ESERCIZI

Eseguire le seguenti somme algebriche tra monomi riducendo i monomi simili:

1 $(-4ab)+(+2ab)-(+5ab)$ $[-7ab]$

2 $\left(-\frac{2}{3}x\right)-\left(-\frac{1}{3}x\right)+\left(-\frac{2}{3}x\right)$ $[-x]$

3 $(-3xy)+(-2x^2y)-(+2xy)$ $[-5xy-2x^2y]$

4 $4x^2y^3-3x^2y^3+4-5x^2y^3-8$ $[-4x^2y^3-4]$

5 $-\frac{1}{2}+2a-3b+\frac{1}{2}-a+3b$ $[a]$

6 $7a^5-(-2a)-(+8a)+(-a^5)$ $[6a^5-6a]$

7 $-\frac{2}{3}a+a^2-\left(-\frac{1}{3}a\right)-\frac{1}{2}a^2$ $\left[\frac{1}{2}a^2-\frac{1}{3}a\right]$

8 $0{,}5x-0{,}2xy+\frac{1}{2}xy-x$ $[-0{,}5x+0{,}3xy]$

9 $2x^{-4}-3x^{-2}+x^{-4}-x^{-2}$ $[3x^{-4}-4x^{-2}]$

10 $-(-xy)+4xy-\frac{5}{2}+(-5xy)+\frac{3}{2}$ $[-1]$

11 $\frac{4}{3}x^4-\frac{1}{2}x^3+\frac{1}{4}x^4+0{,}5x^3$ $\left[\frac{19}{12}x^4\right]$

12 $-\frac{3}{8}xy+2x-\frac{xy}{8}+\frac{1}{2}x-x$ $\left[-\frac{1}{2}xy+\frac{3}{2}x\right]$

13 $\frac{4xy^3}{3}-\frac{xy^2}{2}+\left(-\frac{4}{3}xy^3\right)-\left(+\frac{1}{2}xy^2\right)$ $[-xy^2]$

14 $-\frac{5}{8}ab^5-\frac{1}{4}ab^2+\frac{1}{4}ab^5-ab^2+\frac{1}{2}ab^2$ $\left[-\frac{3}{8}ab^5-\frac{3}{4}ab^2\right]$

15 $2x^m-\frac{2}{3}x^{m+1}+\frac{1}{2}x^m-\frac{1}{3}x^{m+1}$ $\left[\frac{5}{2}x^m-x^{m+1}\right]$

Eseguire le seguenti moltiplicazioni tra monomi:

16 $\left(\frac{1}{2}a^2b\right)\cdot\left(\frac{4}{3}a^3b^2\right)$ $\left[\frac{2}{3}a^5b^3\right]$

17 $\left(-\frac{2}{5}x^3y^2z^4\right)\cdot\left(\frac{1}{10}xy^3z^2\right)$ $\left[-\frac{1}{25}x^4y^5z^6\right]$

18 $(-5ab^3)\cdot\left(-\frac{2}{5}a^2b\right)\cdot\left(-\frac{3}{2}ab^4\right)$ $[-3a^4b^8]$

19 $\frac{2}{3}abc^2\cdot\left(-\frac{3}{4}ac^3\right)\cdot 2abc$ $[-a^3b^2c^6]$

20 $-x^2 \cdot \left(+\frac{2}{3}xy^4\right) \cdot \left(-\frac{3}{8}y^5\right)$ $\left[\frac{1}{4}x^3y^9\right]$

21 $+\frac{2}{3}xyz^3 \cdot \left(-\frac{3}{10}x^2\right) \cdot (-2x^4y^2z^5)$ $\left[\frac{2}{5}x^7y^3z^8\right]$

22 $\frac{2}{5}xy \cdot (-0{,}2x^2y^3) \cdot \left(+\frac{25}{4}y^4\right) \cdot 2x$ $[-x^4y^8]$

23 $2x^m \cdot \left(-\frac{3}{2}x^{2m}\right)$ $[-3x^{3m}]$

24 $x^m y^{2m} \cdot (+4xy^3)$ $[4x^{m+1}y^{2m+3}]$

25 $-2x^{m+1}y^2 \cdot \left(-\frac{1}{2}x^3y^{m+1}\right) \cdot (+3x^my^3)$ $[3x^{2m+4}y^{m+6}]$

26 $a^{-m}b^n \cdot \left(\frac{1}{2}a^2b^n\right) \cdot (-4a^mb^{-n})$ $[-2a^2b^n]$

27 $3x^{2\cdot n}y^3 \cdot (-x^{2+m}y^{-2}) \cdot (+x^my)$ $[-3x^{4+m}y^2]$

Eseguire le operazioni indicate:

28 $(2a+3a) \cdot (b-3b)$ $[-10ab]$

29 $\left(\frac{1}{2}ab - ab\right) \cdot (a^2 - 3a^2 + 4a^2)$ $[-a^3b]$

30 $\left(-\frac{1}{3}a^3 + \frac{1}{2}a^3 - 2a^3\right) \cdot (a^{-1} + 2a^{-1})$ $\left[-\frac{11}{2}a^2\right]$

31 $\left(2xy - \frac{1}{2}xy\right) \cdot \left(-3x^2 + \frac{1}{2}x^2 - x^2\right)$ $\left[-\frac{21}{4}x^3y\right]$

32 $(-2x^4y - 3x^4y + 5x^4y) \cdot \left(-\frac{2}{3}xy^2 + \frac{1}{2}xy^2\right)$ $[0]$

33 $\left(-\frac{9}{2}a^5 + \frac{3}{2}a^5\right) \cdot \left(-\frac{2}{3}a^{-5}\right)$ $[2]$

34 $\left(-\frac{4}{5}ab + 2ab - ab\right) \cdot \left(-3a^4b^3 + \frac{1}{2}a^4b^3\right)$ $\left[-\frac{1}{2}a^5b^4\right]$

35 $\left(\frac{4}{3}x^3 - \frac{2}{3}x^3 + x^3\right) \cdot \left(-\frac{1}{2}x + x - \frac{1}{2}x\right)$ $[0]$

36 $\left(x^4 - \frac{3}{2}x^4 + 0{,}5x^4\right) \cdot \left(0{,}3x^2 - x^2 + \frac{7}{10}x^2\right)$ $[0]$

37 $\left(-\frac{4}{3}xy\right) \cdot (-x^2y) + x^3y^2$ $\left[\frac{7}{3}x^3y^2\right]$

38 $\left(-\frac{1}{2}x^4y^5\right) \cdot (+x^{-1}y^2) - 2x^3y^7$ $\left[-\frac{5}{2}x^3y^7\right]$

39 $(-xy^2) \cdot (+x^{-1}y^2) + \left(+\frac{2}{3}y\right) \cdot (-y^3)$ $\left[-\frac{5}{3}y^4\right]$

40 $\left(+\frac{2}{5}ab^3\right)\cdot(-5ab)-(+a^2b^2)\cdot\left(-\frac{1}{2}b^2\right)$ $\left[-\frac{3}{2}a^2b^4\right]$

41 $2a^5\cdot(-ab^3)-a^2b\cdot(+a^4b^2)+\frac{1}{2}a^6b^3$ $\left[-\frac{5}{2}a^6b^3\right]$

