Operazioni con i polinomi

indice

Gli esercizi sono proposti in ordine di difficoltà crescente.
nota: in un file così lungo e complesso può accadere che sia presente un errore di diversa natura nonostante gli esercizi siano stati controllati più volte. Saremo grati di ricevere segnalazioni di eventuali refusi o suggerimenti di qualsiasi natura.

Operazioni con i polinomi

PASSED

1. somma algebrica di polinomi

1	$a+(1-a)$	1
2	$(1-a)+2a$	$1+a$
3	$x-(x-1)$	1
4	$a-(a+1-a^2)$	a^2-1
5	$(a+1)+(a-1)$	$2a$
6	$(a+1)-(a-1)$	2
7	$(x-1)-(x+1)$	-2
8	$-(a^2+b^2)-(-a^2-b^2)$	0
9	$(a^2-1)+(1-a-a^2)$	$-a$
10	$(x^2+y^2+1)-(1-x^2)$	$2x^2+y^2$
11	$(3-a+a^2)+(3+2a-2a^2)$	$-a^2+a+6$
12	$(3-a+a^2)-(3+2a-2a^2)$	$-3a+3a^2$
13	$-(3-a+a^2)+(3+2a-2a^2)$	$3a-3a^2$
14	$-(3-a+a^2)-(3+2a-2a^2)$	$-6-a+a^2$

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15	$\left(2x^3-\frac{8}{3}x^2+\frac{1}{4}x+1\right)-\left(\frac{1}{5}x^3-\frac{5}{2}x^2+x+1\right)$	$\frac{9}{5}x^3-\frac{1}{6}x^2-\frac{3}{4}x$
16	$(3x^2b^3+7x^2-b^2)-(+8x^2-4x^2b^3+b^2)$	$7x^2b^3-x^2-2b^2$
17	$\left(\frac{3}{4}mn-n^3+\frac{1}{4}an^3\right)-\left(\frac{1}{4}mn-\frac{1}{2}an^3\right)$	$\frac{1}{2}mn-n^3+\frac{3}{4}an^3$
18	$\left(\frac{1}{3}a^2+a-5\right)+\left(\frac{2}{3}a^2-a\right)-(a^2-3a+1)$	$3a-6$
19	$[2x-(a-b)]+(3a+b)-(2a+3b)$	$2x-b$
20	$-\frac{2}{3}a-\left\{-\left[\frac{1}{2}b-\left(2a-\frac{1}{6}\right)\right]+b-\frac{1}{3}a\right\}$	$\frac{1}{6}-\frac{7}{3}a-\frac{1}{2}b$
21	$(0,\bar{6}m^2-m)-(m^2-3m+1)-\left(\frac{1}{3}m^2+m-5\right)$	$4+m-\frac{2}{3}m^2$
22	$(x^2-x+1)-(3x^2+2)-(5-2x^2)$	$-x-6$
23	$[-(a^2b^2c+3ab^2c)+(7ab^2c+8a^2b^3c)+a^2b^2c]-3a^2b^3c+-(-ab^2c+5a^2bc)$	$5ab^2c-5a^2bc+5a^2b^3c$

2. prodotto di un polinomio per un monomio

24	$2(a+b)$	$2a+2b$
25	$a(x+1)$	$ax+a$
26	$b(b-1)$	b^2-b
27	$-x(x-x^2)$	x^3-x^2
28	$(a-x)3x$	$3ax-3x^2$

29	$b(a+b-c)$	$ab+b^2-bc$
30	$(2x^2+3ax-b^2)(-4ab)$	$-8abx^2-12a^2bx+4ab^3$
31	$(a^2-3x+2)3x$	$3a^2x-9x^2+6x$
32	$-3a^2x(ax-4x+2)$	$-3a^3x^2+12a^2x^2-6a^2x$
33	$2a(2a^2-4a-3)$	$4a^3-8a^2-6a$
34	$\frac{1}{3}a(x-3y+6z)$	$\frac{1}{3}ax-ay+2az$
35	$\frac{1}{2}b^2x^3(-2x+4b-6x^2+8b^2)$	$-b^2x^4+2b^3x^3-3b^2x^5+4b^4x^3$
36	$-0{,}5xy(xy+4x^2y+4xy^2-0{,}\bar{6}x^2y^2)$	$-\frac{1}{2}x^2y^2-2x^3y^2-2x^2y^3+\frac{1}{3}x^3y^3$
37	$3mn(0{,}\bar{6}m^2n+0{,}2mn-m^2n^2)$	$2m^3n^2+\frac{3}{5}m^2n^2-3m^3n^3$
38	$\left(-\frac{2}{3}m^2n+0{,}\bar{3}m^2n^2-\frac{2}{3}mn^2t^2\right)(3m^2n^2t^3)$	$-2m^4n^3t^3+m^4n^4t^3-2m^3n^4t^5$
39	$\left(-3xy+4xy^2-\frac{2}{3}x^2y\right)\left(-\frac{1}{2}xy\right)$	$\frac{3}{2}x^2y^2-2x^2y^3+\frac{1}{3}x^3y^2$
40	$2b^2x^3(0{,}5b+0{,}25x-0{,}1\bar{6}x^2-0{,}125b^2)$	$b^3x^3+\frac{1}{2}b^2x^4-\frac{1}{3}b^2x^5-\frac{1}{4}b^4x^3$
41	$3a(a-b)+b(2b+3a)-3(a^2-b^2)$	$5b^2$
42	$p(p+q+1)-q(p-1)-p(p+q)+q(p+1)$	$p+2q$

