xy + 3a^2m^5 - m^7 \right) - \left(2bm^6 - \frac{1}{2}xy \right) \right]$. [-xy]

Calcolare i seguenti **prodotti di un polinomio per un monomio** e semplificare, eventualmente, i polinomi ottenuti:

1. $a(a - b + 1); -2a(x + y - z); a^2(a^2 - 2a + 3).$ $[a^2 - ab + a; \dots]$
2. $(3b^5 - 2c^4 + 9b^3c^2 - 27 - b^4) \cdot \left(-\frac{2}{3}b^m c^n\right).$
 $\left[-2b^{m+5}c^n + \frac{4}{3}b^m c^{n+4} - 6b^{m+3}c^{n+2} + 18b^m c^n + \frac{2}{3}b^{m+4}c^n\right]$
3. $a(a + b + c) - b(a - c + b) - c(b - a); 2x(x - 2y + 1) - y(-2x + 4y - 1) - 2y(-1 - 2y - x).$
 $[a^2 - b^2; 2x^2 + 2x + 3y]$
4. $3a(2a - 5b) - b(3a - 4b) - 6a(a - 3b).$ $[4b^2]$
5. $2x(3x + y) - [4x(x - 2y) - 2x(3x + y) + 4x(2x + 3y)].$ $[0]$
6. $2m[3m^2 - 2n(3m - n)] - 3n[m^2 - 2m(m - 2n)] - 3m^2(2m - 3n).$ $[-8mn^2]$
7. $3(a - c) + 4(3a + 2b - c); 3y(a - 2x) - 2x(a - 3y) + a(2x - 3y).$ $[15a + 8b - 7c; 0]$
8. $7c(3a + 2b) - 5b(3a - 6c) + 3a(5b - 7c).$ $[44bc]$
9. $4x^3 - \{2xy(2x - 3y) - [2x^2(2y - 3x) + 2x(x^2 - 3y^2)]\}.$ $[0]$
10. $3a^2b - \{2a(a^2 - 2b^2) - [3a^2(a + 2b) - a^2(9b + a)]\}.$ $[4ab^2]$
11. $\frac{1}{4}x^2(x - 2b) + \frac{1}{2}bx(x + 3b) - \frac{3}{4}b^2(2x - b).$ $\left[\frac{1}{4}x^3 + \frac{3}{4}b^3\right]$
12. $3pq^2 - [pq(3p + q) - 3p^2(p + q)] - p(3p^2 + 2q^2).$ $[0]$
13. $4x + (3y + z) - 2(2x - y + z) - 8(x - 4y - 4z).$ $[-8x - 37y + 31z]$
14. $a(a - b) - b(a - b) + 2ab - (a^2 - b^2) + a(a + b) - b(a + b).$ $[a^2 + b^2]$
15. $3x^3[4x^4 - 7x(9x^3 - 11x^2) + 59x^3(x - 1)] + 2(-3x^2)^3.$ $[0]$
16. $\left\{\left[\frac{4}{3}xy^3\left(-\frac{3}{5}ay + \frac{1}{6}yz^3 + \frac{1}{5}xt^3\right)\right]\left(-\frac{2}{3}abxy\right)\right\}(x^3y).$ $\left[\frac{8}{15}a^2bx^5y^6 - \frac{4}{27}abx^5y^6z^3 - \frac{8}{45}abx^6y^5t^3\right]$
17. $\left[(3m^3x^3)\left(\frac{1}{6}xy - \frac{1}{9}amy - \frac{3}{4}x\right)\right]\left(\frac{1}{5}xy^3\right).$ $\left[\frac{1}{10}m^3x^5y^4 - \frac{1}{15}am^4x^4y^4 - \frac{9}{20}m^3x^5y^3\right]$

Semplificare le seguenti espressioni:

21. $2ab^2(a^2 - 2ab - 3b^2) - ab(a^2b - 4ab^2 - 6b^3)$. [a^3b^2]
22. $-2x(3 - 5x) - 3x^2\left(1 - \frac{1}{3}x\right) + 2x\left(-x^2 + \frac{1}{2}x^3\right) + x^2(x - 8)$. [$-6x$]
23. $2xy\left(x + \frac{1}{2}y\right) + (x^3 - y^3) - (2x^2y + xy^2) - x^2(x - y) + y^3$. [x^2y]
24. $2xy^2(x^2 - 2xy - 3y^2) - xy(x^2y - 4xy^2 - 6y^3)$. [x^3y^2]
25. $2ab(9a - 2b) - 3b^2(a + b) - b(18a^2 - 3b^2) + 12ab^2$. [$5ab^2$]
26. $3x^2(5 - 7x + 6x^2) - 5x(6x^3 - 4x^4 - 7x^2) - x^3(5x + 2x^2 - 2)$. [$18x^5 - 17x^4 + 16x^3 + 15x^2$]
27. $x(x - y) - y(x - y) + 2xy - (a^2 - b^2) + a(a + b) - b(a + b)$. [$x^2 + y^2$]
28. $(2a + 3b)a - 2b(2a + 3b) - (8b^2 + ab) - 2a^2 + b(2a + 3b)$. [$-11b^2$]
29. $-\frac{2}{3}xy^2\left\{(2x - y)(-x^2) - \left[-\frac{1}{2}x(4x^2 - 2xy) + 3a(b - a) - 3ab\right]\right\}$. [$-2a^2xy^2$]
30. $6(ax + 3x^2 + 4x^3) - 3x^2(a + 9 + 13x) + 5x(a + 2x + 3x^2)$. [$-3ax^2 + x^2 + 11ax$]
31. $3x^3[4x^4 - 7x(9x^3 - 11x^2) + 59x^3(x - 1)] + 2(-3x^2)^3$. [0]
32. $x(x - y) - y(x - y) + 2xy - (a^2 - b^2) + a(a + b) - b(a + b)$. [$x^2 + y^2$]
33. $(2a + 3b)a - 2b(2a + 3b) - (8b^2 + ab) - 2a^2 + b(2a + 3b)$. [$-11b^2$]
34. $\left(\frac{1}{2}x^2y - \frac{2}{3}ax^3y^3\right)\left(-\frac{6}{5}\right) - \left[xy\left(\frac{2}{5}x - \frac{6}{5}ax^2y^2\right) + 2a(2a^2 - b) + 2ab + 2ax^3y^3\right]$. [$-4a^3 - x^2y$]
35. $-\frac{2}{3}xy^2\left\{(2x - y)(-x^2) - \left[-\frac{1}{2}x(4x^2 - 2xy) + 3a(b - a) - 3ab\right]\right\}$. [$-2a^2xy^2$]
36. $x^2y^2 - 2x\left\{\frac{3}{4}y + 2x\left[-3 - \frac{1}{2}y\left(3x - \frac{1}{2}y\right)\right] + 3x^2y\right\} + \frac{3}{2}xy$. [$12x^2$]

Semplificare le seguenti espressioni contenenti **prodotti fra polinomi:**

$$54. (x+a)(y+b); (2m+ab)(2ab-m). \quad [xy+bx+ay+ab; 3abm-2m^2+2a^2b^2]$$

$$55. (x^3-2x+1)(x^3-3x+2). \quad [x^6-5x^4+3x^3+6x^2-7x+2]$$

$$56. (2a+3b-c)(x+2a+c). \quad [2ax+3bx-cx+4a^2-c^2+6ab+3bc]$$

$$57. \left(\frac{1}{3}a-3x\right)\left(\frac{1}{9}a^2+ax+9x^2\right); (a+3b)(a^2-3ab+9b^2). \quad \left[\frac{1}{27}a^3-27x^3; a^3+27b^3\right]$$

$$58. (a-m)(a^5+a^4m+a^3m^2+a^2m^3+am^4+m^5). \quad [a^6-m^6]$$

$$59. (x-1)(x^4+x^3+x^2+x+1); (x+1)(x^4-x^3+x^2-x+1). \quad [x^5-1; x^5+1]$$

$$60. (a+b)(a^2+b^2)(a-b)(a^4+b^4)(a^8+b^8). \quad [a^{16}-b^{16}]$$

Semplificare le seguenti espressioni:

$$67. (2a+5b)(3a+4b) - (a+2b)(6a-10b) + 9ab. \quad [0]$$

$$68. (x+2y)(3x+y) - (3x+y)(2x-y) - 3x(2y-x). \quad [-y^2]$$

$$69. (x^2+x+1)(x^2-x+1) - (x^2-x-1) - (x^2+x-2) - x(5x-1). \quad [-1]$$

$$70. 4y^2 + (3x+2y)(4x-6y) - (2x-y)(6x+8y) + 20xy. \quad [0]$$

$$71. (2x-3y)(x+4y) - (3x-2y)(4x+6y) + 5x(2x+y). \quad [0]$$

$$72. (a+b+c)(a+b-c) - (a-b+c)(-a+b+c). \quad [2a^2+2b^2-2c^2]$$

$$73. (a+b-c)(a-b) - (a-b-c)(b-c) + (a-b+c)(c-a). \quad [0]$$

$$74. (a+b+c)(ab+bc+ca) - (a+b)(b+c)(c+a). \quad [abc]$$

$$75. a^2(b-c) - b^2(a-c) + c^2(a-b) - (a-b)(b-c)(a-c). \quad [0]$$

$$76. abc - (a+b)(b+c) - a[c-c(1-b)] + b(a+c). \quad [-ac-b^2]$$

$$77. (a - c)[(a - b) - c(b + c)] - b(a - b)(b + c) - (a^2 - b^2 - c^2)(a - b - c). \quad [-abc]$$

$$78. (x + 1) \left(-0,5x + \frac{1}{2} \right) 3x - 5x \left[\frac{1}{2}x + \left(\frac{1}{2}x + 1 \right) \left(-\frac{1}{3}x - 0, \bar{3} \right) + 0,5 \right]. \quad \left[-\frac{2}{3}x^3 + \frac{2}{3}x \right]$$

$$79. 6[2ab(a - 3b) - (a + b)(4a^2 - 2ab + b^2) + 5a(b^2 + 2a^2)] \left(a^3 + \frac{1}{6}b^3 \right). \quad [36a^6 - b^6]$$

$$80. \left(y + \frac{1}{2}x \right) \left[\frac{1}{4}y^2 + x - \frac{1}{2}y \left(4 + \frac{1}{2}y \right) \right] \left[\frac{1}{2}x(4x + 8y) - 4y(x - 2y) \right]. \quad [x^4 - 16y^4]$$

$$81. a(b - c) + b(c - a) + c(a - b) - \{ (a - b)(c - d) - [(c - b)(a - d) - (c - a)(b - d)] \}. \quad [0]$$

$$82. [a(b + c)(b + c - a) + b(a + c)(a + c - b) + c(a + b)(a + b - c)]x. \quad [6abcx]$$

$$83. [2x - x(x^2 - x + 1)](x^2 + x) - x[1 + x(1 + 2x)]. \quad [-x^5 - x]$$

$$84. \left[\left(x + \frac{1}{2}y \right) \left(\frac{2}{3}a + b \right) - \frac{1}{3}ay - bx \right] (6ax - 12by) + 5by(ax + by). \quad [4a^2x^2 - b^2y^2]$$

$$85. -xy \left[3xy \left(x^2 - 3xy - \frac{1}{3}y^2 \right) - (x^2 - xy)(y^2 + 3xy) \right] - (-xy)^3. \quad [8x^3y^3]$$

$$86. \left[\left(3m^2 - \frac{1}{2}n \right) (2x + 3) + nx - 9m^2 \right] (2m^2x - 2n) - m^2x(12m^2x - 15n). \quad [3n^2]$$

$$87. x^2 \left(\frac{1}{2}y^2 + x^2 \right) - \left[(x^2 + 2y^2) \left(-\frac{7}{4}xy \right) - \left(\frac{1}{4}y - x \right) (2x + 4y) \left(\frac{1}{2}x^2 + y^2 \right) \right] - b^2(b^2 + a^2). \quad [0]$$

$$88. b^2 \left\{ \left[-3ab \left(2a - \frac{1}{3}b \right) + 6a^2b \right] + b^2 \right\} (a + 2) - 3ab^3 \left(b + \frac{1}{3}ab \right). \quad [2b^4]$$

$$89. a^5 - 2a \left\{ 4a^3 - 5a^2 + 2a \left[\left(\frac{3}{2}a - 2 \right) \left(\frac{1}{3}a - 1 \right) \left(\frac{3}{4}a - \frac{1}{2} \right) - \frac{1}{24} (3a^3 + 3a^2 + 2a) \right] \right\} - (-2a)^2. \quad [0]$$