

## Scomposizione di polinomi

raccolgimento totale		
1	$abx^2 + 2ab^2x + a^2bx$	$abx(x + 2b + a)$
2	$4a^2x^2 - 6a^3x + 8a^2x^3$	$2a^2x(2x - 3a + 4x^2)$
3	$x^4y^2 + x^6y^4 - x^3y^3$	$x^3y^2(x + x^3y^2 - y)$
4	$15a^{10} - 20a^8 + 25a^6$	$5a^6(3a^4 - 4a^2 + 5)$
5	$b^2(3x - y) - b(3x - y)^2 - 3(3x - y)$	$(3x - y)[b^2 - b(3x - y) - 3]$
6	$(x - y)^2 + 2(x - y) - xy(x - y)$	$(x - y)(x - y + 2 - xy)$
7	$12x^2y^3 - 24x^3y^2 + 9x^2y^2$	$3x^2y^2(4y - 8x + 3)$
8	$8a^4t^3 - 12at^4 - 4a^3t^2$	$4at^2(2a^3t - 3t^2 - a^2)$

raccolgimento parziale		
9	$ay - 2by + a^2 - 2ab$	$(a - 2b)(a + y)$
10	$4a^2 - 2a + 6ab - 3b$	$(2a - 1)(2a + 3b)$
11	$2x^2 - 3ax + xy - 2bx + 3ab - by$	$(x - b)(2x - 3a + y)$
12	$2x(x - y)^2 - 4xy + 4y^2$	$2(x - y)[x(x - y) - 2y]$
13	$(a - 1)y + 1 - a$	$(a - 1)(y - 1)$
14	$(a + b)^2(a - b) - 4ax - 4bx + ab^2 + b^3$	$(a + b)(a^2 - 4x)$
15	$4x^2 + 3x + 4xy + 3y$	$(4x + 3)(x + y)$
16	$5a^2 - 7ab + 5a^2x - 7abx$	$a(5a - 7b)(x + 1)$
17	$nx + ny + 2my + 2m + n + 2mx$	$(n + 2m)(x + y + 1)$

differenza di due quadrati		
18	$x^6y^2 - 1$	$(x^3y + 1)(x^3y - 1)$
19	$a^4 - 4$	$(a^2 - 2)(a^2 + 2)$

## Scomposizione di polinomi

20	$x^4 - 1$	$(x^2 + 1)(x + 1)(x - 1)$
21	$\frac{9}{4}x^2 - \frac{1}{9}y^2$	$\left(\frac{3}{2}x - \frac{1}{3}y\right)\left(\frac{3}{2}x + \frac{1}{3}y\right)$
22	$(a - 1)^2 - b^2$	$(a - 1 - b)(a - 1 + b)$
23	$(a + b)^2 - (x - y)^2$	$(a + b - x + y)(a + b + x - y)$
24	$\frac{4n^2}{y^2} - \frac{z^2}{81}$	$\left(\frac{2n}{y} - \frac{z}{9}\right)\left(\frac{2n}{y} + \frac{z}{9}\right)$
25	$121e^2 - 289i^2$	$(11e - 17i)(11e + 17i)$

## sviluppo del quadrato di un binomio

26	$x^2 + 9 + 6x$	$(x + 3)^2$
27	$4a^2 + 9 - 12a$	$(2a - 3)^2$
28	$25a^4b^2 - 10a^2bc^2 + c^4$	$(5a^2b - c^2)^2$
29	$\frac{1}{4}x^2 + \frac{1}{3}xy + \frac{1}{9}y^2$	$\left(\frac{1}{2}x + \frac{1}{3}y\right)^2$
30	$(a - 1)^2 - 2(a - 1) + 1$	$(a - 2)^2$
31	$(a + b)^2 + 2(a + b)(x + y) + (x + y)^2$	$(a + b + x + y)^2$
32	$\frac{x^2}{4} - \frac{xy}{3} + \frac{y^2}{9}$	$\left(\frac{x}{2} - \frac{y}{3}\right)^2$
33	$16a^2b^2 + 40abc + 25c^2$	$(4ab + 5c)^2$

## sviluppo del quadrato di un trinomio

34	$a^2 + x^2 + 81 + 2ax + 18a + 18x$	$(a + x + 9)^2$
35	$a^2 + b^2 + 16 - 2ab - 8a + 8b$	$(a - b - 4)^2 = (b + 4 - a)^2$
36	$x^2 + 4y^2 + 9z^2 - 4xy + 6xz - 12yz$	$(x - 2y + 3z)^2 = (-x + 2y - 3z)^2$
37	$x^4 + 9 + 10x^2 + 4x^3 + 12x$	$(x^2 + 3 + 2x)^2$
38	$\frac{9}{16}x^2 + 3xy - \frac{3}{2}x^2y + 4y^2 - 4xy^2 + x^2y^2$	$\left(\frac{3}{4}x - xy + 2y\right)^2 = \left(-\frac{3}{4}x + xy - 2y\right)^2$