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43	$7a^2b^2\left(-\frac{4}{7}b+\frac{5}{7}a\right)+(-a^2b)(5ab-4b^2+8a^2)$	$-8a^4b$
44	$\left(mn+5n^2-\frac{1}{3}mn^3\right)(3m^2n)-\left(\frac{1}{5}m-n-mn\right)15m^2n^2$	$15m^3n^3-m^3n^4+30m^2n^3$
45	$a^2(2a-3b)5b-\frac{1}{2}(ab-4b^2)a^2-\left(-\frac{1}{2}a^3b\right)$	$10a^3b-13a^2b^2$
46	$\frac{x^2}{2}(x-y+1)-\frac{2}{3}x(-x^2+x)-x^2(y-3)-\frac{23}{6}x^2$	$\frac{7}{6}x^3-x^2-\frac{3}{2}x^2y$
47	$xy(x^2-y^3)-(2xy^2+x)x^2y+(x^2-2y)\left(-\frac{xy^3}{2}\right)$	$-\frac{5}{2}x^3y^3$
48	$\left[2(x^2-3xy)+\left(\frac{1}{2}x-3y\right)2x-(3x-6y)\frac{1}{3}x\right]\frac{1}{2}x$	x^3-5x^2y
49	$\left[\frac{1}{3}a^2\left(\frac{4}{3}a-b\right)-\frac{1}{4}a(a^2-2ab)\right]\left(-\frac{3}{4}ab\right)-b^2\left(\frac{1}{24}a^3-a^2b\right)+\frac{1}{3}ab\left(a^3+\frac{1}{2}a^2b\right)$	$\frac{3}{16}a^4b+a^2b^3$
50	$x^2-xy(y-z)-\frac{x}{2}(yz+x-6)-3x-\frac{1}{2}xyz$	$\frac{1}{2}x^2-xy^2$
51	$(2+x)\left\{-\left[2xy\left(\frac{1}{2}x-\frac{3}{4}y\right)\right]+x^2y\right\}^2-9x^2y^4\left(\frac{1}{4}x+\frac{1}{2}\right)$	0
52	$a\left\{a^3-\left[(-4a^2+5b^2+2ab)(-a)+\left(\frac{5}{2}b+a\right)2ab\right]\right\}$	$-3a^4$
53	$\left\{x^2-\left[3y\left(x-\frac{y}{9}\right)-\frac{2}{3}x\left(y-\frac{3}{4}x\right)\right]\right\}\left(-\frac{2}{3}x\right)-\frac{1}{9}x(-2xy+2y^2-3x^2)$	$\frac{16}{9}x^2y-\frac{4}{9}xy^2$
54	$a^2\left(a+\frac{1}{3}\right)+\left(-\frac{3}{5}a-\frac{3}{2}a^2+\frac{1}{5}a^3\right)\left(\frac{5}{9}a\right)+\frac{1}{3}\left(a+\frac{1}{9}a^4\right)-\frac{4}{27}a^4-2a\left(a^2+\frac{1}{6}\right)$	$-\frac{11}{6}a^3$
55	$\left[(-5a^2+2b^2)ab+\left(\frac{5}{2}a^2b-b^3\right)(2a)\right]^0$	*perde di significato*
56	$(y-x-2)(-y)+2(-2y)+(x-2y+3)\left(\frac{1}{2}x\right)+2y(1+y)-\frac{1}{4}x(2+2x)$	$x+y^2$

57	$(x^2+1)2x^2-3x^2(x^2-x+1)-(-x^3+x^2-x)x$	$2x^3$
58	$x^2y^2+\left[xy\left(\frac{x}{2}+\frac{3}{2}y+1\right)-x\left(xy+\frac{3}{2}y^2+y\right)\right]^2 xy-\frac{1}{4}x^5y^3$	x^2y^2