42 $\left[-2a\cdot(-3ab)+a^2b-b\cdot\left(-\frac{1}{2}a^2\right)\right]\cdot\left(a+\frac{3}{2}a\right)$ $\left[\frac{75}{4}a^3b\right]$

Eseguire le seguenti divisioni tra monomi:

43 $\left(-\frac{2}{3}x^3y^2\right):\left(\frac{1}{3}xy\right)$ $[-2x^2y]$

44 $\left(+\frac{4}{5}x^4y^3z^5\right):(-2xy^2z^3)$ $\left[-\frac{2}{5}x^3yz^2\right]$

45 $\left(-\frac{2}{3}a^6b^5\right):\left(-\frac{4}{3}ab^4\right)$ $\left[\frac{1}{2}a^5b\right]$

46 $(+0{,}5a^3b^2c^4):(+0{,}2a^3bc^4)$ $\left[\frac{5}{2}b\right]$

47 $(-0{,}\overline{3}a^4b^7):(0{,}\overline{2}ab^7)$ $\left[-\frac{3}{2}a^3\right]$

48 $\left(+\frac{4}{5}ab^2c^2\right):\left(-\frac{2}{15}abc\right)$ $[-6bc]$

49 $(+2a^2b^3):\left(-\frac{1}{2}a^3b^2\right)$ $[-4a^{-1}b]$

50 $\left(-\frac{2}{5}ab^{-2}\right):\left(+\frac{4}{5}a^{-1}b^{-3}\right)$ $\left[-\frac{1}{2}a^2b\right]$

51 $\left(-\frac{2}{3}x^{m+2}y^{m+3}\right):\left(-\frac{1}{3}x^my^4\right)$ $[2x^2y^{m-1}]$

52 $\frac{2}{5}x^{3m}y^{m-1}:\left(\frac{1}{5}x^{2m}y^m\right)$ $[2x^my^{-1}]$

53 $2ab^2:ac^2$ $[2b^2c^{-2}]$

Eseguire le operazioni indicate:

54 $(2a^2-7a^2):\left(\frac{1}{2}a-4\right)$ $[10a]$

55 $(3a^4b^2-a^4b^2-8a^4b^2):\left(-a^3b+\frac{1}{3}a^3b\right)$ $[9ab]$

56 $\left(-\frac{2}{5}a^5b^2+\frac{1}{5}a^5b^2\right):(a^3b-3a^3b)$ $\left[\frac{1}{10}a^2b\right]$

57 $\left(0{,}3a^4b-0{,}5a^4b+\frac{1}{2}a^4b\right):\left(-0{,}2a^2b+\frac{1}{2}a^2b\right)$ $[a^2]$

58 $\left(-\frac{4}{5}a^7b^2\right)\cdot(-5ab^3):(-4a^5b^2)$ $[-a^3b^3]$

59 $+\frac{5}{9}a^3b^2\cdot\left(-\frac{9}{2}ab^5\right):\left(-\frac{1}{2}a^4b^7\right)$ $[5]$

60 $\frac{2}{3}a^2b^4:\left(-\frac{1}{3}ab^2\right) - (-2a^5b^3):(-a^4b)$ $[-4ab^2]$

61 $-x^7y^2:(2x^5y) + xy \cdot (-3x)$ $\left[-\frac{7}{2}x^2y\right]$

62 $(2a^3 - 5a^3):\left(\frac{1}{2}a - 3a\right) + (-a^4 + 3a^4):\left(-\frac{1}{2}a^2\right)$ $\left[-\frac{14}{5}a^2\right]$

63 $(3x^4y - x^4y):(-x^2y - x^2y) + (2x^3 - x^3):\left(3x + \frac{1}{2}x\right)$ $\left[-\frac{5}{7}x^2\right]$

64 $(x^4y^5 - 2x^2y^3 \cdot x^2y^2):(3x^2y - 8x^2y)$ $\left[\frac{1}{5}x^2y^4\right]$

65 $[-3x^4y^5:(-9xy^3)]:\left(+\frac{2}{3}x^2y^2\right)$ $\left[\frac{1}{2}x\right]$

66 $\left[\left(4x^3y^2 - \frac{1}{3}x^3y^2\right):(-7xy)\right]:\left(-\frac{4}{3}x^2y\right)$ $\left[\frac{3}{8}\right]$

67 $\left(\frac{8}{7}x^4 - \frac{1}{7}x^4 - x^4\right) \cdot (3x - 8x):\left(-\frac{5}{4}\right)$ $[0]$

68 $(x^{2m} + 2x^{2m} - 4x^{2m}):\left(x^{1-m} - \frac{1}{2}x^{1-m}\right)$ $[-2x^{2m-1}]$

Calcolare le seguenti potenze:

69 $(-5a^2b^3)^2$; $\left(+\frac{1}{2}ab^2c\right)^2$ $\left[25a^4b^6;\ \frac{1}{4}a^2b^4c^2\right]$

70 $\left(-\frac{2}{3}xy^5\right)^3$; $\left(+\frac{1}{4}x^3y^2z\right)^3$ $\left[-\frac{8}{27}x^3y^{15};\ \frac{1}{64}x^9y^6z^3\right]$

71 $(-2a^5bc^3)^4$; $(+3ab^6)^0$ $[16a^{20}b^4c^{12};\ 1]$

72 $(-a^2b^3)^2$; $\left(-\frac{1}{2}ab^3\right)^3$ $\left[a^4b^6;\ -\frac{1}{8}a^3b^9\right]$

73 $\left(-\frac{2}{3}a^{13}b^5\right)^2$; $\left(+\frac{3}{2}ab^4\right)^3$ $\left[\frac{4}{9}a^{26}b^{10};\ \frac{27}{8}a^3b^{12}\right]$

Eseguire le operazioni indicate:

74 $\left(-\frac{1}{2}x^2y\right)^3 \cdot (-2xy^3)^2$ $\left[-\frac{1}{2}x^8y^9\right]$

75 $\left(-\frac{2}{3}xyz^2\right) \cdot (+3xy^3)^3 \cdot (-xy)^4$ $[+18x^8y^{14}z^2]$

76 $\left[\left(\frac{1}{2}a^5b^3\right)^2 \cdot (2ab^2)^3\right] : (-ab)^2$ $[2a^{11}b^{10}]$

77 $\left(2a - \frac{1}{2}a\right)^2 \cdot (-2ab - 2ab)^3$ $[-144a^5b^3]$

78 $\left(-\frac{3}{2}ab - 0{,}5ab\right)^3 \cdot \left(1 - \frac{2}{3}\right)^2$ $\left[-\frac{8}{9}a^3b^3\right]$

79 $\left(\frac{1}{2}ab - 3ab\right) : \left(a^2 - 3a^2 + \frac{1}{2}a^2\right)^0$ $\left[-\frac{5}{2}ab\right]$

80 $(-0{,}2x^4 + 0{,}6x^4)^2 : \left(3x - \frac{5}{2}x\right)$ $[0{,}32x^7]$

81 $\left[(-2a)^2 \cdot \left(\frac{1}{2}ab\right)^3 - a^5b^3\right] : (a^2b)$ $\left[-\frac{1}{2}a^3b^2\right]$

82 $\left[(-c^2)^2 + \left(-\frac{1}{2}c^3\right) \cdot (2c)\right] : \left[(-2a^5b)^2 - a^7 \cdot \left(\frac{1}{2}a^3b^2\right)\right]$ $[0]$

