

Scheda di Allenamento: Scomposizione di Polinomi

Tecniche fondamentali e strategie di calcolo

1. Raccoglimento totale

Parte Base 1. Scomponi i seguenti polinomi ricercando il M.C.D. tra i termini (raccoglimento totale):

1. ■□□ $3x + 3y$ $[3(x + y)]$
2. ■□□ $a^2 + a$ $[a(a + 1)]$
3. ■□□ $5x^2 - 10x$ $[5x(x - 2)]$
4. ■□□ $4ab + 6ac$ $[2a(2b + 3c)]$
5. ■□□ $x^3 + x^2 + x$ $[x(x^2 + x + 1)]$
6. ■□□ $12a^2b - 18ab^2$ $[6ab(2a - 3b)]$
7. ■□□ $7x^2y - 14xy^2 + 7xy$ $[7xy(x - 2y + 1)]$
8. ■□□ $2a + 4b - 8c$ $[2(a + 2b - 4c)]$
9. ■□□ $x^2y^2 + xy$ $[xy(xy + 1)]$
10. ■□□ $15a^3 - 5a^2$ $[5a^2(3a - 1)]$
11. ■□□ $3ax - 6a^2$ $[3a(x - 2a)]$
12. ■□□ $\frac{1}{4}x^2 + \frac{3}{4}x$ $[\frac{1}{4}x(x + 3)]$
13. ■■□ $4x^3y - 2x^2y^2 + 6x^2y$ $[2x^2y(2x - y + 3)]$
14. ■■□ $-5a^2 - 15a - 20$ $[-5(a^2 + 3a + 4)]$
15. ■■□ $y^5 + y^8 + y^6$ $[y^5(1 + y^3 + y)]$
16. ■■□ $\frac{2}{5}ab^2 - \frac{4}{5}a^2b$ $[\frac{2}{5}ab(b - 2a)]$
17. ■■□ $8x^2y^3 + 4x^3y^2 - 2x^2y^2$ $[2x^2y^2(4y + 2x - 1)]$
18. ■■■ $\frac{3}{2}a^2b - \frac{9}{4}ab^2 + \frac{3}{4}ab$ $[\frac{3}{4}ab(2a - 3b + 1)]$
19. ■■■ $12a^4b^2 + 18a^3b^3 - 6a^2b^2$ $[6a^2b^2(2a^2 + 3ab - 1)]$
20. ■■■ $\frac{1}{9}y^3 - 3y^2$ $[\frac{1}{9}y^2(y - 27)]$
21. ■■■ $\frac{3}{4}a^3b^2c - \frac{9}{8}a^2b^3c^2 + \frac{3}{2}a^2b^2c$ $[\frac{3}{8}a^2b^2c(2a - 3bc + 4)]$

22. ■■■■ $\frac{10}{3}a^3b^2 - \frac{5}{6}a^2b^3 + \frac{15}{2}a^4b$ $[\frac{5}{6}a^2b(4ab - b^2 + 9a^2)]$
23. ■■■■ $\frac{4}{9}x^{18} - \frac{2}{3}x^6 + x^3$ $[\frac{1}{9}x^3(4x^{15} - 6x^3 + 9)]$
24. ■■■■ $18a^3y - 4a^4y^3 + 10a^5y^2$ $[2a^3y(9 - 2ay^2 + 5a^2y)]$
25. ■■■■ $\frac{5}{2}a^2b - \frac{15}{4}ab^2 + \frac{3}{4}ab$ $[\frac{1}{4}ab(10a - 15b + 3)]$
26. ■■■■ $-3a^5 + 12a^3b - 6a^2$ $[-3a^2(a^3 - 4ab + 2)]$
27. ■■■■ $12a^2b^3 + 30a^3b + 6ab$ $[6ab(2ab^2 + 5a^2 + 1)]$
28. ■■■■ $\frac{1}{3}x^2y - \frac{1}{9}x^3y^2$ $[\frac{1}{9}x^2y(3 - xy)]$
29. ■■■■ $4x^2y^5 - 12xy^6 - 6xy^5$ $[2xy^5(2x - 6y - 3)]$
30. ■■■■ $\frac{1}{2}a^2bc - \frac{1}{4}a^4bc + \frac{1}{8}a^3b^3$ $[\frac{1}{8}a^2b(4c - 2a^2c + ab^2)]$

Parte Avanzata 1. Scomponi i seguenti polinomi raccogliendo il fattore comune (anche binomio), prestando attenzione ai cambiamenti di segno e alle proprietà delle potenze:

31. ■■■■ $a(x + y) + b(x + y)$ $[(x + y)(a + b)]$
32. ■■■■ $x(a + b) - (a + b)$ $[(a + b)(x - 1)]$
33. ■■■■ $x(a - 1) - y(1 - a)$ $[(a - 1)(x + y)]$
34. ■■■■ $3(a - 2x) - 2y(2x - a)$ $[(a - 2x)(3 + 2y)]$
35. ■■■■ $4x^2(x + 1) - 8x(x + 1)^2$ $[4x(x + 1)(-x - 2)]$
36. ■■■■ $(a + 1)(a + 2) + (-a - 1)(a + 3)$ $[-(a + 1)]$
37. ■■■■ $2(x + y)(a + b) + \frac{1}{2}(x + y)$ $[(x + y)(2a + 2b + \frac{1}{2})]$
38. ■■■■ $a(a - 2) - ab(2 - a)$ $[a(a - 2)(1 + b)]$
39. ■■■■ $5(x + 2)^2 - 10(x + 2)$ $[5x(x + 2)]$
40. ■■■■ $(a - b)^2 + 3a(b - a)$ $[-(a - b)(2a + b)]$
41. ■■■■ $x^{n+1} + x^n$ $[x^n(x + 1)]$
42. ■■■■ $3a^{2n} - 6a^n$ $[3a^n(a^n - 2)]$
43. ■■■■ $x^{n+2} - 5x^{n+1} + x^n$ $[x^n(x^2 - 5x + 1)]$
44. ■■■■ $\frac{1}{2}a^nb - \frac{1}{4}a^{n+1}$ $[\frac{1}{4}a^n(2b - a)]$
45. ■■■■ $y^{3n} + y^{2n} - y^n$ $[y^n(y^{2n} + y^n - 1)]$
46. ■■■■ $4x^{n+1}y^n - 8x^n y^{n+1}$ $[4x^n y^n(x - 2y)]$
47. ■■■■ $a^n(x - 1) - a^{n+1}(x - 1)$ $[a^n(x - 1)(1 - a)]$

48. ■■■ $x^{n+1}(a-b) - x^n(b-a)$ $[x^n(a-b)(x+1)]$
49. ■■■ $\frac{2}{3}x^{n+3} - \frac{4}{9}x^{n+1}$ $[\frac{2}{9}x^{n+1}(3x^2-2)]$
50. ■■■ $a^{n+1}b^n - a^n b^{n+1} + a^n b^n$ $[a^n b^n(a-b+1)]$
51. ■■■ $x^{2n+1} - x^{n+1} + x^n$ $[x^n(x^{n+1} - x + 1)]$
52. ■■■ $a^n b^{m+1} - a^{n+1} b^m + a^n b^m$ $[a^n b^m(b-a+1)]$
53. ■■■ $12x^{3n} - 8x^{2n} + 4x^n$ $[4x^n(3x^{2n} - 2x^n + 1)]$
54. ■■■ $(x-y)^{n+2} - (x-y)^{n+1}$ $[(x-y)^{n+1}(x-y-1)]$
55. ■■■ $\frac{3}{5}a^{2n}b^n - \frac{9}{10}a^n b^{2n}$ $[\frac{3}{10}a^n b^n(2a^n - 3b^n)]$
56. ■■■ $x^n y^m(a+b) - x^{n-1} y^{m+1}(a+b)$ $[x^{n-1} y^m(a+b)(x-y)]$
57. ■■■ $2x^{n+2} y^m - 4x^{n+1} y^{m+1} + 6x^n y^{m+2}$ $[2x^n y^m(x^2 - 2xy + 3y^2)]$
58. ■■■ $3(a+b)^{2n} - 6(a+b)^n$ $[3(a+b)^n((a+b)^n - 2)]$
59. ■■■ $\frac{1}{2}x^{2n} - \frac{1}{4}x^n + \frac{1}{8}x^{3n}$ $[\frac{1}{8}x^n(4x^n - 2 + x^{2n})]$
60. ■■■ $a^n b^m(x+y)^2 - a^{n+1} b^{m-1}(x+y)$ $[a^n b^{m-1}(x+y)(b(x+y) - a)]$

2. Raccoglimento parziale

Parte Base 2. Scomponi i seguenti polinomi mediante il metodo del raccoglimento parziale:

61. ■□□ $5ay - y - 5a + 1$ $[(5a-1)(y-1)]$
62. ■□□ $x^2 y^2 + 1 + x^2 + y^2$ $[(x^2+1)(y^2+1)]$
63. ■□□ $5ax + 2ay + 5bx + 2by$ $[(a+b)(5x+2y)]$
64. ■□□ $3a^2 b - 2a + 12ab - 8$ $[(3ab-2)(a+4)]$
65. ■□□ $x^3 + 12x^2 + 6x + 72$ $[(x+12)(x^2+6)]$
66. ■□□ $9ax - 6a + 12bx - 8b$ $[(3x-2)(3a+4b)]$
67. ■□□ $3bx + x - 6b^2 - 2b$ $[(3b+1)(x-2b)]$
68. ■□□ $x^3 y^2 + 2x^3 y - ay - 2a$ $[(y+2)(x^3 y - a)]$
69. ■□□ $y^4 - y^3 - 2y + 2$ $[(y-1)(y^3-2)]$
70. ■□□ $ax + 6x + ay + 6y$ $[(a+6)(x+y)]$
71. ■□□ $ax + ay - 3x - 3y$ $[(a-3)(x+y)]$
72. ■□□ $2a^3 - a^2 + 4a - 2$ $[(2a-1)(a^2+2)]$