3. prodotto di polinomi

59	$(2-a)(a+3)$	$-a^2-a+6$
60	$(x+3)(x-4)$	x^2-x-12
61	$(2m-1)(m-2)$	$2m^2-5m+2$
62	$(a-2)(a+6)$	$a^2+4a-12$
63	$\left(a+\frac{1}{2}\right)(2b-6)$	$2ab-6a+b-3$
64	$(2a^2+b^3)(a^3+2b^2)$	$2a^5+4a^2b^2+a^3b^3+2b^5$
65	$\left(x-\frac{1}{3}\right)(3y-6)$	$3xy-6x-y+2$
66	$(a-2)(a+2)$	a^2-4
67	$(a+b+c)(a+b-c)$	$a^2+2ab+b^2-c^2$
68	$(x-y)(x^2+xy+y^2)$	x^3-y^3
69	$(a+b)(a^2-ab+b^2)$	a^3+b^3

70	$(5a-b+3c)(5a+b-3c)$	$25a^2-b^2+6bc-9c^2$
71	$(x+1)(x-2)(x+3)$	x^3+2x^2-5x-6
72	$(a+b)(a^2-ab+b^2)(a^3-b^3)$	a^6-b^6
73	$(1-a)(1+a+a^2)(1+a^3+a^6)$	$1-a^9$
74	$(2x-1)(2x+1)+(-2x-1)(2x+1)-2(-2x+1)$	-4
75	$(x-y)(1+x)+(y-1)(x-2y)-y(1-2y)$	x^2
76	$3x^2y(xy-1)+(xy-1)(xy+1)-x^2y^2(3x+1)+1$	$-3x^2y$
77	$(m+3)(m+2)(m+1)-(m-3)(m-2)(m-1)-6(m^2+2)$	$6m^2$
78	$(3b-a^2)(a^3-4b^3)-(3b-a^2)(a^3+2b^3)-6b(b^3+a^2b^2)$	$-24b^4$
79	$3x^2(3+x^2)-(x^2-1)(x^2-2)-2[(x^2+1)(x^2+2)-3]$	$6x^2$
80	$(1+x-x^3)(5+x^3)-(1-x^2)(1+x+x^2)(1-x+x^2)-4(1-x^3)-5x(1-x^3)$	$6x^4$
81	$2(3x+1)(2x-1)-2(6x+1)(x+2)+(-3x)^2-5(4x+1)$	$9x^2-48x-11$
82	$(3+m)(1-m)(m+2)+(m^2-2m+1)(m+3)$	$-3m^2-6m+9$
83	$5a(a^2x)-ax^2(-14a-9x)+(0,\bar{3}a+0{,}6x)(a+x)(-15ax)$	0

84	$(a+2)\left\{\left[6a^2b-3ab\left(2a-\frac{1}{3}b\right)+b^2\right]\right\}b^2-3ab^3\left(\frac{1}{3}ab+b\right)$	$2b^4$
85	$\left[\left(\frac{3}{2}ab^2-0{,}2a^2b\right)\left(2a+\frac{20}{3}b\right)-(10b^2-0{,}4a^2)ab+\frac{4}{3}a^2b^2\right]^2$	$9a^4b^4$

4. divisione di un polinomio per un monomio

86	$(6x^2-10x):2$	$3x^2-5x$
87	$(a^2+2a):a$	$a+2$
88	$(4x^3+6x^2):2x$	$2x^2+6x$
89	$(12a^4-15a^2):3a^2$	$4a^2-5$
90	$(20x^5+12x^3):4x^2$	$5x^3+3x$
91	$(-18a^6-24a^4):(-6a^2)$	$3a^4+4a^2$
92	$(3x^3-2x^2-x):(x)$	$3x^2-2x-1$
93	$(a^2b-2ab^2-3a^2b^2):(ab)$	$a-2b-3ab$
94	$(2a^2b-4ab^2-8a^2b^2):(2ab)$	$a-2b-4ab$
95	$(x^2y-2xy^2-3x^2y^2):(2xy)$	$\frac{1}{2}x-y-\frac{3}{2}xy$
96	$(12a^4y^5-4a^3y^2+8ay^4):(-4ay^2)$	$-3a^3y^3+a^2-2y^2$
97	$(8x^2y^3-6xy^2+4xy):(-2xy)$	$-4xy^2+3y-2$