83 $(2ab)^2 : 4ab^2 + 3a^4 : \left(-\frac{3}{2}a\right)^3 + \frac{4}{3}a^3b^2 : \left(\frac{1}{3}ab\right)^2 - 10a$ $\left[\frac{19}{9}a\right]$

84 $[(-ab^3)(-5a^3b) : (-ab)^2]^2 : \left(\frac{5}{3}ab^2\right)^2 - 2a^2$ $[7a^2]$

85 $[(-2xy^2)^2 : 4x^2]^3 - \left[\left(\frac{1}{4}x^3y^2\right)^2 : \left(-\frac{1}{2}x^3\right)^2\right]^3 + \frac{5}{64}y^{12}$ $\left[\frac{17}{16}y^{12}\right]$

86 $\left[\frac{1}{3}a^4bc^3 : \frac{6}{5}abc + \frac{1}{2}a^3(2c)^2 - \frac{1}{3}a^2\left(-\frac{9}{2}ac^2\right)\right] : 34ac + a^2c$ $\left[\frac{10}{9}a^2c\right]$

87 $\left\{\left[\frac{4}{5}a^3b^4c : \left(-\frac{2}{5}ab^2\right)\right]^2 + (-2a^2bc)^2(-7b^2)\right\} : (-12a^2b^4) + (-ac)^2$ $[3a^2c^2]$

88 $\left[\frac{2}{3}x^5y^5 : (-2xy^2)^2 + \left(\frac{1}{2}xy^8\right)^3 : y^{23} + \frac{5}{6}x^3y + \frac{3}{8}x^4y : x\right] : (-3xy)$ $\left[-\frac{1}{2}x^2\right]$

89 $\left\{[(2ab^2)^2 : 4a^2]^3 + 16 \cdot \left[\left(-\frac{1}{16}a^6b^4\right) : \left(\frac{1}{4}a^6\right)\right]^3\right\} : \frac{b^6}{4} + b^6$ $[4b^6]$

90 $\left\{\frac{5}{24}a^6b^6 : \left[\left(-\frac{3}{4}b^2\right)^2 ab^2 - \frac{1}{3}ab^6 - 2ab^2\left(-\frac{1}{4}b^2\right)^2\right] - \frac{1}{2}a^5\right\}^2$ $\left[\frac{9}{4}a^{10}\right]$

91 $\left[(-xy)^2 : xy^2 - 3x^4 : \left(\frac{3}{2}x\right)^3 + \frac{4}{3}x^3y^2 : \left(-\frac{1}{3}xy\right)^2\right] \cdot (-3x)^3 + 300x^4$ $[-27x^4]$

92 $[5a^3(-2ab)^2 - 2a(-a^2b)^2 + (-ab)^2(-2a)^3 - (-a)^3(-4ab)^2] : (-13a^4b^2)$ $[-2a]$

93 $\left\{\left[(-3a^2b)^3 : (6a^2)^2 + \frac{1}{4}a^2b^3\right]^2 : \left(-\frac{1}{2}a^2b^3\right)^2\right\}^4 \cdot (-2ab^2)^3 + 8a^3b^6$ $[0]$

94 $16b^6 : \left\{\left[2a^4b^2 : \left(-\frac{1}{10}a^2b\right) - 2a^3b^3 : (-ab^2)\right]^3 : (-9a^3)^2 + (4b)^3\right\}$ $[-2b^3]$

95 $29x^9 : \left[\left(-\frac{3}{4}x^3\right)(-2x^2)^2\left(-\frac{2}{9}x\right) - \left(-\frac{1}{2}x^2\right)^4\right] + [(-3x)^3 : 9x - (-2x)^2] : (-7x)$ $[49x]$

96 $\left\{\frac{5}{8}ab + 9a^2b : 6a - \left[\left(\frac{1}{2}a^3b^3\right)^2 + \left(-\frac{1}{2}a^2b^2\right)^3\right] : (ab)^5\right\}^2 : (-3ab)^2 + 1$ $\left[\frac{13}{9}\right]$

97 $[(-a^2b)^3 (-ab^2)^3 + (-0{,}5ab^2)^4 a^5b + (-0{,}5a^3b^3)^3] : \left[-\left(\frac{1}{4}a^2b^2\right)^2 + a^4b^4\right]$ $[a^5b^5]$

98 $\{[-(2x^2y)^2]^2 - (5x^4y^2)^2 + x^8y^4\}^2 : \left[(xy^3)^2 (-xy) - \frac{1}{3}y(-xy^2)^3\right] + 96x^{13}y$ $[0]$

99 $\{[-0{,}4a^3b^3 : (-0{,}2ab^2) - 20a^2b]^3 : (-9a^3)^2 + 64b^3\}^2 : (4b^2)^3 + 2$ $[3]$

100 $2x^2 - x^2\{[-27x^6y^3 : (-6x^2)^2 + 0{,}25x^2y^3]^2 : (-0{,}5x^2y^3)^2\}^5$ $[x^2]$

101 $\left[-2ab^3 \cdot \left(-\frac{1}{2}ax^4\right) + \frac{3}{5}a^2x^2 \cdot \left(-\frac{5}{2}b^3x^2\right)\right]^3 : \left[ab^3x^2 + \frac{3}{4}b^2 \cdot (-abx^2)\right]^2$ $[-2a^4b^3x^8]$

102 $\left(-\frac{2}{5}ac\right)^3 : \left\{\left[(-a^{-2}b^3c)^2 \cdot (2a^4b^{-5}c^{-1}) - \frac{1}{5}bc\right]^2 : (1{,}8b)^2 - \left(-\frac{3}{5}c\right)^2\right\} + 0{,}3a^3c$ $\left[\frac{1}{5}a^3c\right]$

103 $\left\{\left[\left(\frac{1}{2}ab^2 + \frac{1}{3}ab^2\right)^2 : \frac{5}{18}a^2 + \frac{3}{2}b^4\right] : 2b^3 - 2b\right\}^6$ $[0]$

104 $\left[\left(-2ab^2 + \frac{1}{2}ab : b^{-1}\right) : \left(a^2bc^2 - \frac{1}{2}a^2bc^2\right)\right]^2$ $[9a^2b^2c^{-4}]$

105 $\left(\frac{1}{2}a^3b^2 - 2ab^2 : a^{-2}\right)^2 : \left(ac^3 - \frac{2}{3}ac^3\right)$ $\left[\frac{27}{4}a^5b^4c^{-3}\right]$

Trovare il M.C.D. ed il m.c.m. dei seguenti gruppi di monomi interi:

106 $3a^3b^2$; $6a^4b^3$; $27a^2b^5$ $[3a^2b^2;\ 54a^4b^5]$

107 $a^4b^2c^6$; $3ab^5$; $2a^6bc^4$ $[ab;\ 6a^6b^5c^6]$

108 $10x^2y^3$; $15x^7y$; $45x^3y^4z^5$ $[5x^2y;\ 90x^7y^4z^5]$

109 $4x^3y^2$; $3x^2z^3$; $5yz$ $[1;\ 60x^3y^2z^3]$

110 $2x^4y^5$; $3xy^6z$; $5xz^5$ $[x;\ 30x^4y^6z^5]$

111 $100x^3y^3z^2$; $20xyz^5$; $10xz^4$ $[10xz^2;\ 100x^3y^3z^5]$

Eseguire le seguenti somme algebriche tra polinomi riducendo poi i termini simili:

112 $(2a - 3) + (a^2 + 4a - 2)$ $[a^2 + 6a - 5]$

113 $(3a^2 + 2ab - b^2) + (-a^2 - 2ab - b^2)$ $[2a^2 - 2b^2]$

114 $\left(\frac{1}{2} - x^3 + 3x - y\right) + \left(\frac{3}{2} + x^3 - 2x - 8y\right)$ $[2 + x - 9y]$

115 $\left(\frac{1}{3}ab - \frac{1}{2}a^2 + 1\right) + \left(-\frac{2}{3}ab - \frac{3}{2}a^2 + \frac{1}{3}\right)$ $\left[-\frac{1}{3}ab - 2a^2 + \frac{4}{3}\right]$

116 $\left(x^4 - \frac{x^2y}{3} + 4x - 2y\right) + (2y - 6x) + \left(\frac{2x^2y}{3} - x^4\right)$ $\left[\frac{1}{3}x^2y - 2x\right]$

117 $(8x^2 - 3xy + 4) + (-2xy - 5x^2 - 4 + y^2)$ $[3x^2 - 5xy + y^2]$

118 $(5x^3 - 2x + 8) + (2x^3 - 9x + 1) + (-3x^3 - 9)$ $[4x^3 - 11x]$

119 $\left(\frac{1}{4}xy - x^4 + 2x\right) + \left(1 - 3x - \frac{x^4}{3}\right) + \left(2 - \frac{3}{2}x - \frac{4}{3}x^4\right)$ $\left[-\frac{8}{3}x^4 + \frac{1}{4}xy - \frac{5}{2}x + 3\right]$

Eseguire le seguenti differenze tra polinomi riducendo poi i termini simili:

120 $(2 - 8x + y) - \left(\frac{1}{2}x + \frac{1}{2}\right)$ $\left[\frac{3}{2} - \frac{17}{2}x + y\right]$

121 $\left(0{,}5a^3 - \frac{1}{2}a + 0{,}3\right) - (0{,}5a + 2{,}5a^3 - 0{,}1)$ $[-2a^3 - a + 0{,}4]$

122 $\left(0{,}\bar{3}a^4 + \frac{1}{3}a^2 - \frac{1}{9}\right) - \left(\frac{5}{9} - \frac{2}{9}a^4 + 0{,}\bar{3}a^2\right)$ $\left[\frac{5}{9}a^4 - \frac{2}{3}\right]$

123 $\left(8x^3 - \frac{1}{2}x^4 + 1\right) - (-2 + 0{,}5x^4 - 2x^3) - (3 - 9x^4)$ $[8x^4 + 10x^3]$

124 $(3 + y - x^2) - \left(2 - 2y + \frac{1}{2}x^2\right)$ $\left[1 + 3y - \frac{3}{2}x^2\right]$

125 $\left(\frac{1}{4}x^2y - x^2z - \frac{xyz}{3}\right) - (2xyz - x^2z) - \left(0{,}25x^2y - \frac{7}{3}xyz\right)$ $[0]$

126 $\left(-\frac{2}{3}a^3 + a^2 - \frac{1}{2}a\right) - (a^3 - a^2 + 4a) - \left(2a^2 - \frac{9a}{2}\right)$ $\left[-\frac{5}{3}a^3\right]$

Eseguire le seguenti operazioni indicate e ridurre i termini simili:

127 $(3a^2 + 2a - 1) + (-a + 2 - a^2) - (-5a^2 + 4a)$ $[7a^2 - 3a + 1]$

128 $(4a + 2b) + [2a - (5b - a)]$ $[7a - 3b]$

129 $\frac{1}{2}a^2 + \left[-a + \left(\frac{1}{2}a - a^2\right)\right] - \left(a + \frac{a^2}{2}\right)$ $\left[-a^2 - \frac{3}{2}a\right]$

130 $(2xy + 1 - x) + [-(3x - xy) + x - (3xy + 1)]$ $[-3x]$

131 $3 - \left[4x + \left(-5 + \frac{1}{2}x\right) - \left(\frac{3}{2} + \frac{x}{2}\right)\right] - \left(\frac{8x}{3} - 2\right)$ $\left[\frac{23}{2} - \frac{20}{3}x\right]$

132 $(3a^2 - b^2) - \left\{a^2 - \left[4b^2 + \left(\frac{a^2}{2} - b^2\right)\right]\right\}$ $\left[\frac{5}{2}a^2 + 2b^2\right]$

133 $\frac{xy}{2} - \left[\frac{3}{2} + \left(-\frac{xy}{2} + \frac{1}{2}\right) - xy\right] - \left[1 + \left(2xy - \frac{3}{2}\right)\right]$ $\left[-\frac{3}{2}\right]$

134 $5x + \left[8x^3 - \frac{4x^2}{3} - \left(2x - \frac{x^2}{2}\right)\right] - \left[2x^3 - \frac{x}{2} + (3x - x^2)\right]$ $\left[6x^3 + \frac{1}{2}x^2 + \frac{x}{2}\right]$

135 $0{,}3xy - \frac{1}{2}x + \left(-0{,}4x + \frac{xy}{5}\right) + [-8x - (2xy - 0{,}1x)]$ $\left[-\frac{3}{2}xy - \frac{44}{5}x\right]$

136 $\left[\frac{a^2b^2}{3} - ab + \left(\frac{2ab}{3} - a^2b^2\right)\right] - \left\{\frac{ab}{2} - \left[2ab + \left(ab - \frac{a^2b^2}{3}\right)\right]\right\}$ $\left[-a^2b^2 + \frac{13}{6}ab\right]$

137 $\left[-\frac{5}{2} + 0{,}2 - (0{,}\bar{3}x + 0{,}\bar{2}y)\right] - \{-[0{,}3 + 0{,}\bar{8}x - (x + 0{,}1y)] + 2x\}$ $\left[-2 - \frac{22}{9}x - \frac{29}{90}y\right]$

138 $\left\{8{,}1x^2 - \left[0{,}2x^2 + 3xy - \left(\frac{1}{10}x^2 - \frac{xy}{3}\right)\right] - 1{,}1x^2\right\} + 8x^2 - \left(-xy + \frac{x^2}{2}\right)$ $\left[14{,}4x^2 - \frac{7}{3}xy\right]$

139 $-\left[2a^3b - \left(\frac{a^2b^2}{2} + 0{,}5a^3b\right)\right] + \left\{-\left[-\left(-\frac{a^3b}{2} + \frac{a^2b^2}{3}\right)\right]\right\} - \frac{5}{6}a^2b^2$ $[-2a^3b]$

140 $\frac{abc}{5} - 0{,}2a^3 + \left[\frac{abc}{2} - \left(\frac{a^3}{4} - abc\right) + (1 - a^3 + 3abc) - 2\right] + 1$ $\left[\frac{47}{10}abc - \frac{29}{20}a^3\right]$

141 $a^{10} - a^7 + \left(\frac{1}{2}a^{10} + 0{,}5a^7\right) - \left[\frac{1}{2}a^{10} - (-a^{10} + 0{,}6a^7) + \frac{a^7}{10}\right]$ $[0]$