## Scomposizione di polinomi

39	$9n^2 + 16m^2 + 4t^2 + 24nm - 12nt - 16mt$	$(3n + 4m - 2t)^2$
40	$\frac{1}{x^2} + \frac{2}{xy} + \frac{1}{y^2} + \frac{2}{yz} + \frac{1}{z^2} + \frac{2}{xz}$	$\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right)^2$

## sviluppo del cubo di un binomio

41	$a^3 + 6a^2x + 12ax^2 + 8x^3$	$(a + 2x)^3$
42	$27x^3 - 27x^2y + 9xy^2 - y^3$	$(3x - y)^3$
43	$1 - x^6 - 3x^2 + 3x^4$	$(1 - x^2)^3$
44	$a^6b^3 - 6a^4b^2 + 12a^2b - 8$	$(a^2b - 2)^3$
45	$\frac{1}{27}x^6 + \frac{1}{3}x^4y + x^2y^2 + y^3$	$\left(\frac{1}{3}x^2 + y\right)^3$
46	$125a^9 + 150a^6b + 60a^3b^2 + 8b^3$	$(5a^3 + 2b)^3$
47	$27v^3 - 54v^2t + 36vt^2 - 8t^3$	$(3v - 2t)^3$
48	$\frac{1}{n^3} + \frac{3m}{n^2} + \frac{3m^2}{n} + m^3$	$\left(\frac{1}{n} + m\right)^3$

## riducendo prima a differenza di quadrati

49	$a^2 + 9 + 6a - (2x - y)^2$	$(a + 3 - 2x + y)(a + 3 + 2x - y)$
50	$a^2 + b^2 - c^2 + 2ab$	$(a + b - c)(a + b + c)$
51	$x^2 + y^2 - 2xy - y^4$	$(x - y + y^2)(x - y - y^2)$
52	$4a^2 - b^2 - c^2 + 2bc$	$(2a + b - c)(2a - b + c)$
53	$a^2 - 4b^2 - 9 + 12b$	$(a + 2b - 3)(a - 2b + 3)$
54	$a^6 - 4y^2 - 1 - 4y$	$(a^3 - 2y - 1)(a^3 + 2y + 1)$

## somma e differenza di cubi

55	$a^3 - b^3$	$(a - b)(a^2 + ab + b^2)$
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56	$x^3 + y^3$	$(x + y)(x^2 - xy + y^2)$
57	$a^6 - 1$	$(a^2 - 1)(a^4 + a^2 + 1)$
58	$a^6 + 27b^3$	$(a^2 + 3b)(a^4 - 3a^2b + 9b^2)$
59	$125 - y^3$	$(5 - y)(25 + 5y + y^2)$
60	$8 + a^9$	$(2 + a^3)(4 - 2a^3 + a^6)$
61	$64a^3b^3 - 125c^3$	$(4ab - 5c)(16a^2b^2 + 20ab + 25c^2)$
62	$1000u^3 + 729k^3$	$(10u + 9k)(100u^2 - 90uk + 81k^2)$

## trinomio di secondo grado

63	$x^2 - 2x - 15$	$(x - 5)(x + 3)$
64	$2a^2 + 7a + 3$	$(2a + 1)(a + 3)$
65	$5x^2 - 2xy - 16y^2$	$(5x + 8y)(x - 2y)$
66	$4a^2 - 11ab + 7b^2$	$(a - b)(4a - 7b)$
67	$x^4 + 4x^2 - 45$	$(x^2 - 5)(x^2 + 9)$
68	$3a^2 + a - 10$	$(3a - 5)(a + 2)$
69	$2t^2 + t - 3$	$(t - 1)(2t + 3)$
70	$3a^2 - 7a - 6$	$(a - 3)(3a + 2)$
71	$v^2 - 2vt - 15t^2$	$(v - 5t)(v + 3t)$
72	$3x^2 + 12x + 13$	<i>indecomponibile</i>
73	$4a^2 - 6ab + 2b^2$	$(2a - 2b)(2a - b)$
74	$x^2 - \frac{7}{12}xy - y^2$	$\left(\frac{1}{4}x - \frac{1}{3}y\right)(4x + 3y)$