73. ■□□ $x^2 + xy - 3x - 3y$ $[(x + y)(x - 3)]$
74. ■□□ $4ab + 4b - a - 1$ $[(a + 1)(4b - 1)]$
75. ■□□ $x^3 - 2x^2 + 3x - 6$ $[(x^2 + 3)(x - 2)]$
76. ■□□ $ab - 3a - 2b + 6$ $[(a - 2)(b - 3)]$
77. ■□□ $2x^2 - 4x + xy - 2y$ $[(x - 2)(2x + y)]$
78. ■□□ $6a^2 + 4ab - 9a - 6b$ $[(3a + 2b)(2a - 3)]$
79. ■□□ $x^2 - ax + bx - ab$ $[(x - a)(x + b)]$
80. ■□□ $x^2y + xy - x - 1$ $[(xy - 1)(x + 1)]$
81. ■□□ $2ax + 3ay + 2bx + 3by$ $[(a + b)(2x + 3y)]$
82. ■□□ $x^3 + x^2 + x + 1$ $[(x^2 + 1)(x + 1)]$
83. ■□□ $ab - ac - b + c$ $[(a - 1)(b - c)]$
84. ■□□ $x^2y - x^2 - y + 1$ $[(x^2 - 1)(y - 1)]$
85. ■□□ $10ax - 5ay + 2bx - by$ $[(5a + b)(2x - y)]$
86. ■□□ $a^2b + a^2c + b + c$ $[(a^2 + 1)(b + c)]$
87. ■□□ $2x^3 - 6x^2 + x - 3$ $[(2x^2 + 1)(x - 3)]$
88. ■□□ $ax + 2a - bx - 2b$ $[(a - b)(x + 2)]$
89. ■□□ $3x^2 - 3xy - x + y$ $[(3x - 1)(x - y)]$
90. ■□□ $a^2b^2 - a^2 - b^2 + 1$ $[(a^2 - 1)(b^2 - 1)]$

Parte Avanzata 2. Scomponi i seguenti polinomi utilizzando il raccoglimento parziale. In alcuni casi sarà necessario cambiare segno a un gruppo di termini o gestire esponenti letterali ($n \in \mathbb{N}$):

91. ■■■ $ax + ay + az - bx - by - bz$ $[(a - b)(x + y + z)]$
92. ■■■ $x^{n+1} + x^n + x + 1$ $[(x^n + 1)(x + 1)]$
93. ■■■ $a^{n+2} - a^n - a^2 + 1$ $[(a^n - 1)(a - 1)(a + 1)]$
94. ■■■ $3x(a - b) - y(b - a) + a - b$ $[(a - b)(3x + y + 1)]$
95. ■■■ $(x + y)^2 - ax - ay$ $[(x + y)(x + y - a)]$
96. ■■■ $x^n y^n - x^n - y^n + 1$ $[(x^n - 1)(y^n - 1)]$
97. ■■■ $2a^{n+1} - 2a^n - 3a + 3$ $[(2a^n - 3)(a - 1)]$
98. ■■■ $ax^n + ay^n - x^n - y^n$ $[(a - 1)(x^n + y^n)]$

99. ■■■ $a(x+y) - b(x+y) - x - y$ $[(x+y)(a-b-1)]$
100. ■■■ $x^{2n} + x^n y^n + x^n + y^n$ $[(x^n+1)(x^n+y^n)]$
101. ■■■ $x^{n+2} + 2x^n - 3x^2 - 6$ $[(x^n-3)(x^2+2)]$
102. ■■■ $a^{2n} + a^n b^n + a^n c^n + b^n c^n$ $[(a^n+b^n)(a^n+c^n)]$
103. ■■■ $2x(a-b)^n - y(a-b)^n + 2x - y$ $[(2x-y)((a-b)^n+1)]$
104. ■■■ $a^{n+m} - a^n - a^m + 1$ $[(a^n-1)(a^m-1)]$
105. ■■■ $x^n(y+1) - y - 1$ $[(y+1)(x^n-1)]$
106. ■■■ $3a^{n+1} - 3a^n b + a - b$ $[(a-b)(3a^n+1)]$
107. ■■■ $x^n y^m + x^n z^m - y^m - z^m$ $[(x^n-1)(y^m+z^m)]$
108. ■■■ $(a+b)^{n+1} - c(a+b)^n + a + b - c$ $[(a+b-c)((a+b)^n+1)]$
109. ■■■ $a^{2n} b^n - a^n b^{2n} + a^n - b^n$ $[(a^n-b^n)(a^n b^n+1)]$
110. ■■■ $x^{n+1} y - x^n y^2 - x + y$ $[(x-y)(x^n y-1)]$

3. Trinomio speciale (Somma e Prodotto)

Parte Base 3. Scomponi i seguenti trinomi di secondo grado cercando due numeri la cui somma sia il coefficiente di primo grado e il cui prodotto sia il termine noto:

111. ■□□ $x^2 + 5x + 6$ $[(x+2)(x+3)]$
112. ■□□ $a^2 + 8a + 15$ $[(a+3)(a+5)]$
113. ■□□ $x^2 - 7x + 10$ $[(x-2)(x-5)]$
114. ■□□ $a^2 + 4a - 21$ $[(a+7)(a-3)]$
115. ■□□ $y^2 + y - 20$ $[(y+5)(y-4)]$
116. ■□□ $x^2 - 14x + 48$ $[(x-6)(x-8)]$
117. ■□□ $b^2 + 2b - 8$ $[(b+4)(b-2)]$
118. ■□□ $x^2 + 13x + 22$ $[(x+11)(x+2)]$
119. ■□□ $a^2 - a - 56$ $[(a-8)(a+7)]$
120. ■□□ $y^2 + 3y - 40$ $[(y+8)(y-5)]$
121. ■□□ $x^2 + 7x + 12$ $[(x+3)(x+4)]$
122. ■□□ $x^2 + 10x + 24$ $[(x+4)(x+6)]$
123. ■□□ $x^2 - 9x + 14$ $[(x-2)(x-7)]$

124. ■□□ $x^2 - 11x + 28$ $[(x - 4)(x - 7)]$
 125. ■□□ $a^2 + a - 30$ $[(a + 6)(a - 5)]$
 126. ■□□ $a^2 - 2a - 24$ $[(a - 6)(a + 4)]$
 127. ■□□ $y^2 + 4y - 5$ $[(y + 5)(y - 1)]$
 128. ■□□ $y^2 - 6y - 16$ $[(y - 8)(y + 2)]$
 129. ■□□ $b^2 + 9b + 18$ $[(b + 3)(b + 6)]$
 130. ■□□ $b^2 - 4b - 21$ $[(b - 7)(b + 3)]$

Parte Avanzata 3. Scomponi i seguenti trinomi prestando attenzione alle potenze e alla presenza di più variabili. Dove necessario, utilizza la scomposizione del termine centrale:

131. ■■□ $x^4 + 12x^2 + 11$ $[(x^2 + 11)(x^2 + 1)]$
 132. ■■□ $a^4 - 5a^2 - 14$ $[(a^2 - 7)(a^2 + 2)]$
 133. ■■□ $y^{10} - 5y^5 + 6$ $[(y^5 - 3)(y^5 - 2)]$
 134. ■■□ $x^6 + 5x^3 - 14$ $[(x^3 + 7)(x^3 - 2)]$
 135. ■■□ $x^2 - 6ax - 16a^2$ $[(x - 8a)(x + 2a)]$
 136. ■■□ $x^2 + 6bx + 8b^2$ $[(x + 4b)(x + 2b)]$
 137. ■■■ $2x^4 + 7x^2 + 3$ $[(2x^2 + 1)(x^2 + 3)]$
 138. ■■■ $4x^4 + 12x^2 + 5$ $[(2x^2 + 5)(2x^2 + 1)]$
 139. ■■■ $3x^4 + x^2 - 2$ $[(3x^2 - 2)(x^2 + 1)]$
 140. ■■■ $9x^6 - 3x^3 - 2$ $[(3x^3 - 2)(3x^3 + 1)]$
 141. ■■■ $x^{2n} + 5x^n + 4$ $[(x^n + 4)(x^n + 1)]$
 142. ■■■ $x^2 + 5xy + 6y^2$ $[(x + 2y)(x + 3y)]$
 143. ■■■ $a^2 - 7ab + 12b^2$ $[(a - 3b)(a - 4b)]$
 144. ■■■ $x^{2n} + 3x^n y^n - 10y^{2n}$ $[(x^n + 5y^n)(x^n - 2y^n)]$
 145. ■■■ $2a^2 + 5ab + 2b^2$ $[(2a + b)(a + 2b)]$
 146. ■■■ $x^2 - 2xy - 15y^2$ $[(x - 5y)(x + 3y)]$
 147. ■■■ $x^{2n} - 8x^n + 15$ $[(x^n - 3)(x^n - 5)]$
 148. ■■■ $a^{2n} + 3a^n - 28$ $[(a^n + 7)(a^n - 4)]$
 149. ■■■ $y^{6n} - 10y^{3n} + 21$ $[(y^{3n} - 7)(y^{3n} - 3)]$

150. ■■■	$2x^{2n} + 7x^n + 3$	$[(2x^n + 1)(x^n + 3)]$
151. ■■■	$x^{2n} + 2ax^n - 3a^2$	$[(x^n + 3a)(x^n - a)]$
152. ■■■	$3x^{2n} - 2x^n - 1$	$[(3x^n + 1)(x^n - 1)]$
153. ■■■	$x^{2n+2} + 5x^{n+1} + 6$	$[(x^{n+1} + 2)(x^{n+1} + 3)]$
154. ■■■	$4x^{2n} - 12x^n + 5$	$[(2x^n - 5)(2x^n - 1)]$
155. ■■■	$a^{2n} - (1 + m)a^n + m$	$[(a^n - m)(a^n - 1)]$

4. Differenza di quadrati

Parte Base 4. Scomponi i seguenti binomi riconoscendoli come differenza di due quadrati:

156. ■□□	$x^2 - 1$	$[(x - 1)(x + 1)]$
157. ■□□	$a^2 - 4$	$[(a - 2)(a + 2)]$
158. ■□□	$9x^2 - 16$	$[(3x - 4)(3x + 4)]$
159. ■□□	$25 - y^2$	$[(5 - y)(5 + y)]$
160. ■□□	$4a^2 - b^2$	$[(2a - b)(2a + b)]$
161. ■□□	$x^2 - \frac{1}{4}$	$[(x - \frac{1}{2})(x + \frac{1}{2})]$
162. ■□□	$\frac{4}{9}a^2 - 1$	$[(\frac{2}{3}a - 1)(\frac{2}{3}a + 1)]$
163. ■□□	$100x^2 - 49y^2$	$[(10x - 7y)(10x + 7y)]$
164. ■□□	$x^4 - 1$	$[(x^2 - 1)(x^2 + 1)]$
165. ■□□	$1 - 64b^2$	$[(1 - 8b)(1 + 8b)]$
166. ■□□	$4x^2 - 1$	$[(2x - 1)(2x + 1)]$
167. ■□□	$a^2 - 25b^2$	$[(a - 5b)(a + 5b)]$
168. ■□□	$16y^2 - 49$	$[(4y - 7)(4y + 7)]$
169. ■□□	$x^2y^2 - 1$	$[(xy - 1)(xy + 1)]$
170. ■□□	$81a^2 - 64b^2$	$[(9a - 8b)(9a + 8b)]$
171. ■□□	$\frac{1}{9}x^2 - 1$	$[(\frac{1}{3}x - 1)(\frac{1}{3}x + 1)]$
172. ■□□	$\frac{1}{16} - a^2$	$[(\frac{1}{4} - a)(\frac{1}{4} + a)]$
173. ■□□	$4x^2 - \frac{9}{25}$	$[(2x - \frac{3}{5})(2x + \frac{3}{5})]$
174. ■□□	$121x^2 - 144y^2$	$[(11x - 12y)(11x + 12y)]$

$$175. \blacksquare\square\square \quad x^6 - y^4 \qquad [(x^3 - y^2)(x^3 + y^2)]$$

Parte Avanzata 4. Scomponi i seguenti binomi riconoscendo la differenza di due quadrati, trattando eventualmente intere parentesi o potenze letterali come termini singoli:

$$176. \blacksquare\blacksquare\blacksquare \quad (x + y)^2 - z^2 \qquad [(x + y - z)(x + y + z)]$$

$$177. \blacksquare\blacksquare\blacksquare \quad a^2 - (b + c)^2 \qquad [(a - b - c)(a + b + c)]$$

$$178. \blacksquare\blacksquare\blacksquare \quad x^{2n} - 1 \qquad [(x^n - 1)(x^n + 1)]$$

$$179. \blacksquare\blacksquare\blacksquare \quad (2a - 1)^2 - (a + 3)^2 \qquad [(a - 4)(3a + 2)]$$

$$180. \blacksquare\blacksquare\blacksquare \quad x^6 - 4(x^3 + 2)^2 \qquad [(-x^3 - 4)(3x^3 + 4)]$$

$$181. \blacksquare\blacksquare\blacksquare \quad 25a^{2n} - 16b^{4n} \qquad [(5a^n - 4b^{2n})(5a^n + 4b^{2n})]$$

$$182. \blacksquare\blacksquare\blacksquare \quad \frac{4}{9}(x - 1)^2 - \frac{1}{25} \qquad [(\frac{2}{3}x - \frac{13}{15})(\frac{2}{3}x - \frac{7}{15})]$$

$$183. \blacksquare\blacksquare\blacksquare \quad x^2y^2 - (x + y)^2 \qquad [(xy - x - y)(xy + x + y)]$$

$$184. \blacksquare\blacksquare\blacksquare \quad 9(a - b)^2 - 16(a + b)^2 \qquad [(-a - 7b)(7a + b)]$$

$$185. \blacksquare\blacksquare\blacksquare \quad (x^2 + 4)^2 - 16x^2 \qquad [(x - 2)^2(x + 2)^2]$$

$$186. \blacksquare\blacksquare\blacksquare \quad 4x^2 - (x + 1)^2 \qquad [(x - 1)(3x + 1)]$$

$$187. \blacksquare\blacksquare\blacksquare \quad (a - 2)^2 - 16 \qquad [(a - 6)(a + 2)]$$

$$188. \blacksquare\blacksquare\blacksquare \quad (x + 1)^2 - (x - 1)^2 \qquad [4x]$$

$$189. \blacksquare\blacksquare\blacksquare \quad 25a^2 - (3a - 1)^2 \qquad [(2a + 1)(8a - 1)]$$

$$190. \blacksquare\blacksquare\blacksquare \quad x^{4n} - 81 \qquad [(x^{2n} - 9)(x^{2n} + 9)]$$

$$191. \blacksquare\blacksquare\blacksquare \quad (x^2 + 1)^2 - 4x^2 \qquad [(x - 1)^2(x + 1)^2]$$

$$192. \blacksquare\blacksquare\blacksquare \quad \frac{4}{25}a^2 - (a - 1)^2 \qquad [(1 - \frac{3}{5}a)(\frac{7}{5}a - 1)]$$

$$193. \blacksquare\blacksquare\blacksquare \quad x^2y^2 - (xy - 2)^2 \qquad [4(xy - 1)]$$

$$194. \blacksquare\blacksquare\blacksquare \quad (2a - b)^2 - (a + 2b)^2 \qquad [3(a - b)(a + b)]$$

$$195. \blacksquare\blacksquare\blacksquare \quad 100 - (10 - x)^2 \qquad [x(20 - x)]$$

5. Scomposizione: Quadrato di binomio

Parte Base 5. Scomponi i seguenti trinomi riconoscendoli come lo sviluppo del quadrato di un binomio ($a^2 \pm 2ab + b^2 = (a \pm b)^2$):

- | | | |
|----------|-----------------------|-----------------|
| 196. ■□□ | $x^2 + 2x + 1$ | $[(x + 1)^2]$ |
| 197. ■□□ | $a^2 - 4a + 4$ | $[(a - 2)^2]$ |
| 198. ■□□ | $y^2 + 6y + 9$ | $[(y + 3)^2]$ |
| 199. ■□□ | $x^2 - 10x + 25$ | $[(x - 5)^2]$ |
| 200. ■□□ | $a^2 + 12a + 36$ | $[(a + 6)^2]$ |
| 201. ■□□ | $x^2 - 2xy + y^2$ | $[(x - y)^2]$ |
| 202. ■□□ | $4a^2 + 4a + 1$ | $[(2a + 1)^2]$ |
| 203. ■□□ | $9x^2 - 12x + 4$ | $[(3x - 2)^2]$ |
| 204. ■□□ | $25y^2 + 10y + 1$ | $[(5y + 1)^2]$ |
| 205. ■□□ | $a^2 + 8ab + 16b^2$ | $[(a + 4b)^2]$ |
| 206. ■□□ | $x^2 + 14x + 49$ | $[(x + 7)^2]$ |
| 207. ■□□ | $4a^2 - 12a + 9$ | $[(2a - 3)^2]$ |
| 208. ■□□ | $x^2y^2 + 2xy + 1$ | $[(xy + 1)^2]$ |
| 209. ■□□ | $16b^2 + 40b + 25$ | $[(4b + 5)^2]$ |
| 210. ■□□ | $x^2 - 16x + 64$ | $[(x - 8)^2]$ |
| 211. ■□□ | $49a^2 - 14a + 1$ | $[(7a - 1)^2]$ |
| 212. ■□□ | $4x^2 + 12xy + 9y^2$ | $[(2x + 3y)^2]$ |
| 213. ■□□ | $100x^2 - 20x + 1$ | $[(10x - 1)^2]$ |
| 214. ■□□ | $x^2 - 18x + 81$ | $[(x - 9)^2]$ |
| 215. ■□□ | $9a^2 + 30ab + 25b^2$ | $[(3a + 5b)^2]$ |

6. Quadrato di binomio: frazioni ed esponenti letterali

Parte Avanzata 5. Scomponi i seguenti trinomi riconoscendo lo sviluppo del quadrato di un binomio. Attenzione ai coefficienti frazionari e agli esponenti letterali ($n \in \mathbb{N}$):

216. ■■■■ $\frac{1}{4}x^2 + x + 1$ $\left[\left(\frac{1}{2}x + 1\right)^2\right]$
217. ■■■■ $a^{2n} - 2a^n + 1$ $[(a^n - 1)^2]$
218. ■■■■ $\frac{4}{9}a^2 - \frac{4}{3}ab + b^2$ $\left[\left(\frac{2}{3}a - b\right)^2\right]$
219. ■■■■ $x^{2n} + 6x^n y^m + 9y^{2m}$ $[(x^n + 3y^m)^2]$
220. ■■■■ $\frac{1}{16}x^4 + \frac{1}{2}x^2 y + y^2$ $\left[\left(\frac{1}{4}x^2 + y\right)^2\right]$
221. ■■■■ $a^{2n+2} - 2a^{n+1} + 1$ $[(a^{n+1} - 1)^2]$
222. ■■■■ $\frac{25}{4}x^2 - 5ax + a^2$ $\left[\left(\frac{5}{2}x - a\right)^2\right]$
223. ■■■■ $x^{4n} + 4x^{2n}y^n + 4y^{2n}$ $[(x^{2n} + 2y^n)^2]$
224. ■■■■ $(x + y)^2 + 2(x + y) + 1$ $[(x + y + 1)^2]$
225. ■■■■ $\frac{1}{9}a^{2n} - \frac{2}{3}a^n b^n + b^{2n}$ $\left[\left(\frac{1}{3}a^n - b^n\right)^2\right]$
226. ■■■■ $\frac{9}{16}x^6 - \frac{3}{2}x^3 y^2 + y^4$ $\left[\left(\frac{3}{4}x^3 - y^2\right)^2\right]$
227. ■■■■ $a^{4n} + 10a^{2n}b^m + 25b^{2m}$ $[(a^{2n} + 5b^m)^2]$
228. ■■■■ $(a - 1)^2 + 4(a - 1) + 4$ $[(a + 1)^2]$
229. ■■■■ $\frac{1}{4}x^8 - x^4 y^3 + y^6$ $\left[\left(\frac{1}{2}x^4 - y^3\right)^2\right]$
230. ■■■■ $4a^{2n}b^{2m} - 4a^n b^m + 1$ $[(2a^n b^m - 1)^2]$
231. ■■■■ $\frac{4}{25}a^{2n} + \frac{12}{5}a^n b^m + 9b^{2m}$ $\left[\left(\frac{2}{5}a^n + 3b^m\right)^2\right]$
232. ■■■■ $(2x - 1)^2 - 2(2x - 1) + 1$ $[4(x - 1)^2]$
233. ■■■■ $x^{2n+4} + 2x^{n+2}y + y^2$ $[(x^{n+2} + y)^2]$
234. ■■■■ $100a^2 b^4 + 20ab^2 c^3 + c^6$ $[(10ab^2 + c^3)^2]$
235. ■■■■ $\frac{1}{9}x^2 y^2 - \frac{2}{15}xyz + \frac{1}{25}z^2$ $\left[\left(\frac{1}{3}xy - \frac{1}{5}z\right)^2\right]$

7. Scomposizioni con tecniche combinate

Introduzione alla scomposizione a più passaggi

In questa fase, un solo "attrezzo" algebrico potrebbe non bastare. La regola d'oro rimane il **raccoglimento totale**: è la pulizia preliminare del campo. Solo dopo aver estratto il fattore comune, osserva la parentesi per decidere se procedere con un trinomio speciale, un quadrato di binomio o una differenza di quadrati. In alcuni casi, il raccoglimento parziale sarà la chiave per sbloccare prodotti notevoli nascosti.