142 $[0{,}01a^5 + [2 - 0{,}02a^5 - (1 + a^5)] - a^5 + 3] - [+2a^5 + (-4 + 0{,}01a^5)]$ $[0]$

143 $(x^m - 2x^{m-2}) + \left[3 - 3x^m - \left(x^{m-2} + \frac{1}{2}\right)\right] + \left(3x^{m-2} - \frac{5}{2}\right)$ $[-2x^m]$

144 $a^n b^{2n} - \frac{4}{5}a^{2n}b^n - \left(a^{2n}b^n + \frac{1}{2}\right) - \left[0{,}5 + \left(\frac{a^n b^{2n}}{2} - 1\right)\right]$ $\left[0{,}5a^n b^{2n} - \frac{9}{5}a^{2n}b^n\right]$

Eseguire le seguenti moltiplicazioni tra un monomio ed un polinomio:

145 $2a^2 \cdot (ab - a^3 + 1)$ $[2a^3b - 2a^5 + 2a^2]$

146 $xy^2 \cdot (-x + 2xy + y^2)$ $[-x^2y^2 + 2x^2y^3 + xy^4]$

147 $\frac{1}{2}a^3b \cdot (-2 + 4ab)$ $[-a^3b + 2a^4b^2]$

148 $\frac{x^2y}{3} \cdot \left(x^4 - 9xy^2 + \frac{3}{2}y\right)$ $\left[\frac{x^6y}{3} - 3x^3y^3 + \frac{x^2y^2}{2}\right]$

149 $-2x^4 \cdot \left(\frac{2x}{3} - \frac{4}{5}xy^3 - \frac{1}{2}\right)$ $\left[-\frac{4}{3}x^5 + \frac{8}{5}x^5y^3 + x^4\right]$

150 $-\frac{a^5b^2}{2} \cdot \left(-a^5 + 4ab^2 - \frac{ab^3}{2}\right)$ $\left[\frac{1}{2}a^{10}b^2 - 2a^6b^4 + \frac{1}{6}a^6b^5\right]$

151 $\left(\frac{xyz}{4} - x^2y + \frac{1}{2}\right) \cdot 8xz^2$ $[2x^2yz^3 - 8x^3yz^2 + 4xz^2]$

152 $\left(-\frac{3}{2} + \frac{a^5b}{2} - \frac{1}{3}\right) \cdot \left(-\frac{2}{3}a\right)$ $\left[-\frac{1}{3}a^6b + \frac{11}{9}a\right]$

153 $\left(-\frac{8ab^3}{3} + \frac{2}{9}a\right) \cdot \left(-\frac{3}{2}b^4\right)$ $\left[4ab^7 - \frac{1}{3}ab^4\right]$

154 $\left(-0{,}5 + \frac{1}{2}a^3 - \frac{b}{4}\right) \cdot (-2ab^2)$ $\left[ab^2 - a^4b^2 + \frac{1}{2}ab^3\right]$

155 $(a^3b^{-2} + 2a^2b^{-1} - ab^3) \cdot \left(-\frac{ab}{2}\right)$ $\left[-\frac{1}{2}a^4b^{-1} - a^3 + \frac{1}{2}a^2b^4\right]$

156 $\left(-\frac{3}{2}a^5 + \frac{2}{3}ab - b\right) \cdot ab^{-4}$ $\left[-\frac{3}{2}a^6b^{-4} + \frac{2}{3}a^2b^{-3} - ab^{-3}\right]$

157 $-\frac{5}{4}a^{-3}b^{-1} \cdot \left(2a - 8a^2b^{-1} + \frac{4}{5}a^3b + \frac{4}{5}\right)$ $\left[-\frac{5}{2}a^{-2}b^{-1} + 10a^{-1}b^{-2} - 1 - a^{-3}b^{-1}\right]$

158 $x^m \cdot (2x^m + 3x^{2m}y^2 - x^{m+1}y^3)$ $[2x^{2m} + 3x^{3m}y^2 - x^{2m+1}y^3]$

159 $x^{m+1}y^{n-1} \cdot (x^my - 2x^{m-1}y^{-n} + xy^2)$ $[x^{2m+1}y^n - 2x^{2m}y^{-1} + x^{m+2}y^{n+1}]$

Eseguire le operazioni indicate:

160 $3x \cdot (xy - 2y) + 2y \cdot (-x^2 + x - 1)$ $[x^2y - 4xy - 2y]$

161 $\frac{1}{2}ab \cdot (a + 3b + 2) - a \cdot \left(ab + \frac{3}{2}b^2 + b\right)$ $\left[-\frac{1}{2}a^2b\right]$

162 $(3x + 5y + 2) \cdot x^2y - xy^2 \cdot (-4x + 1)$ $[3x^3y + 9x^2y^2 + 2x^2y - xy^2]$

163 $\left(-\frac{1}{2} + a^3 - 2b\right) \cdot 2a - 3 \cdot \left(ab - \frac{1}{2}a\right)$ $\left[2a^4 - 7ab + \frac{1}{2}a\right]$

164 $\left(\frac{2}{5}x - \frac{3}{2}y + 2\right) \cdot (-xy) + \left(4x^2 - \frac{1}{2}x\right) \cdot \left(-\frac{2}{3}y\right) + \frac{46}{15}x^2y$ $\left[\frac{3}{2}xy^2 - \frac{5}{3}xy\right]$

165 $\frac{3}{2}a^2(a - b + 1) - \frac{2}{3}a(-a^2 + a) - a^2(b - 3) - \frac{23}{6}a^2$ $\left[\frac{13}{6}a^3 - \frac{5}{2}a^2b\right]$

166 $2a - b\,(3b - a) + b^2 - \frac{a}{2}(1 - b)$ $\left[\frac{3}{2}a - 2b^2 + \frac{3}{2}ab\right]$

167 $a^2 - ab\,(b - c) - \frac{a}{2}(bc + a - 1) - 3a + 4ab^2$ $\left[\frac{1}{2}a^2 + \frac{1}{2}abc - \frac{5}{2}a + 3ab^2\right]$

168 $(x^2 - 2y)\left(-\frac{1}{2}xy^3\right) - (2xy^2 + x)\,x^2y + xy\,(x^2 - y^3)$ $\left[-\frac{5}{2}x^3y^3\right]$

Eseguire le seguenti moltiplicazioni tra polinomi:

169 $(3a - 2b) \cdot (a + 2b)$ $[3a^2 - 4b^2 + 4ab]$

170 $(a^2 - 3b + 1)(-2 + a^2 - b)$ $[-a^2 + a^4 - 4a^2b + 5b + 3b^2 - 2]$

171 $(3 - x + 2y)(x - 3y + 1)$ $[-x^2 - 6y^2 + 5xy + 2x - 7y + 3]$

172 $\left(-\frac{y}{2} + 2x - \frac{3}{2}\right)(-x + 2y + 1)$ $\left[-2x^2 - y^2 + \frac{9}{2}xy + \frac{7}{2}x - \frac{7}{2}y - \frac{3}{2}\right]$