regola di Ruffini		
75	$x^3 - 5x^2 - 4x + 20$	$(x - 5)(x - 2)(x + 2)$
76	$3a^3 + 2a^2 - 4a - 3$	$(a + 1)(3a^2 - a - 3)$
77	$4b^4 - 3b^2 + 5b - 6$	$(b - 1)(4b^3 + 4b^2 + b + 6)$
78	$x^4 - 2x^3 - 10x^2 + 4x + 16$	$(x + 2)(x^3 - 4x^2 - 2x + 8)$
79	$a^4 + 5a^3 + 5a^2 - 5a - 6$	$(a - 1)(a + 1)(a + 2)(a + 3)$
80	$3x^3 + 8x^2y + 9xy^2 + 10y^3$	$(x + 2y)(3x^2 + 2xy + 5y^2)$
81	$y^3 - 4y^2 + y + 6$	$(y + 1)(y - 2)(y - 3)$
82	$3x^3 - 8x^2 + 8x - 3$	$(x - 1)(3x^2 - 5x + 3)$
83	$a^4 - 7a^3 + 4a^2 + 5a - 2$	<i>indecomponibile</i>
84	$3y^3 - 6y^2 + y - 2$	$(3y^2 + 1)(y - 2)$

esercizi di riepilogo		
85	$a^6b^8 - 81$	$(a^3b^4 - 9)(a^3b^4 + 9)$
86	$x^2 + 6a - 2ax - 9$	$(x - 3)(x + 3 - 2a)$
87	$\frac{m^3}{8} + n^9$	$\left(\frac{m}{2} + n^3\right)\left(\frac{m^2}{4} - \frac{1}{2}mn^3 + n^6\right)$
88	$6a^4 + 5a^2b^2 - 6b^4$	$(3a^2 - 2b^2)(2a^2 + 3b^2)$
89	$a^2b^2 + x^2y^2 + 2abxy$	$(ab + xy)^2$
90	$(2x - 3)^3 - x(2x - 3)^2 + 3(2x - 3)^2$	$x(2x - 3)^2$
91	$2a^4 - 7a^3 + 15 - 17a^2 + 7a$	$(a - 1)(a + 1)(2a + 3)(a - 5)$
92	$x^{16} - 1$	$(x^8 + 1)(x^4 + 1)(x^2 + 1) \times (x + 1)(x - 1)$

93	$3xy + x^2y - 7xy^2$	$xy(3 + x - 7y)$
94	$2x^2 - 3x - 2$	$(2x + 1)(x - 2)$
95	$m^6 - n^6$	$(m - n)(m + n) \times$ $(m^2 - mn + n^2)(m^2 + mn + n^2)$
96	$25 - \frac{x^2}{9}$	$(5 - \frac{x}{3})(5 + \frac{x}{3})$
97	$2a^3b^3 - a^4 - a^2b^6$	$-a^2(a - b^3)^2$
98	$x^{10} + x^9 + x^8 + x^7$	$x^7(x + 1)(x^2 + 1)$
99	$m^2 - (n + bm)^2$	$(m - n - bm)(m + n + bm)$
100	$a^3 + 32a + 15a^2 - 48$	$(a - 1)(a + 4)(a + 12)$
101	$(x + y)^3 + 1$	$(x + y + 1) \times$ $[(x + y)^2 - (x + y) + 1]$
102	$12x^3 + 4xy - 6x^2 - 2y$	$2(2x - 1)(3x^2 + y)$
103	$25x^4 - 30x^2y + 9y^2$	$(5x^2 - 3y)^2$
104	$9a^3 + 18a^2 - a - 2$	$(a + 2)(3a + 1)(3a - 1)$
105	$b^3 - a^6$	$(b - a^2)(b^2 + a^2b + a^4)$
106	$2x^2 + xy - y^2$	$(2x - y)(x + y)$
107	$-a^2 + 2a - 1$	$-(a - 1)^2$
108	$m^4 + 17m^2 + 10m + 16 + 10m^3$	$(m + 2)(m + 8)(m^2 + 1)$
109	$a^2 + 3ab - 10b^2$	$(a - 2b)(a + 5b)$

**esercizi più impegnativi**

110	$a^2 - 1 + a^2x - x$	$(a - 1)(a + 1)(1 + x)$
111	$4a^2b^2 - (a^2 + b^2 - 4)^2$	$(2 - a + b)(2 + a - b) \times$ $(-2 + a + b)(2 + a + b)$