Parte Base 6. Scomponi i seguenti polinomi combinando correttamente le tecniche studiate:

- | | | |
|----------|--------------------------|----------------------------------|
| 236. ■□□ | $2x^2 - 32$ | $[2(x - 4)(x + 4)]$ |
| 237. ■□□ | $a^3 + 6a^2 + 9a$ | $[a(a + 3)^2]$ |
| 238. ■□□ | $x^3 - x^2 - 12x$ | $[x(x - 4)(x + 3)]$ |
| 239. ■□□ | $3b^2 - 12b + 12$ | $[3(b - 2)^2]$ |
| 240. ■□□ | $x^3 + x^2 - 4x - 4$ | $[(x + 1)(x - 2)(x + 2)]$ |
| 241. ■□□ | $5a^2 - 20b^2$ | $[5(a - 2b)(a + 2b)]$ |
| 242. ■□□ | $x^2(a - b) - (a - b)$ | $[(a - b)(x - 1)(x + 1)]$ |
| 243. ■□□ | $2y^2 - 10y + 12$ | $[2(y - 2)(y - 3)]$ |
| 244. ■□□ | $ax^2 + 2ax + a$ | $[a(x + 1)^2]$ |
| 245. ■□□ | $x^4 - y^4$ | $[(x^2 + y^2)(x - y)(x + y)]$ |
| 246. ■□□ | $7x^2 - 7$ | $[7(x - 1)(x + 1)]$ |
| 247. ■□□ | $x^3 + 8x^2 + 16x$ | $[x(x + 4)^2]$ |
| 248. ■□□ | $x^2y - 2xy - 15y$ | $[y(x - 5)(x + 3)]$ |
| 249. ■□□ | $4a^2 - 16b^2$ | $[4(a - 2b)(a + 2b)]$ |
| 250. ■□□ | $2x^2 - 28x + 98$ | $[2(x - 7)^2]$ |
| 251. ■□□ | $x^3 - 3x^2 - 4x + 12$ | $[(x - 3)(x - 2)(x + 2)]$ |
| 252. ■□□ | $x^2(y - 5) - 25(y - 5)$ | $[(y - 5)(x - 5)(x + 5)]$ |
| 253. ■□□ | $3a^2 - 18a + 27$ | $[3(a - 3)^2]$ |
| 254. ■□□ | $x^4 - 17x^2 + 16$ | $[(x - 4)(x + 4)(x - 1)(x + 1)]$ |
| 255. ■□□ | $2ax^2 + 8ax + 8a$ | $[2a(x + 2)^2]$ |
| 256. ■□□ | $5x^2 - 45$ | $[5(x - 3)(x + 3)]$ |

257. ■□□ $x^2y + 10xy + 25y$ $[y(x + 5)^2]$
258. ■□□ $a^3 - a^2 - 6a$ $[a(a - 3)(a + 2)]$
259. ■□□ $x^4 - 1$ $[(x^2 + 1)(x - 1)(x + 1)]$
260. ■□□ $2x^3 - 4x^2 + 2x$ $[2x(x - 1)^2]$
261. ■□□ $ax^2 - 4ax - 12a$ $[a(x - 6)(x + 2)]$
262. ■□□ $x^3 + 5x^2 - 4x - 20$ $[(x + 5)(x - 2)(x + 2)]$
263. ■□□ $3y^2 - 18y + 27$ $[3(y - 3)^2]$
264. ■□□ $x^2(a + b) - 16(a + b)$ $[(a + b)(x - 4)(x + 4)]$
265. ■□□ $x^4 - 13x^2 + 36$ $[(x - 3)(x + 3)(x - 2)(x + 2)]$

8. Scomposizioni di livello avanzato

Parte Avanzata 6. Scomponi i seguenti polinomi utilizzando tutte le strategie studiate. Attenzione: l'ordine dei termini potrebbe non essere quello immediato.

266. ■■■ $2(2a^2 - 3)^2 - 8$ $[2(2a^2 - 5)(2a^2 - 1)]$
267. ■■■ $25x^2 - y^2 - 10x + 1$ $[(5x - 1 - y)(5x - 1 + y)]$
268. ■■■ $4a^2 + 4ab + b^2 - c^2$ $[(2a + b - c)(2a + b + c)]$
269. ■■■ $2(a - 1)^2 - 8(x + 3)^2$ $[2(a - 2x - 7)(a + 2x + 5)]$
270. ■■■ $x^{2n} + 2^{n+1}x^n + 2^{2n} - 1$ $[(x^n + 2^n - 1)(x^n + 2^n + 1)]$
271. ■■■ $12(a + b)^3 - 27(a + b)(a - 6b)^2$ $[3(a + b)(20b - a)(5a - 16b)]$
272. ■■■ $3a^{3n+1} - 2ab^{6n} - 3a^{3n}b + 2b^{6n+1}$ $[(a - b)(3a^{3n} - 2b^{6n})]$
273. ■■■ $\frac{4}{27}x^3 - \frac{1}{3}x$ $[\frac{1}{3}x(\frac{2}{3}x - 1)(\frac{2}{3}x + 1)]$
274. ■■■ $x^4 + 5x^3 + 6x^2 - (x^2 + 5x + 6)$ $[(x - 1)(x + 1)(x + 2)(x + 3)]$
275. ■■■ $a^{2n}b^n - (ab)^n + (a^n b^n)^2$ $[a^n b^n(a^n - 1 + a^n b^n)]$
276. ■■■ $x^2 - y^2 - 6y - 9$ $[(x - y - 3)(x + y + 3)]$
277. ■■■ $a^2b - 4b - a^2c + 4c$ $[(b - c)(a - 2)(a + 2)]$
278. ■■■ $x^4 - 10x^2 + 9$ $[(x - 3)(x + 3)(x - 1)(x + 1)]$
279. ■■■ $4(a - b)^2 - (a + b)^2$ $[(a - 3b)(3a - b)]$
280. ■■■ $x^{2n} - 2x^n + 1 - a^{2n}$ $[(x^n - 1 - a^n)(x^n - 1 + a^n)]$
281. ■■■ $y^2 - x^2 + 4x - 4$ $[(y - x + 2)(y + x - 2)]$

282. ■■■■	$3ax^2 - 6ax + 3a - 3ay^2$	$[3a(x - 1 - y)(x - 1 + y)]$
283. ■■■■	$a^4 - 13a^2 + 36$	$[(a - 3)(a + 3)(a - 2)(a + 2)]$
284. ■■■■	$x^2 + 2xy + y^2 - 16$	$[(x + y - 4)(x + y + 4)]$
285. ■■■■	$a^2 - 4ab + 4b^2 - (x - y)^2$	$[(a - 2b - x + y)(a - 2b + x - y)]$
286. ■■■■	$a^2 - x^2 - 2xy - y^2$	$[(a - x - y)(a + x + y)]$
287. ■■■■	$9(x - y)^2 - 16(x + y)^2$	$[(-x - 7y)(7x + y)]$
288. ■■■■	$x^{4n} - 5x^{2n} + 4$	$[(x^n - 1)(x^n + 1)(x^n - 2)(x^n + 2)]$
289. ■■■■	$a^2 - 9b^2 - 2a + 6b$	$[(a - 3b)(a + 3b - 2)]$
290. ■■■■	$x^2 + 4xy + 4y^2 - (a - 3)^2$	$[(x + 2y - a + 3)(x + 2y + a - 3)]$
291. ■■■■	$x^4 + y^4 - 2x^2y^2 - 9x^2$	$[x(x - 3 - y)(x + 3 - y)]$
292. ■■■■	$49 - a^2 - b^2 + 2ab$	$[(7 - a + b)(7 + a - b)]$
293. ■■■■	$a^{3n} - a^n b^{2n}$	$[a^n(a^n - b^n)(a^n + b^n)]$
294. ■■■■	$x^2 - 12x + 36 - (y + 2)^2$	$[(x - y - 8)(x + y - 4)]$
295. ■■■■	$3a^2 - 12ab + 12b^2 - 3c^2$	$[3(a - 2b - c)(a - 2b + c)]$
296. ■■■■	$a^2 + 2ab + b^2 - 25$	$[(a + b - 5)(a + b + 5)]$
297. ■■■■	$x^3 - x^2 - 20x$	$[x(x - 5)(x + 4)]$
298. ■■■■	$a^2 - 4b^2 - a - 2b$	$[(a + 2b)(a - 2b - 1)]$
299. ■■■■	$x^4 - 10x^2 + 9$	$[(x - 3)(x + 3)(x - 1)(x + 1)]$
300. ■■■■	$y^2 - 1 - x^2 + 2x$	$[(y - x + 1)(y + x - 1)]$
301. ■■■■	$2x^4 - 16x^2 + 32$	$[2(x - 2)^2(x + 2)^2]$
302. ■■■■	$a^3 - 4a - a^2 + 4$	$[(a - 1)(a - 2)(a + 2)]$
303. ■■■■	$x^2 - 6x + 9 - (y + 1)^2$	$[(x - y - 4)(x + y - 2)]$
304. ■■■■	$4a^{2n} - 12a^n + 9 - b^2$	$[(2a^n - 3 - b)(2a^n - 3 + b)]$
305. ■■■■	$x^5 - 17x^3 + 16x$	$[x(x - 4)(x + 4)(x - 1)(x + 1)]$
306. ■■■■	$\frac{1}{2}x^2 - \frac{1}{8}$	$[\frac{1}{2}(x - \frac{1}{2})(x + \frac{1}{2})]$
307. ■■■■	$\frac{1}{3}a^2 - \frac{4}{3}a + \frac{4}{3}$	$[\frac{1}{3}(a - 2)^2]$
308. ■■■■	$x^2 + \frac{3}{2}x + \frac{1}{2}$	$[(x + 1)(x + \frac{1}{2})]$
309. ■■■■	$\frac{1}{4}x^4 - \frac{1}{4}$	$[\frac{1}{4}(x^2 + 1)(x - 1)(x + 1)]$