173 $(a + b)(a - b)(2a - b)$ $[2a^3 - a^2b - 2ab^2 + b^3]$

174 $(x - 1)(x + 2)(x + 1)$ $[x^3 + 2x^2 - x - 2]$

175 $x\,(2x + 1)(x - 2)$ $[2x^3 - 3x^2 - 2x]$

176 $(1 + 2a)(3a + 2)(1 - a)$ $[-6a^3 - a^2 + 5a + 2]$

177 $-\frac{xy}{2}(1 - xy)\left(2xy + \frac{1}{2}\right)$ $\left[x^3y^3 - \frac{3}{4}x^2y^2 - \frac{1}{4}xy\right]$

Eseguire le operazioni indicate:

178 $(a - 2b)(2a + 3b) + (a + 4b)(a - b)$ $[3a^2 - 10b^2 + 2ab]$

179 $(1 - 2a)(a - 3) + (a - 1)(3a + 2)$ $[a^2 + 6a - 5]$

180 $\left(2x - \frac{1}{2}\right)(2 - 3x) + (4x + 1)\left(\frac{1}{2}x - 1\right)$ $[-4x^2 + 2x - 2]$

181 $(a + 4b)(a - b) - (2a - b)(2a + b)$ $[-3a^2 - 3b^2 + 3ab]$

182 $\left(-a + \frac{3}{2}\right)(a + 1) - \left(\frac{a}{2} - 1\right)\left(2a + \frac{3}{2}\right)$ $\left[-2a^2 + \frac{7}{4}a + 3\right]$

183 $(a + b - 3)(2a - b + 1) + (a - 3b)(-b)$ $[2b^2 + 2a^2 - 5a + 4b - 3]$

184 $\frac{3}{2}a\,(2a+1-b)-(-a+b+4)\,(a-b)-4a\,(a-1)-\frac{3}{2}a$ $\left[-\frac{7}{2}ab+b^2+\ldots\right]$

185 $(a-2b)\,(a+2b)-a\,(a+2b)-b\,(-4b-2a)$

186 $2a\,(a-3b)\,(a+b)-b\,(2a+b)\,(a-b)$ $[2a^3+b^3-5ab^2-6\ldots]$

187 $\frac{2}{3}x^2\,(x+y-1)-2x\,(x+1)\,(x-y)-\frac{4}{3}x^2\,(2y-x)$ $\left[-\frac{8}{3}x^2+2\ldots\right]$

188 $(2x^2-y^2)\,(x+y)+\frac{1}{2}y^2\,(x-2y)-3x^2\,(x+2y)$ $\left[-x^3-2y^3-4x^2y-\frac{1}{2}\ldots\right]$

189 $(3x-y+1)\left(-x+\frac{y}{2}-2\right)-\left(3x-\frac{y}{2}+4\right)\left(-x+y-\frac{1}{2}\right)+\frac{1}{2}\left(2xy+3x+\frac{7}{2}y\right)$

190 $[2x^2+(x-2)\,(-2x+1)]\,(x-3)-(5x-4)\,(x+3)-18$ $[-2\ldots]$

191 $(a-2b)\left[b^2-\frac{1}{2}a\,(4a-2b)\right]-3a\,[(a-2b)\,(3a+b)+5ab]-5ab\,(a+b)$ $[-11a^3-2\ldots]$

192 $\left(\frac{3}{2}xy^2-\frac{1}{5}x^2y\right)\left(2x+\frac{20}{3}y\right)-2xy\left(5y^2-\frac{x^2}{5}\right)-\frac{2}{3}x^2y^2$ $[x^3\ldots]$

193 $\{-b^2\,[(2a+3b)\,(a+b)-(5ab+2a^2-2b^2)]-2b^4\}\left(-\frac{1}{7}b\right)+b^5$ $[2b^5]$

194 $2x\,[(2x+y-2)\,(2x-y+1)-(4x-y)\,(x+y+1)-2\,(-1-3x+2y)+3xy]$ $[-1\ldots]$

Eseguire i seguenti prodotti notevoli:

Quadrati di binomi

195 $(2a+3b)^2$ $[4a^2+12ab+9b^2]$

196 $\left(\frac{1}{2}a-2b\right)^2$ $\left[\frac{a^2}{4}-2ab+4b^2\right]$

197 $\left(-\frac{3}{2}a+2a^2\right)^2$ $\left[\frac{9}{4}a^2-6a^3+4a^4\right]$

198 $(x^2+2xy)^2$; $\left(\frac{1}{4}x-2y\right)^2$

199 $\left(\frac{a^2}{4}-4\right)^2$ $\left[\frac{a^4}{16}-2a^2+16\right]$

200 $\left(xy-\frac{1}{2}x^2y^3\right)^2$ $\left[x^2y^2-x^3y^4+\frac{1}{4}x^4y^6\right]$

201 $(-2x-3y^2)^2$ $[4x^2+12xy^2+9y^4]$

202 $\left(\frac{4}{5}x^2-\frac{5}{2}xy^2\right)^2$ $\left[\frac{16}{25}x^4-4x^3y^2+\frac{25}{4}x^2y^4\right]$

Cubi di binomi

203 $(2a+b)^3$ $[8a^3+12a^2b+6ab^2+b^3]$

204 $(a+3b)^3$; $(2a+3b)^3$

205 $\left(\frac{a}{3}+2b\right)^3$ $\left[\frac{a^3}{27}+\frac{2a^2b}{3}+4ab^2+8b^3\right]$

206 $\left(\frac{1}{3}a^2-ab\right)^3$ $\left[\frac{1}{27}a^6-\frac{1}{3}a^5b+a^4b^2-a^3b^3\right]$

207 $(ab-3b^2)^3$; $(2a-5b)^3$

208 $\left(\frac{2}{3}x^2-\frac{1}{3}y^3\right)^3$ $\left[\frac{8}{27}x^6-\frac{4}{9}x^4y^3+\frac{2}{9}x^2y^6-\frac{1}{27}y^9\right]$

209 $\left(-3x-\frac{1}{9}xy\right)^3$ $\left[-27x^3-3x^3y-\frac{1}{9}x^3y^2-\frac{1}{729}x^3y^3\right]$

210 $\left(-2a^2-\frac{1}{2}ab^3\right)^3$; $(a+3a^2b)^3$

211 $\left(\frac{a}{b}-b\right)^3$ $\left[\frac{a^3}{b^3}-3\frac{a^2}{b}+3ab-b^3\right]$

Potenze di binomi con esponente maggiore di 3

212 $(a+2b)^4$ $[a^4+8a^3b+24a^2b^2+32ab^3+16b^4]$

213 $(a-2b)^4$ $[a^4-8a^3b+24a^2b^2-32ab^3+16b^4]$

214 $(1+ab)^4$ $[1+4ab+6a^2b^2+4a^3b^3+a^4b^4]$

215 $(2x+1)^5$ $[32x^5+80x^4+80x^3+40x^2+10x+1]$

216 $(x-xy)^5$ $[x^5-5x^5y+10x^5y^2-10x^5y^3+5x^5y^4-x^5y^5]$

Quadrati di polinomi

217 $(a+b-c)^2$ $[a^2+b^2+c^2+2ab-2ac-2bc]$

218 $(2a-b+3c)^2$ $[4a^2+b^2+9c^2-4ab+12ac-6bc]$

219 $\left(a - \frac{1}{2}b + 2c\right)^2$ $\left[a^2 + \frac{1}{4}b^2 + 4c^2 - ab + 4ac - 2bc\right]$