98	$\left(\frac{6}{5}m^2-\frac{7}{3}m^3+4m^5-\frac{1}{2}m^6\right):\left(\frac{3}{2}m^2\right)$	$-\frac{1}{3}m^4+\frac{8}{3}m^3-\frac{14}{9}m\frac{4}{5}$
99	$\left(\frac{3}{2}p^6q-6p^5q-4p^3pq^4+\frac{5}{6}p^5q^2-\frac{3}{8}p^3q^3\right):\left(\frac{1}{4}p^3q\right)$	$6p^3-24p^2-16pq^3+\frac{10}{3}p^2q-\frac{3}{2}q^2$
100	$[(2x+z^2)(x^3z-z^2):z+z^3]:x-2x(x^3+z)-z(x^2z-2-2x)$	$2x^3-2x^4$
101	$\{(x+y)[(x+y)+(x-y)]-2xy\}:[(-2)(-x)^2]$	-1
102	$[(1-a)(1+a+a^2)(1+a^3)-1]:(-a)^5$	a
103	$\left\{2a^4\left[b\left(\frac{1}{8}b+a\right)+16a\left(\frac{1}{8}a-\frac{1}{16}b\right)\right]:a^2+a^2\left(a^2-\frac{1}{4}b^2\right)\right\}:(-5a^4)$	-1
104	$\left\{\left[\left(2m^2n^3-\frac{1}{4}m^5\right)(-8m)+2(1+2mn)(1-2mn+4m^2n^2)\right]:2\right\}:\frac{1}{2}$	$2m^6+2$

5. esercizi di riepilogo

105	$\left[2\left(3+x+\frac{1}{2}y\right)(x+3y-4)-\left(y+\frac{14}{3}\right)3y+2x(1-x)-4\right]:7$	$xy-4$
106	$\left[4(2a-b)\left(a-\frac{1}{3}b\right)+2(b-2a+1)\left(2a-\frac{2}{3}b-1\right)+2\left(\frac{5}{3}b-4a+1\right)\right]^3-4$	-4
107	$(m^2+n^2)\left[(1{,}5m-0{,}\bar{6}n)(0{,}\bar{6}m+1{,}5n)-1{,}80\bar{5}mn\right]-(-m^2)^2$	$-n^4$
108	$\frac{a}{2}\left(\frac{a}{3}+\frac{b}{2}\right)-\frac{2}{3}b\left(\frac{a}{4}+\frac{3}{2}a\right)-\left(\frac{1}{3}a^2-\frac{2}{3}b^2-\frac{11}{6}ab\right)\cdot\frac{1}{2}$	$\frac{1}{3}b^2$
109	$\left\{\left[\left(\frac{1}{2}x+y\right)\left(\frac{y}{3}-x\right)2+\frac{4}{3}xy\right]\left(\frac{2}{3}y^2+x^2\right)+\left(\frac{5}{9}y^4+x^4+\frac{1}{3}x^3y\right)\right\}:2(-y)^3$	$\frac{1}{9}x-\frac{1}{2}y$
110	$\left\{\left[\left(x+\frac{1}{2}y\right)\left(b+\frac{2}{3}a\right)-bx-\frac{1}{3}ay\right](ax-2by)6+5by(ax+by)\right\}:\left(-\frac{1}{2}\right)^2$	$16a^2x^2-4b^2y^2$
111	$2\left(a^3+\frac{1}{4}\right)\left(\frac{1}{16}-a^3\right)+\left[\left(a-\frac{1}{2}\right)\left(a^4+\frac{1}{2}a^3+\frac{1}{4}a^2\right)\left(a^3+\frac{1}{8}\right)\right]:\left(\frac{1}{2}a^2\right)$	$-\frac{3}{8}a^3$

112	$\left[\left(-\frac{2}{3}ax\right)^2+\frac{1}{2}ax\left(\frac{4}{3}a+\frac{5}{2}x\right)+a\left(\frac{2}{3}ax-\frac{5}{4}x^2\right)\right]:(-ax)$	$-\frac{4}{9}ax-\frac{4}{3}$
113	$[x(x-2y)-2x(y-2z)+x^2](2y-1)-(y-1)(x-3y+2z)\cdot 2x$	$2x^2y-2xy^2+4xyz-2xy$
114	$\{[(m+2)(m-1)+2](m^2+m-1)+m\}\left(-\frac{1}{2}m\right)^2-\left(-\frac{1}{2}m^3\right)^2$	$\frac{1}{2}m^5$
115	$\left[\left(\frac{1}{2}x+\frac{2}{3}y^2\right)(6x-18y^2)-4\left(x^2-\frac{39}{16}y^4\right)+\left(x+\frac{9}{2}y^2\right)\left(x+\frac{1}{2}y^2\right)\right]:xy$	0