310. ■■■ $\frac{1}{9}a^2 - \frac{1}{3}a + \frac{1}{4} - b^2$ $[(\frac{1}{3}a - \frac{1}{2} - b)(\frac{1}{3}a - \frac{1}{2} + b)]$
311. ■■■ $\frac{4}{25}x^2 - (y - \frac{1}{5})^2$ $[(\frac{2}{5}x - y + \frac{1}{5})(\frac{2}{5}x + y - \frac{1}{5})]$
312. ■■■ $\frac{1}{6}x^2 - \frac{5}{6}x + 1$ $[\frac{1}{6}(x - 2)(x - 3)]$
313. ■■■ $\frac{1}{2}ax - a - \frac{1}{2}bx + b$ $[(\frac{1}{2}x - 1)(a - b)]$
314. ■■■ $a^2x^2 - \frac{1}{4}a^2 - b^2x^2 + \frac{1}{4}b^2$ $[(a - b)(a + b)(x - \frac{1}{2})(x + \frac{1}{2})]$
315. ■■■ $\frac{x^2}{4} + \frac{x}{3} + \frac{1}{9} - \frac{y^2}{16}$ $[(\frac{x}{2} + \frac{1}{3} - \frac{y}{4})(\frac{x}{2} + \frac{1}{3} + \frac{y}{4})]$

9. Scomposizione: Quadrato di trinomio

Parte Base 7. Scomponi i seguenti polinomi riconoscendo lo sviluppo del quadrato di un trinomio ($a^2 + b^2 + c^2 + 2ab + 2ac + 2bc = (a + b + c)^2$):

316. ■□□ $x^2 + y^2 + z^2 + 2xy + 2xz + 2yz$ $[(x + y + z)^2]$
317. ■□□ $a^2 + b^2 + 1 + 2ab + 2a + 2b$ $[(a + b + 1)^2]$
318. ■□□ $x^2 + y^2 + z^2 - 2xy + 2xz - 2yz$ $[(x - y + z)^2]$
319. ■□□ $4a^2 + b^2 + c^2 + 4ab + 4ac + 2bc$ $[(2a + b + c)^2]$
320. ■□□ $x^2 + 4y^2 + 9z^2 + 4xy + 6xz + 12yz$ $[(x + 2y + 3z)^2]$
321. ■□□ $a^2 + b^2 + c^2 - 2ab - 2ac + 2bc$ $[(a - b - c)^2]$
322. ■□□ $x^2 + y^2 + 16 - 2xy + 8x - 8y$ $[(x - y + 4)^2]$
323. ■□□ $9a^2 + 4b^2 + 1 - 12ab + 6a - 4b$ $[(3a - 2b + 1)^2]$
324. ■□□ $x^2 + y^2 + z^2 + 2xy - 2xz - 2yz$ $[(x + y - z)^2]$
325. ■□□ $a^2 + 25 + b^2 + 10a + 2ab + 10b$ $[(a + b + 5)^2]$
326. ■□□ $a^2 + 4b^2 + 1 + 4ab + 2a + 4b$ $[(a + 2b + 1)^2]$
327. ■□□ $x^2 + y^2 + 16 - 2xy + 8x - 8y$ $[(x - y + 4)^2]$
328. ■□□ $4a^2 + b^2 + c^2 - 4ab + 4ac - 2bc$ $[(2a - b + c)^2]$
329. ■□□ $x^2 + 9y^2 + 4z^2 + 6xy - 4xz - 12yz$ $[(x + 3y - 2z)^2]$
330. ■□□ $\frac{1}{4}a^2 + b^2 + 1 + ab - a - 2b$ $[(\frac{1}{2}a + b - 1)^2]$
331. ■□□ $x^2 + y^2 + z^2 - 2xy - 2xz + 2yz$ $[(x - y - z)^2]$
332. ■□□ $9a^2 + 4b^2 + 1 - 12ab + 6a - 4b$ $[(3a - 2b + 1)^2]$
333. ■□□ $x^2 + \frac{1}{4}y^2 + 9 + xy + 6x + 3y$ $[(x + \frac{1}{2}y + 3)^2]$

$$334. \blacksquare\square\square \quad a^2 + b^2 + 25 + 2ab - 10a - 10b \quad [(a + b - 5)^2]$$

$$335. \blacksquare\square\square \quad 4x^2 + y^2 + z^2 + 4xy - 4xz - 2yz \quad [(2x + y - z)^2]$$

Parte Avanzata 7. Scomponi i seguenti polinomi. Attenzione agli esponenti letterali e alla frazioni:

$$336. \blacksquare\square\square \quad x^{2n} + y^{4n} + 1 + 2x^n y^{2n} - 2x^n - 2y^{2n} \quad [(x^n + y^{2n} - 1)^2]$$

$$337. \blacksquare\square\square \quad \frac{9}{16}b^2 + ab - 2bc + \frac{4}{9}a^2 - \frac{16}{9}ac + \frac{16}{9}c^2 \quad \left[\left(\frac{2}{3}a + \frac{3}{4}b - \frac{4}{3}c \right)^2 \right]$$

$$338. \blacksquare\square\square \quad a^8 - 2a^6 - 2a^5 + a^4 + 2a^3 + a^2 \quad [(a^4 - a^2 - a)^2]$$

$$339. \blacksquare\square\square \quad 4x^2 + \frac{2}{3}xy + \frac{1}{36}y^2 + 12x + y + 9 \quad \left[\left(2x + \frac{1}{6}y + 3 \right)^2 \right]$$

$$340. \blacksquare\square\square \quad x^6 + 4x^8 - 4x^7 + x^3 + \frac{1}{4} - 2x^4 \quad \left[\left(2x^4 - x^3 - \frac{1}{2} \right)^2 \right]$$

$$341. \blacksquare\square\square \quad x^{2n+2} + 4x^{4n} - 4x^{3n+1} + x^{n+1} + \frac{1}{4} - 2x^{2n} \quad \left[\left(2x^{2n} - x^{n+1} - \frac{1}{2} \right)^2 \right]$$

$$342. \blacksquare\square\square \quad 25x^2 + 9y^2 + 4 - 30xy + 20x - 12y \quad [(5x - 3y + 2)^2]$$

$$343. \blacksquare\square\square \quad a^2b^2 + c^2 + d^2 - 2abc - 2abd + 2cd \quad [(ab - c - d)^2]$$

$$344. \blacksquare\square\square \quad x^4 + y^2 + 1 + 2x^2y - 2x^2 - 2y \quad [(x^2 + y - 1)^2]$$

$$345. \blacksquare\square\square \quad \frac{1}{4}a^{2n} + \frac{1}{9}b^{2n} + \frac{1}{16}c^{2n} + \frac{1}{3}a^n b^n - \frac{1}{4}a^n c^n - \frac{1}{6}b^n c^n \quad \left[\left(\frac{1}{2}a^n + \frac{1}{3}b^n - \frac{1}{4}c^n \right)^2 \right]$$

10. Scomposizione: Cubo di binomio

Parte Base 8. Scomponi i seguenti polinomi riconoscendo lo sviluppo del cubo di un binomio ($a^3 \pm 3a^2b + 3ab^2 \pm b^3 = (a \pm b)^3$):

$$346. \blacksquare\square\square \quad x^3 + 3x^2 + 3x + 1 \quad [(x + 1)^3]$$

$$347. \blacksquare\square\square \quad a^3 - 6a^2 + 12a - 8 \quad [(a - 2)^3]$$

$$348. \blacksquare\square\square \quad 8x^3 + 12x^2 + 6x + 1 \quad [(2x + 1)^3]$$

$$349. \blacksquare\square\square \quad x^3 - 9x^2 + 27x - 27 \quad [(x - 3)^3]$$

$$350. \blacksquare\square\square \quad 27a^3 + 27a^2 + 9a + 1 \quad [(3a + 1)^3]$$

$$351. \blacksquare\square\square \quad x^3 + 3x^2y + 3xy^2 + y^3 \quad [(x + y)^3]$$

$$352. \blacksquare\square\square \quad 8a^3 - 36a^2b + 54ab^2 - 27b^3 \quad [(2a - 3b)^3]$$

$$353. \blacksquare\square\square \quad 1 - 3x + 3x^2 - x^3 \quad [(1 - x)^3]$$

$$354. \blacksquare\square\square \quad x^6 + 3x^4 + 3x^2 + 1 \quad [(x^2 + 1)^3]$$

$$355. \blacksquare\square\square \quad 125 + 75x + 15x^2 + x^3 \quad [(5 + x)^3]$$

356.	■□□	$x^3 + 9x^2 + 27x + 27$	$[(x + 3)^3]$
357.	■□□	$8a^3 - 12a^2 + 6a - 1$	$[(2a - 1)^3]$
358.	■□□	$x^3 + 12x^2 + 48x + 64$	$[(x + 4)^3]$
359.	■□□	$27y^3 - 54y^2 + 36y - 8$	$[(3y - 2)^3]$
360.	■□□	$a^3b^3 + 3a^2b^2 + 3ab + 1$	$[(ab + 1)^3]$
361.	■□□	$x^3 - 15x^2 + 75x - 125$	$[(x - 5)^3]$
362.	■□□	$8 + 60x + 150x^2 + 125x^3$	$[(2 + 5x)^3]$
363.	■□□	$1 - 9a + 27a^2 - 27a^3$	$[(1 - 3a)^3]$
364.	■□□	$x^3y^3 - 3x^2y^2 + 3xy - 1$	$[(xy - 1)^3]$
365.	■□□	$x^6 + 6x^4 + 12x^2 + 8$	$[(x^2 + 2)^3]$

11. Scomposizione: Somma e differenza di cubi

Parte Base 9. Scomponi i seguenti polinomi utilizzando le formule $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$ e $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$:

366.	■□□	$x^3 + 1$	$[(x + 1)(x^2 - x + 1)]$
367.	■□□	$a^3 - 8$	$[(a - 2)(a^2 + 2a + 4)]$
368.	■□□	$x^3 + 27$	$[(x + 3)(x^2 - 3x + 9)]$
369.	■□□	$8b^3 - 1$	$[(2b - 1)(4b^2 + 2b + 1)]$
370.	■□□	$y^3 + 64$	$[(y + 4)(y^2 - 4y + 16)]$
371.	■□□	$27a^3 - 8$	$[(3a - 2)(9a^2 + 6a + 4)]$
372.	■□□	$x^3 + y^3$	$[(x + y)(x^2 - xy + y^2)]$
373.	■□□	$1 - a^3$	$[(1 - a)(1 + a + a^2)]$
374.	■□□	$8x^3 + 27$	$[(2x + 3)(4x^2 - 6x + 9)]$
375.	■□□	$a^3 - 125$	$[(a - 5)(a^2 + 5a + 25)]$
376.	■□□	$x^3 + 1331$	$[(x + 11)(x^2 - 11x + 121)]$
377.	■□□	$8a^3 - 729$	$[(2a - 9)(4a^2 + 18a + 81)]$
378.	■□□	$64x^3 + 1$	$[(4x + 1)(16x^2 - 4x + 1)]$
379.	■□□	$1000y^3 - 27$	$[(10y - 3)(100y^2 + 30y + 9)]$
380.	■□□	$343 + 8z^3$	$[(7 + 2z)(49 - 14z + 4z^2)]$

381. ■□□ $216a^3 - 125$ $[(6a - 5)(36a^2 + 30a + 25)]$
 382. ■□□ $x^3 + 512$ $[(x + 8)(x^2 - 8x + 64)]$
 383. ■□□ $27b^3 - 1000$ $[(3b - 10)(9b^2 + 30b + 100)]$
 384. ■□□ $1 + 125y^3$ $[(1 + 5y)(1 - 5y + 25y^2)]$
 385. ■□□ $729x^3 - 64$ $[(9x - 4)(81x^2 + 36x + 16)]$

12. Scomposizione: Teorema di Ruffini

Parte Base 10. Scomponi i seguenti polinomi cercando gli zeri tra i divisori del termine noto:

386. ■□□ $x^3 - 2x^2 - x + 2$ $[(x - 1)(x + 1)(x - 2)]$
 387. ■□□ $x^3 - 3x + 2$ $[(x - 1)^2(x + 2)]$
 388. ■□□ $x^3 - 4x^2 + x + 6$ $[(x + 1)(x - 2)(x - 3)]$
 389. ■□□ $x^3 + 2x^2 - 5x - 6$ $[(x + 1)(x - 2)(x + 3)]$
 390. ■□□ $x^3 - 7x - 6$ $[(x + 1)(x + 2)(x - 3)]$
 391. ■□□ $x^3 + 4x^2 + x - 6$ $[(x - 1)(x + 2)(x + 3)]$
 392. ■□□ $x^3 - 6x^2 + 11x - 6$ $[(x - 1)(x - 2)(x - 3)]$
 393. ■□□ $x^3 - 19x - 30$ $[(x + 2)(x + 3)(x - 5)]$
 394. ■□□ $x^3 + 5x^2 - 2x - 24$ $[(x - 2)(x + 3)(x + 4)]$
 395. ■□□ $x^3 - x^2 - 4x + 4$ $[(x - 1)(x - 2)(x + 2)]$
 396. ■□□ $x^3 - 4x^2 + 5x - 2$ $[(x - 1)^2(x - 2)]$
 397. ■□□ $x^3 + x^2 - 4x - 4$ $[(x + 1)(x - 2)(x + 2)]$
 398. ■□□ $x^3 - 3x^2 - 4x + 12$ $[(x - 2)(x + 2)(x - 3)]$
 399. ■□□ $x^3 - 2x^2 - 5x + 6$ $[(x - 1)(x + 2)(x - 3)]$
 400. ■□□ $x^3 + 3x^2 - x - 3$ $[(x - 1)(x + 1)(x + 3)]$
 401. ■□□ $x^3 + 6x^2 + 11x + 6$ $[(x + 1)(x + 2)(x + 3)]$
 402. ■□□ $x^3 - x^2 - x + 1$ $[(x - 1)^2(x + 1)]$
 403. ■□□ $x^3 - 5x^2 + 8x - 4$ $[(x - 1)(x - 2)^2]$
 404. ■□□ $x^3 + 4x^2 - 3x - 18$ $[(x - 2)(x + 3)^2]$
 405. ■□□ $x^3 - 3x^2 + 4$ $[(x + 1)(x - 2)^2]$

13. Scomposizione: Teorema di Ruffini - Livello Avanzato

Parte Avanzata 8. Scomponi i seguenti polinomi. Attenzione: in alcuni casi lo zero del polinomio è un numero razionale (frazione) o il grado è superiore al terzo:

406. ■■■■ $2x^3 - 5x^2 - 4x + 3$ $[(x - 3)(x + 1)(2x - 1)]$
407. ■■■■ $3x^3 - 4x^2 - 17x + 6$ $[(x - 3)(x + 2)(3x - 1)]$
408. ■■■■ $6x^3 + 7x^2 - 1$ $[(x + 1)(2x - 1)(3x + 1)]$
409. ■■■■ $2x^3 + 3x^2 - 1$ $[(x + 1)^2(2x - 1)]$
410. ■■■■ $4x^3 - 8x^2 - x + 2$ $[(x - 2)(2x - 1)(2x + 1)]$
411. ■■■■ $3x^3 - 2x^2 - 7x - 2$ $[(x - 2)(x + 1)(3x + 1)]$
412. ■■■■ $x^4 - 2x^3 - x + 2$ $[(x - 1)(x - 2)(x^2 + x + 1)]$
413. ■■■■ $2x^4 - x^3 - 6x^2 - x + 2$ $(x + 1)^2(x - 2)(2x - 1)$
414. ■■■■ $4x^3 - 7x + 3$ $[(x - 1)(2x - 1)(2x + 3)]$
415. ■■■■ $6x^3 - 5x^2 - 2x + 1$ $[(x - 1)(2x + 1)(3x - 1)]$
416. ■■■■ $x^3 - (a + 1)x^2 + (a + 1)x - 1$ $[(x - 1)(x^2 - ax + 1)]$
417. ■■■■ $x^3 + ax^2 - x - a$ $[(x + a)(x - 1)(x + 1)]$
418. ■■■■ $x^3 - (a + 2)x^2 + (2a + 1)x - a$ $[(x - 1)^2(x - a)]$
419. ■■■■ $x^3 - (2a + 1)x^2 + a(a + 2)x - a^2$ $[(x - a)^2(x - 1)]$
420. ■■■■ $x^3 - (a + 3)x^2 + (3a + 2)x - 2a$ $[(x - 1)(x - 2)(x - a)]$
421. ■■■■ $ax^3 - (a + 1)x^2 + 1$ $[(x - 1)(ax^2 - x - 1)]$
422. ■■■■ $x^3 - 2ax^2 - a^2x + 2a^3$ $[(x - 2a)(x - a)(x + a)]$
423. ■■■■ $x^3 - (a + b)x^2 + (ab + 1)x - b$ $[(x - b)(x^2 - ax + 1)]$
424. ■■■■ $x^3 - (a + 1)x^2 - 4x + 4a + 4$ $[(x - a - 1)(x - 2)(x + 2)]$
425. ■■■■ $x^4 - (a + 1)x^3 + ax^2 + x - a$ $[(x - 1)(x - a)(x^2 + x + 1)]$
426. ■■■■ $x^4 - 2x^3 - 13x^2 + 14x + 24$ $[(x - 2)(x + 1)(x + 3)(x - 4)]$
427. ■■■■ $a^3 - 6a^2 + 11a - 6$ $[(a - 1)(a - 2)(a - 3)]$
428. ■■■■ $2y^3 - 5y^2 - 4y + 3$ $[(y - 3)(y + 1)(2y - 1)]$
429. ■■■■ $x^4 - x^3 - 3x^2 + 5x - 2$ $[(x - 1)^3(x + 2)]$

430. ■■■■ $b^3 - (a+1)b^2 - (a-2)b + 2a$ $[(b-2)(b-a)(b+1)]$
 431. ■■■■ $6x^3 + 7x^2 - 1$ $[(x+1)(2x-1)(3x+1)]$
 432. ■■■■ $a^4 - 2a^3 - a + 2$ $[(a-1)(a-2)(a^2+a+1)]$
 433. ■■■■ $x^3 - 3ax^2 + 4a^3$ $[(x+a)(x-2a)^2]$
 434. ■■■■ $y^5 - 1$ $[(y-1)(y^4+y^3+y^2+y+1)]$
 435. ■■■■ $3x^3 - 2x^2 - 7x - 2$ $[(x-2)(x+1)(3x+1)]$

14. Scomposizioni di riepilogo

Parte Base 11. Scomponi i seguenti polinomi utilizzando la tecnica più opportuna (raccoglimenti, prodotti notevoli, trinomio particolare):

436. ■□□ $3x^2 - 12$ $[3(x-2)(x+2)]$
 437. ■□□ $a^2 - 10a + 25$ $[(a-5)^2]$
 438. ■□□ $x^2 - 3x - 10$ $[(x-5)(x+2)]$
 439. ■□□ $x^3 - 27$ $[(x-3)(x^2+3x+9)]$
 440. ■□□ $ax + 2a + bx + 2b$ $[(a+b)(x+2)]$
 441. ■□□ $16x^2 - 1$ $[(4x-1)(4x+1)]$
 442. ■□□ $y^3 + 3y^2 + 3y + 1$ $[(y+1)^3]$
 443. ■□□ $2a^2 + 4ab + 2b^2$ $[2(a+b)^2]$
 444. ■□□ $x^4 - y^4$ $[(x-y)(x+y)(x^2+y^2)]$
 445. ■□□ $5x^3 - 5x$ $[5x(x-1)(x+1)]$
 446. ■□□ $2x^2 - 18$ $[2(x-3)(x+3)]$
 447. ■□□ $a^2 + 6a + 9$ $[(a+3)^2]$
 448. ■□□ $x^2 + 5x + 6$ $[(x+2)(x+3)]$
 449. ■□□ $ay - 3a + by - 3b$ $[(y-3)(a+b)]$
 450. ■□□ $25y^2 - 4$ $[(5y-2)(5y+2)]$
 451. ■□□ $x^3 - 4x^2 + 4x$ $[x(x-2)^2]$
 452. ■□□ $b^2 - 7b + 12$ $[(b-3)(b-4)]$
 453. ■□□ $4a^3 - 4a$ $[4a(a-1)(a+1)]$
 454. ■□□ $x^2 - 8x + 15$ $[(x-3)(x-5)]$