220 $\left(2a - 3b - \frac{1}{2}c + d\right)^2$ $\left[4a^2 + 9b^2 + \frac{1}{4}c^2 + d^2 - 12ab - 2ac + 4ad + 3bc - 6bd - cd\right]$

221 $(a + 2a^2 - a^3 + 1)^2$ $[a^6 - 4a^5 + 2a^4 + 2a^3 + 5a^2 + 2a + 1]$

222 $(a + b + c + d + 1)^2$

223 $(a - b + c + d - 1)^2$

224 $(1 + x - x^2 + x^3)^2$ $[x^6 - 2x^5 + 3x^4 - x^2 + 2x + 1]$

Somma per differenza

225 $(a + 2b)(a - 2b)$ $[a^2 - 4b^2]$

226 $\left(\frac{1}{2}a^2 + 2b\right)\left(\frac{1}{2}a^2 - 2b\right)$; $(3a - b^2)(3a + b^2)$

227 $(3x^2y - y)(3x^2y + y)$ $[9x^4y^2 - y^2]$

228 $\left(\frac{1}{2}xy + \frac{1}{3}\right)\left(\frac{1}{2}xy - \frac{1}{3}\right)$; $(x^2y + y^3)(x^2y - y^3)$

229 $(-5x + 2y)(+5x + 2y)$ $[4y^2 - 25x^2]$

230 $(-3x + 4xy)(-3x - 4xy)$ $[9x^2 - 16x^2y^2]$

231 $(x^{-2} + 2x)(x^{-2} - 2x)$ $[x^{-4} - 4x^2]$

232 $(x^m - y^n)(x^m + y^n)$ $[x^{2m} - y^{2n}]$

233 $(3x^{m+1} + 2)(3x^{m+1} - 2)$ $[9x^{2m+2} - 4]$

234 $\left(-\frac{3}{2}x + 2xy\right)\left(\frac{3}{2}x + 2xy\right)$ $\left[4x^2y^2 - \frac{9}{4}x^2\right]$

235 $(a + b + 2c)(a + b - 2c)$ $[a^2 + 2ab + b^2 - 4c^2]$

236 $(a - 2b + 3c)(a + 2b + 3c)$ $[a^2 + 6ac + 9c^2 - 4b^2]$

237 $(2a + b + c - 1)(2a + b - c + 1)$ $[4a^2 + b^2 + 4ab - c^2 + 2c - 1]$

238 $\left(\frac{a}{2} - a^2 + 1\right)\left(\frac{a}{2} + a^2 + 1\right)$ $\left[\frac{a^2}{4} + 1 + a - a^4\right]$

239 $(a^2 + 2a + b)(b - a^2 + 2a)$ $[4a^2 + b^2 + 4ab - a^4]$

240 $\left(\frac{1}{2} + 3b - a + 2c\right)\left(\frac{1}{2} - 3b + a + 2c\right)$ $\left[\frac{1}{4} + 4c^2 + 2c - 9b^2 - a^2 + 6ab\right]$

241 $\left(\frac{3}{2}x^2 - 1 - x\right)\left(\frac{3}{2}x^2 - 1 + x\right)$ $\left[\frac{9}{4}x^4 + 1 - 4x^2\right]$

242 $(3a - b + a^2 - 1)(3a + b - a^2 + 1)$ $[11a^2 - b^2 - a^4 - 1 + 2a^2b - 2b]$

243 $(x^2 - xy + x - 2y^2)(x^2 - xy - x + 2y^2)$; $(2a + 5b - c)(2a - 5b + c)$

244 $(1 + 2a - 3a^2 - a^3)(1 - 2a + 3a^2 - a^3)$ $[a^6 - 9a^4 + 10a^3 - 4a^2 + 1]$

Eseguire le operazioni indicate:

245 $(2x - 1)^2 + \left(\frac{3}{2}x - 1\right)^2$ $\left[\frac{25}{4}x^2 - 7x + 2\right]$

246 $(x + 2y)^2 - (x - 2y)^2 - 8xy$ $[0]$

247 $\left(x - \frac{y}{2}\right)^2 + \left(x + \frac{y}{2}\right)^2 - \frac{y^2}{2}$ $[2x^2]$

248 $(2x - 3y)(2x + 3y) - (2x + 3y)^2$ $[-18y^2 - 12xy]$

249 $-(xy + 1)(xy - 1) + (xy + 1)^2$ $[2xy + 2]$

250 $(a^2 - 2)^2 - (a^2 - 2)(a^2 + 1) - a^2 - 6$ $[-4a^2]$

251 $(3x - y^2)^2 - (3x + y^2)(3x - 2y^2) - y^2(y^2 - 3x + 2y^2)$ $[0]$

252 $2x(3x - 2y)^2 + x(x + 4y)(x - 4y) + 8xy^2$ $[19x^3 - 24x^2y]$

253 $\left(2x - \frac{y}{2}\right)\left(2x + \frac{y}{2}\right) - \frac{x}{3}(x + y) - (xy + 1)^2 - \frac{x}{3}(11x - 3xy^2 - 7y)$ $\left[-\frac{y^2}{4} - 1\right]$

254 $(1 + x - y)^2 - (2x + y - 1)^2 + (x - 3y)(x + 3y)$ $[-9y^2 - 2x^2 + 6x - 6xy]$

255 $(2x - 3y + 1)^2 - (x + 4y - 1)^2 + (x - 3y)(x + y) + 2y(5y + 11x - 1)$ $[4x^2 + 6x]$

256 $(2a + 1)^3 + (2a - 1)^3 - 4a(4a^2 + 3)$ $[0]$

257 $(a^2 + 3b)^3 - (a^2 - 3b)^3 + (a^2 + b)(a^2 - b)(a^2 + 2b)$ $[20a^4b + 52b^3 - a^2b^2 + a^6]$

258 $(3x - y + 1)^2 - (x + 4y)(x - 4y) + \left(x + \frac{y}{2}\right)(x + 2y) - 9\left(x^2 + 2y^2 + \frac{2}{3}x\right) + \frac{7}{2}xy$ $[1 - 2y]$

259 $-4x^2(x - 3y)^2 - (x^2 + 2y^2)(x^2 - 2y^2) + \frac{y^2}{2}(2x + y)^2 - 2xy(12x^2 + y^2 - 17xy)$ $\left[-5x^4 + \frac{9}{2}y^4\right]$

260 $[(3x - 1)(3x + 1)]^2 - \left(9x^2 - \frac{1}{2}\right)^2 + \frac{1}{4}$ $[-9x^2 + 1]$

261 $\left(\frac{1}{5}a^2 + 1\right)^2\left(\frac{1}{5}a^2 - 1\right)^2 - \frac{1}{5}a^2\left(5 - \frac{2}{5}a^2\right)$ $\left[\frac{1}{625}a^8 - a^2 + 1\right]$

262 $(x + 2y)(x - 2y)(3x - y)(3x + y) - (x^2 - y^2 - 1)^2$ $[8x^4 + 3y^4 - 35x^2y^2 + 2x^2 - 2y^2 - 1]$

263 $(a + 3b - c)^2 - (2a + b + 3c)(2a + b - 3c) - 2b(4b + a - 3c) + 3a^2$ $[10c^2 - 2ac]$