112	$a^2 - 4 + 3a(a - 2)$	$2(a - 2)(2a + 1)$
113	$2x^4 - 32$	$2(x^2 + 4)(x - 2)(x + 2)$
114	$a^3 - 8 + 5(a^2 + 2a + 4)$	$(a^2 + 2a + 4)(a + 3)$
115	$(x + 2y)^2 - 4y(x + 2y) + 4y^2$	$x^2$
116	$16 - x^2 + 2xy - y^2$	$(4 - x + y)(4 + x - y)$
117	$(x - 3)^2 - 4(x - 3)$	$(x - 3)(x - 7)$
118	$4a^2b^2 - (ab - a^2)^2$	$a^2(a + b)(3b - a)$
119	$x^3 + 9y^2 + x^2 + 9xy^2$	$(x + 1)(x^2 + 9y^2)$
120	$3x^6 - 192$	$3(x - 2)(x^2 + 2x + 4) \times$ $(x + 2)(x^2 - 2x + 4)$
121	$x^3 - 6x^2 - x + 30$	$(x - 5)(x - 3)(x + 2)$
122	$ax^3 - 3bx^3 + 3b - a$	$(a - 3b)(x - 1)(x^2 + x + 1)$
123	$(2x - 1)^2 - 9x^2$	$-(x + 1)(5x - 1)$
124	$a^2 + b^2 + 2ab - ax - bx$	$(a + b - x)(a + b)$
125	$5a^6 + 5a$	$5a(a + 1) \times$ $(a^4 - a^3 + a^2 - a + 1)$
126	$4z^3 - 7y^2z + 3y^3$	$(y - z)(2z + 3y)(2z - y)$
127	$x^6 - y^6 + 2x^2 - 2y^2$	$(x + y)(x - y) \times$ $(x^4 + x^2y^2 + y^4 + 2)$
128	$3x^4 + 6x^3 + 9x^2 + 18x$	$3x(x + 2)(x^2 + 3)$
129	$(a + 4b)^2 + 2(a + 4b)(a - b) + (a - b)^2$	$(2a + 3b)^2$
130	$2x^5 - 32$	$2(x^5 - 16)$
131	$y^3 - 3xy^2 + 5x^2y - 3x^3$	$(y - x)(y^2 - 2xy + 3x^2)$

132	$x^6 + 2x^3 + 1$	$(x + 1)^2(x^2 - x + 1)^2$
133	$x^5 - 6x^4 + 12x^3 - 8x^2$	$x^2(x - 2)^3$
134	$x^6 - y^6 + x^3 - y^3$	$(x - y)(x^2 + xy + y^2) \times$ $(x^3 + y^3 + 1)$
135	$3x(4 - x^2) - 2x + x^2$	$x(2 - x)(3x + 5)$
136	$4(a - 5b)^2 - a^2$	$(a - 10b)(3a - 10b)$
137	$a^2 - 4a + 4 + ab - 2b$	$(a - 2)(a - 2 + b)$
138	$x^2 - y^2 + ax^2 - 2axy + ay^2$	$(x - y)(x + y + ax - ay)$
139	$256 - (x - y)^4$	$(4 - x + y)(4 + x - y) \times$ $[16 + (x - y)^2]$
140	$(x + 2y - 1)^2 - 1$	$(x + 2y - 2)(x + 2y)$
141	$x^4 - y^4 + 3ax^2 - 3ay^2$	$(x + y)(x - y)(x^2 + y^2 + 3a)$
142	$a(a - 2b)(a - b) - 2b(a + 2b)(a - b)$	$(a - b)(a^2 - 4ab - 4b^2)$
143	$a^6 + 16a^3 + 64$	$(a + 2)^2(a^2 - 2a + 4)^2$
144	$a^2 + 4a - 21 + ax - 3x$	$(a - 3)(a + 7 + x)$
145	$x^5 - x - 2x^4 + 2$	$(x^2 + 1)(x + 1)(x - 1)(x - 2)$
146	$(a^2 - 9)^2 + a^2 - 6a + 9$	$(a - 3)^2[(a + 3)^2 + 1]$
147	$x^3 + 3x^2 - 6x - 8$	$(x + 1)(x - 2)(x + 4)$
148	$x^3 - 3x^2 + 3x - 1 + xy - y$	$(x - 1)[(x - 1)^2 + y]$
149	$27x^4 - \frac{xy^3}{8}$	$x \left(3x - \frac{y}{2}\right) \left(9x^2 + \frac{3}{2}xy + \frac{y^2}{4}\right)$
150	$2x^6 - 10x^4y^2 + 8x^2y^4$	$2x^2(x - y)(x - 2y)(x + y)(x + 2y)$