455. ■□□ $3x^2 + 6x + 3$ $[3(x + 1)^2]$
456. ■□□ $x^2 - 4x - 21$ $[(x - 7)(x + 3)]$
457. ■□□ $4a^2 - 25b^2$ $[(2a - 5b)(2a + 5b)]$
458. ■□□ $x^3 + 8y^3$ $[(x + 2y)(x^2 - 2xy + 4y^2)]$
459. ■□□ $5a^2 - 5a - 60$ $[5(a - 4)(a + 3)]$
460. ■□□ $7x^2 - 35x + 42$ $[7(x - 2)(x - 3)]$
461. ■□□ $ax + ay - x - y$ $[(x + y)(a - 1)]$
462. ■□□ $x^3 - 64$ $[(x - 4)(x^2 + 4x + 16)]$
463. ■□□ $9y^2 - 12y + 4$ $[(3y - 2)^2]$
464. ■□□ $a^3 - a$ $[a(a - 1)(a + 1)]$
465. ■□□ $x^2 - 5x - 14$ $[(x - 7)(x + 2)]$
466. ■■□ $3x^2 - 12$ $[3(x - 2)(x + 2)]$
467. ■■□ $x^3 - x$ $[x(x - 1)(x + 1)]$
468. ■■□ $2a^2 - 12a + 18$ $[2(a - 3)^2]$
469. ■■□ $4x^3 - 4x^2 + x$ $[x(2x - 1)^2]$
470. ■■□ $ax^2 - 7ax + 10a$ $[a(x - 2)(x - 5)]$
471. ■■□ $x^4 - 16$ $[(x - 2)(x + 2)(x^2 + 4)]$
472. ■■□ $2y^3 - 54$ $[2(y - 3)(y^2 + 3y + 9)]$
473. ■■□ $x^2y - 4y$ $[y(x - 2)(x + 2)]$
474. ■■□ $3b^2 - 15b + 18$ $[3(b - 2)(b - 3)]$
475. ■■□ $a^4 - a^2b^2$ $[a^2(a - b)(a + b)]$

Parte Avanzata 9. Scomponi i seguenti polinomi applicando più tecniche in successione o metodi particolari (es. completamento del quadrato, Ruffini letterale):

476. ■■■ $x^4 + 324$ $[(x^2 + 6x + 18)(x^2 - 6x + 18)]$
477. ■■■ $a^4 + a^2b^2 + b^4$ $[(a^2 + ab + b^2)(a^2 - ab + b^2)]$
478. ■■■ $x^6 - 1$ $[(x - 1)(x + 1)(x^2 + x + 1)(x^2 - x + 1)]$
479. ■■■ $a^{2n} - 2a^n + 1 - b^{2m}$ $[(a^n - 1 - b^m)(a^n - 1 + b^m)]$
480. ■■■ $x^3 - (a + 1)x^2 + (a - 2)x + 2$ $[(x - 1)(x - 2)(x - a - 1)]$

481. ■■■■	$y^4 - z^4 + 2y^3z - 2yz^3$	$[(y+z)^3(y-z)]$
482. ■■■■	$x^2 + 2xy + y^2 - z^2 + 4z - 4$	$[(x+y-z+2)(x+y+z-2)]$
483. ■■■■	$4a^4 + 1$	$[(2a^2 + 2a + 1)(2a^2 - 2a + 1)]$
484. ■■■■	$x^5 - x^4 - 16x + 16$	$[(x-1)(x-2)(x+2)(x^2+4)]$
485. ■■■■	$a^3 + 3a^2 + 3a + 1 - b^3$	$[(a+1-b)(a^2+2a+1+ab+b+b^2)]$
486. ■■■■	$x^2 - y^2 + 6y - 9$	$[(x-y+3)(x+y-3)]$
487. ■■■■	$a^6 - 64$	$[(a-2)(a+2)(a^2+2a+4)(a^2-2a+4)]$
488. ■■■■	$x^4 - 13x^2 + 36$	$[(x-2)(x+2)(x-3)(x+3)]$
489. ■■■■	$a^2 - b^2 - c^2 + 2bc$	$[(a-b+c)(a+b-c)]$
490. ■■■■	$x^5 - 17x^3 + 16x$	$[x(x-1)(x+1)(x-4)(x+4)]$
491. ■■■■	$4x^2 - 4xy + y^2 - 25$	$[(2x-y-5)(2x-y+5)]$
492. ■■■■	$a^3 - 3a^2 - 4a + 12$	$[(a-3)(a-2)(a+2)]$
493. ■■■■	$x^3 - x^2 - x + 1$	$[(x-1)^2(x+1)]$
494. ■■■■	$3x^4 - 3$	$[3(x-1)(x+1)(x^2+1)]$
495. ■■■■	$ax^2 - ay^2 - 2x + 2y$	$[(x-y)(ax+ay-2)]$
496. ■■■■	$16x^4 - 81$	$[(2x-3)(2x+3)(4x^2+9)]$
497. ■■■■	$a^4 - 5a^2 + 4$	$[(a-1)(a+1)(a-2)(a+2)]$
498. ■■■■	$x^2 - 6x + 9 - 4y^2$	$[(x-3-2y)(x-3+2y)]$
499. ■■■■	$a^3 - 4a - a^2b + 4b$	$[(a-2)(a+2)(a-b)]$
500. ■■■■	$x^6 - 1$	$[(x-1)(x+1)(x^2+x+1)(x^2-x+1)]$
501. ■■■■	$4a^2 + b^2 + 9c^2 + 4ab - 12ac - 6bc$	$[(2a+b-3c)^2]$
502. ■■■■	$2x^3 + 16$	$[2(x+2)(x^2-2x+4)]$
503. ■■■■	$(a+b)^2 - (c-d)^2$	$[(a+b-c+d)(a+b+c-d)]$
504. ■■■■	$x^4 + 2x^2 + 1 - y^2$	$[(x^2+1-y)(x^2+1+y)]$
505. ■■■■	$x^5 - x$	$[x(x-1)(x+1)(x^2+1)]$
506. ■■■■	$x^4 + 64$	$[(x^2+4x+8)(x^2-4x+8)]$
507. ■■■■	$a^2 - b^2 - c^2 + 2bc$	$[(a-b+c)(a+b-c)]$
508. ■■■■	$x^4 + x^2 + 1$	$[(x^2+x+1)(x^2-x+1)]$

509. ■■■■	$a^6 - 64$	$[(a - 2)(a + 2)(a^2 + 2a + 4)(a^2 - 2a + 4)]$
510. ■■■■	$x^4 - 3x^2 + 1$	$[(x^2 + x - 1)(x^2 - x - 1)]$
511. ■■■■	$x^3 - 3x^2 - 4x + 12$	$[(x - 3)(x - 2)(x + 2)]$
512. ■■■■	$x^4 + 2x^3 - 2x - 1$	$[(x - 1)(x + 1)^3]$
513. ■■■■	$a^2 - 4b^2 - 4b - 1$	$[(a - 2b - 1)(a + 2b + 1)]$
514. ■■■■	$x^5 - 17x^3 + 16x$	$[x(x - 1)(x + 1)(x - 4)(x + 4)]$
515. ■■■■	$x^2(y - z) + y^2(z - x) + z^2(x - y)$	$[-(x - y)(y - z)(z - x)]$
516. ■■■■	$x^{2n} - y^{2n}$	$[(x^n - y^n)(x^n + y^n)]$
517. ■■■■	$a^{4n} - 1$	$[(a^n - 1)(a^n + 1)(a^{2n} + 1)]$
518. ■■■■	$x^6 - 2x^3 + 1$	$[(x - 1)^2(x^2 + x + 1)^2]$
519. ■■■■	$a^{3n} - 8b^{3n}$	$[(a^n - 2b^n)(a^{2n} + 2a^n b^n + 4b^{2n})]$
520. ■■■■	$x^4 + 4$	$[(x^2 + 2x + 2)(x^2 - 2x + 2)]$
521. ■■■■	$a^2 - b^2 + 2b - 1$	$[(a - b + 1)(a + b - 1)]$
522. ■■■■	$x^3 - (a + b)x^2 + abx$	$[x(x - a)(x - b)]$
523. ■■■■	$y^{2n} - 5y^n + 6$	$[(y^n - 2)(y^n - 3)]$
524. ■■■■	$x^4 + x^2 y^2 + y^4$	$[(x^2 + xy + y^2)(x^2 - xy + y^2)]$
525. ■■■■	$a^{n+2} - 2a^{n+1} + a^n$	$[a^n(a - 1)^2]$
526. ■■■■	$x^3 - 3ax^2 + 3a^2x - a^3$	$[(x - a)^3]$
527. ■■■■	$4x^{2n} - 12x^n + 9$	$[(2x^n - 3)^2]$
528. ■■■■	$a^3 - 7a - 6$	$[(a + 1)(a + 2)(a - 3)]$
529. ■■■■	$x^4 - (a^2 + 1)x^2 + a^2$	$[(x - 1)(x + 1)(x - a)(x + a)]$
530. ■■■■	$2y^3 - (2a + 1)y^2 + ay$	$[y(y - a)(2y - 1)]$
531. ■■■■	$x^{6n} - 1$	$[(x^n - 1)(x^n + 1)(x^{2n} + x^n + 1)(x^{2n} - x^n + 1)]$
532. ■■■■	$a^2 + 2ab + b^2 - x^2 + 4x - 4$	$[(a + b - x + 2)(a + b + x - 2)]$
533. ■■■■	$x^3 + 2x^2 - 5x - 6$	$[(x + 1)(x - 2)(x + 3)]$
534. ■■■■	$a^3 + 3a^2b + 3ab^2 + b^3 - 1$	$[(a + b - 1)(a^2 + 2ab + b^2 + a + b + 1)]$
535. ■■■■	$x^{2n} - 2x^n + 1 - a^2$	$[(x^n - 1 - a)(x^n - 1 + a)]$
536. ■■■■	$\frac{1}{27}x^3 - \frac{8}{125}y^6$	$[(\frac{1}{3}x - \frac{2}{5}y^2)(\frac{1}{9}x^2 + \frac{2}{15}xy^2 + \frac{4}{25}y^4)]$

537. ■■■■ $ax^3 - 27a - bx^3 + 27b$ $[(a - b)(x - 3)(x^2 + 3x + 9)]$
538. ■■■■ $\frac{1}{16}x^4 + \frac{1}{2}x$ $[\frac{1}{2}x(\frac{1}{2}x + 1)(\frac{1}{4}x^2 - \frac{1}{2}x + 1)]$
539. ■■■■ $x^6 - y^6$ $[(x - y)(x + y)(x^2 + xy + y^2)(x^2 - xy + y^2)]$
540. ■■■■ $\frac{27}{64}a^3 - (a - b)^3$ $[(\frac{7}{4}b - \frac{1}{4}a)(\frac{37}{16}a^2 - \frac{1}{4}ab + b^2)]$
541. ■■■■ $x^5y - xy^5$ $[xy(x - y)(x + y)(x^2 + y^2)]$
542. ■■■■ $125a^4 - 8ab^3 - 125a^3b + 8b^4$ $[(a - b)^2(5a - 2b)(25a^2 + 10ab + 4b^2)]$
543. ■■■■ $\frac{1}{8}x^3y^3 + \frac{27}{1000}$ $[(\frac{1}{2}xy + \frac{3}{10})(\frac{1}{4}x^2y^2 - \frac{3}{20}xy + \frac{9}{100})]$
544. ■■■■ $(x + y)^3 - (x - y)^3$ $[2y(3x^2 + y^2)]$
545. ■■■■ $\frac{27}{8}a^3b^3 - \frac{1}{8}a^3 - \frac{27}{8}b^3 + \frac{1}{8}$ $[\frac{1}{8}(3b - 1)(9b^2 + 3b + 1)(a - 1)(a^2 + a + 1)]$
546. ■■■■ $a^4 + 4b^4$ $[(a^2 + 2b^2 + 2ab)(a^2 + 2b^2 - 2ab)]$
547. ■■■■ $x^{2n+2} - 2x^{n+2} + x^2$ $[x^2(x^n - 1)^2]$
548. ■■■■ $(2x^2 - 1)^2 - (x^2 + 3)^2$ $[(x - 2)(x + 2)(3x^2 + 2)]$
549. ■■■■ $x^4 + 4x^2y - 2x^2z^2 - 4yz^2 + 4y^2 + z^4$ $[(x^2 + 2y - z^2)^2]$
550. ■■■■ $x^8 - 7x^5 - 8x^2$ $[x^2(x - 2)(x^2 + 2x + 4)(x + 1)(x^2 - x + 1)]$
551. ■■■■ $x^4 - 5x^2 + 4 + 3x^3 - 3x$ $[(x + 1)(x - 1)^2(x + 4)]$
552. ■■■■ $8x^{3n}y + 12x^{2n}y^{n+1} + 6x^ny^{2n+1} + y^{3n+1}$ $[y(2x^n + y^n)^3]$
553. ■■■■ $8x^3(x^3 - 1) - 27y^3(x^3 - 1)$ $[(x - 1)(x^2 + x + 1)(2x - 3y)(4x^2 + 6xy + 9y^2)]$
554. ■■■■ $1 - 8xy - y^2 - 16x^2$ $[(1 - y - 4x)(1 + y + 4x)]$
555. ■■■■ $b^8 + b^4 + 1$ $[(b^2 - b + 1)(b^2 + b + 1)(b^4 - b^2 + 1)]$
556. ■■■■ $a^4 + 4b^4$ $[(a^2 + 2b^2 + 2ab)(a^2 + 2b^2 - 2ab)]$
557. ■■■■ $x^{2n+2} - 2x^{n+2} + x^2$ $[x^2(x^n - 1)^2]$
558. ■■■■ $(2x^2 - 1)^2 - (x^2 + 3)^2$ $[(x - 2)(x + 2)(3x^2 + 2)]$
559. ■■■■ $x^4 + 4x^2y - 2x^2z^2 - 4yz^2 + 4y^2 + z^4$ $[(x^2 + 2y - z^2)^2]$
560. ■■■■ $x^8 - 7x^5 - 8x^2$ $[x^2(x - 2)(x^2 + 2x + 4)(x + 1)(x^2 - x + 1)]$
561. ■■■■ $x^4 - 5x^2 + 4 + 3x^3 - 3x$ $[(x + 1)(x - 1)^2(x + 4)]$
562. ■■■■ $8x^{3n}y + 12x^{2n}y^{n+1} + 6x^ny^{2n+1} + y^{3n+1}$ $[y(2x^n + y^n)^3]$
563. ■■■■ $8x^3(x^3 - 1) - 27y^3(x^3 - 1)$ $[(x - 1)(x^2 + x + 1)(2x - 3y)(4x^2 + 6xy + 9y^2)]$
564. ■■■■ $1 - 8xy - y^2 - 16x^2$ $[(1 - y - 4x)(1 + y + 4x)]$

565. ■■■■	$b^8 + b^4 + 1$	$[(b^2 - b + 1)(b^2 + b + 1)(b^4 - b^2 + 1)]$
566. ■■■■	$x^{3n+1} - x$	$[x(x^n - 1)(x^{2n} + x^n + 1)]$
567. ■■■■	$a^2 + b^2 + 1 + 2ab + 2a + 2b - c^2$	$[(a + b + 1 - c)(a + b + 1 + c)]$
568. ■■■■	$x^4 + x^2y^2 + y^4$	$[(x^2 + xy + y^2)(x^2 - xy + y^2)]$
569. ■■■■	$x^3 - (a + 1)x^2 + (a - 2)x + 2$	$[(x - 1)(x^2 - ax - 2)]$
570. ■■■■	$x^4y^2 - x^2y^4 - x^2 + y^2$	$[(x - y)(x + y)(xy - 1)(xy + 1)]$
571. ■■■■	$x^2 + (3a - 2)x - 6a$	$[(x + 3a)(x - 2)]$
572. ■■■■	$a^{2n} - 2a^nb^m + b^{2m} - c^2$	$[(a^n - b^m - c)(a^n - b^m + c)]$
573. ■■■■	$x^{4n} - 16y^{4n}$	$[(x^n - 2y^n)(x^n + 2y^n)(x^{2n} + 4y^{2n})]$
574. ■■■■	$a(a - 2)^3 - 8a$	$[a(a - 4)(a^2 - 2a + 4)]$
575. ■■■■	$(x + y)^4 - (x - y)^4$	$[8xy(x^2 + y^2)]$
576. ■■■■	$x^{4n} - 13x^{2n} + 36$	$[(x^n - 2)(x^n + 2)(x^n - 3)(x^n + 3)]$
577. ■■■■	$a^4 + a^2b^2 + b^4$	$[(a^2 + ab + b^2)(a^2 - ab + b^2)]$
578. ■■■■	$x^3 - (2a + 1)x^2 + (a^2 + 2a)x - a^2$	$[(x - a)^2(x - 1)]$
579. ■■■■	$y^4 - z^4 + 2y^3z - 2yz^3$	$[(y + z)^3(y - z)]$
580. ■■■■	$4a^{n+1} - 2a^{2n+1} - 4b^n + 2a^nb^n$	$[2(2 - a^n)(a^{n+1} - b^n)]$
581. ■■■■	$x^4 - 7x^3 + 11x^2 - 7x + 10$	$[(x^2 + 1)(x - 5)(x - 2)]$
582. ■■■■	$\frac{1}{16}(x + y)^4 - \frac{1}{2}(x + y)^2 + 1$	$\left[\left(\frac{1}{2}x + \frac{1}{2}y + 1 \right)^2 \left(\frac{1}{2}x + \frac{1}{2}y - 1 \right)^2 \right]$
583. ■■■■	$a^2 - 4ax + 4x^2 - (a - 2x)^2y^4$	$[(a - 2x)^2(1 + y^2)(1 - y)(1 + y)]$
584. ■■■■	$x^6y^6 + x^3y^3 - 6$	$[(x^3y^3 + 3)(x^3y^3 - 2)]$
585. ■■■■	$a^5 + 3a^4 - a^3 - 11a^2 - 12a$	$[a(a + 1)^3(a - 2)(a + 2)]$
586. ■■■□	$x^2 - a^2 - 4a - 4$	$[(x - a - 2)(x + a + 2)]$
587. ■■■□	$2a^3 - 16$	$[2(a - 2)(a^2 + 2a + 4)]$
588. ■■■□	$x^4 - 13x^2 + 36$	$[(x - 2)(x + 2)(x - 3)(x + 3)]$
589. ■■■□	$ax + 2ay - x - 2y$	$[(a - 1)(x + 2y)]$
590. ■■■□	$y^3 + y^2 - 4y - 4$	$[(y + 1)(y - 2)(y + 2)]$
591. ■■■□	$\frac{1}{9}x^2 - \frac{2}{3}x + 1$	$\left[\left(\frac{1}{3}x - 1 \right)^2 \right]$
592. ■■■□	$a^2 - b^2 + 2a - 2b$	$[(a - b)(a + b + 2)]$

593. ■■□ $x^6 - y^6$ $[(x - y)(x + y)(x^2 - xy + y^2)(x^2 + xy + y^2)]$
594. ■■□ $3x^2 - 12x + 12 - 3y^2$ $[3(x - 2 - y)(x - 2 + y)]$
595. ■■□ $a^4 - 2a^2 + 1$ $[(a - 1)^2(a + 1)^2]$
596. ■■■ $x^4 + x^2 + 1$ $[(x^2 + x + 1)(x^2 - x + 1)]$
597. ■■■ $a^4 + 64b^4$ $[(a^2 + 4ab + 8b^2)(a^2 - 4ab + 8b^2)]$
598. ■■■ $a^3 - a^2 - 8a + 12$ $[(a + 3)(a - 2)^2]$
599. ■■■ $x^6 - y^6$ $[(x - y)(x + y)(x^2 + xy + y^2)(x^2 - xy + y^2)]$
600. ■■■ $x^4 + 5x^2 + 9$ $[(x^2 + x + 3)(x^2 - x + 3)]$