264 $(a^3 + 2a)^2 - (a^2 - 2)\left(\frac{1}{2} - a^4\right) - (a^3 - 5)(a^3 + 5) - a^4(2 + a^2)$ $\left[\frac{7}{2}a^2 + 26\right]$

265 $\left[\left(-\frac{1}{2}a + 2b\right)\left(-\frac{1}{2}a - 2b\right)\right]^2 + \left(2a^2 - b^2 + \frac{1}{2}\right)^2 - b^2(17b^2 - 6a^2 - 1) - \frac{65}{16}a^4$ $\left[2a^2 + \frac{1}{4}\right]$

266 $(5a - 1)^2(5a + 1)^2 - (25a^2 - 2)^2 + 3(1 - 15a^2) - 5a^2$ $[0]$

267 $\left(\frac{x}{y} - 1\right)^2 - \left(\frac{x}{y} + 2\right)\left(\frac{x}{y} - 2\right) - 5$ $\left[-\frac{2x}{y}\right]$

268 $(3a - 2)^3 - (2a + 4)^3 + (a + 1)(2a - 3)^2 - 23a^3 + 63a$ $[-110a^2 - 63]$

269 $\frac{5a}{2}\left(2a - \frac{1}{5}\right) - \left(\frac{2a}{3} + 1\right)^2 - \left(2 - \frac{3}{2}a\right)^2 - \frac{83}{36}a^2$ $\left[\frac{25}{6}a - 5\right]$

270 $\left(3a + 4b - \frac{1}{2}\right)^2 - (a - 3b + 1)^2 - \left(\frac{a}{2} + \frac{3}{2}b\right)\left(\frac{a}{2} - \frac{3}{2}b\right) - 2b(15a + 1) - \frac{31}{4}a^2 + \frac{3}{4}$ $\left[\frac{37}{4}b^2 - 5a\right]$

271 $(x^2 - 3xy)^2 - 2(x^2 - 3xy)^2 + (x^2 + 3xy)^2$ $[12x^3y]$

272 $(5ab - 3a)^2 - 2(5ab - 3a)(3a + 5ab) + (4a + 5ab)^2$ $[43a^2 + 10a^2b]$

273 $4a^2 + (2a - 3b)^2 - 4a(2a - 3b) - 9b^2$ $[0]$

274 $(a - 3b)(a + 3b)(a^2 + 9b^2) - (a^2 - 2b^2)^2 + 85b^4$ $[4a^2b^2]$

275 $(x - 2y)^3 + (x + 2y)^3 - 2x(x^2 + 12y^2)$ $[0]$

276 $\left[2a - \left(\frac{3}{2}b - \frac{a}{2}\right)\right]^2 - \left[0{,}5a - \frac{b}{2} + (2b - a)\right]^2$ $[6a^2 - 6ab]$

277 $\left[0{,}2a - \left(\frac{a}{2} + 3b\right)\right]^2 - (2a - 5b)\left(0{,}2b + \frac{a}{2}\right)$ $[10b^2 - 0{,}91a^2 + 3{,}9ab]$

278 $\left(3x - \frac{y}{2}\right)^2 - 8x\left(\frac{x}{2} + \frac{y}{4}\right) - [5x - (3x + 0{,}2y)]^2$ $\left[x^2 + \frac{21}{100}y^2 - \frac{21}{5}xy\right]$

279 $\{-3a + [-2b + (a - 3b)]\}^2 - [5a - (a + 3b)]^2 - ab$ $[-12a^2 + 16b^2 + 43ab]$

280 $\{(3a - 5b)^2 - [a - (a + 5b)]^2\}^2 - (9a^2 - 25b^2)^2$ $[1350a^2b^2 - 625b^4 - 540a^3b]$

281 $\{(2a - b)^2 - [(a - 3b) - (a - b)]^2\}^2 - (4a^2 + 3b^2)^2 + 32a^2b(a + b)$ $[24ab^3]$

282 $[(a + b + c)^2 - (a - b - c)^2]^2 - [4a(b - c)]^2$ $[64a^2bc]$

283 $(a + 1)^3 + 3(a + 1)^2(a - 1) + 3(a + 1)(a - 1)^2 + (a - 1)^3$ $[8a^3]$

284 $(a - b)^3 + 3(a - b)^2(2a + b) + 3(a - b)(2a + b)^2 + (2a + b)^3$ $[27a^3]$

285 $[-(a - 3b)(a + 3b)]^2 - (9b^2 - a^2 + 1)^2 + (a - b)(a + b + 1)$ $[3a^2 - 19b^2 + a - b - 1]$

286 $a(a - 2b)^3 - [(a + 2b)^2 - (2a + b)^2]^2 + 2ab(3a^2 + 4b^2 - 15ab)$ $[-8a^4 - 9b^4]$

287 $(3a - b + 1)^2 + (b - 2a - 1)^2 + 2(3a - b + 1)(b - 2a - 1)$ $[a^2]$

288 $\left[-(-0{,}1a^3)^2+\frac{a^6}{4}\right]-[0{,}2a^6-(a^2+1)^3]-(2a^2+3a^4)$ $[1{,}04a^6+a^2+1]$

289 $\left\{-\left[\frac{4}{9}a-(2a+3b)-\frac{1}{9}a+1\right]\right\}^2-\left(\frac{5}{103}a+1+3b\right)^2+4\left(\frac{5}{3}a+3b\right)$ $[0]$

290 $(a+1)^5-(a+1)^4-(a+1)^3$ $[a^5+4a^4+5a^3+a^2-2a-1]$

291 $(a-1)^4+4(a-1)^3+6(a-1)^2+4(a-1)+1$ $[a^4]$

292 $[(2a+b)^2-2(2a+b)(2a-b)+(2a-b)^2]^2-(2b-1)^4+1$ $[32b^3-24b^2+8b]$

293 $[-2a(-a^2b)^2]+(-2a)^3(-ab)^2-(-a)^5(-4b)^2+(-3a)^0$ $[6a^5b^2+1]$

294 $(2abx^2-by)\left(\frac{2}{3}by+\frac{1}{3}abx^2\right)+\left(-\frac{2}{3}b^2\right)(a^2x^4-y^2)-aby(bx^2+1)$ $[-ab\,y]$

295 $\left[\left(\frac{1}{2}x+y\right)^3-\frac{3}{2}xy\left(\frac{1}{2}x+y\right)\right]\left(\frac{1}{8}x^3-y^3\right)+y^6$ $\left[\frac{1}{64}x^6\right]$

296 $\left(-\frac{1}{3}a^2\right)^3-a^4-\left\{\frac{3}{4}a^2b^2-\left(-\frac{2}{3}a^3\right)^2-\left[\left(\frac{1}{3}a^2\right)^3-\left(\frac{1}{4}a^2b^2-a^4-a^2b^2\right)\right]\right\}$ $\left[\frac{4}{9}a^6\right]$

297 $\left[\left(\frac{1}{2}x^2y-x\right)^2+x^2\right]^2-\frac{1}{64}x^9y^5-\left(\frac{x^3y}{4}\right)^2\cdot\left(1-\frac{1}{4}xy\right)(x^2y^2+32)$ $[4x^4-4x^5y]$

298 $\left[\left(\frac{1}{2}a-2b\right)^2+2ab\right]^3-(3a^2+16b^2)\left(4b^4+\frac{1}{64}a^4\right)+\left(\frac{1}{2}a^2-2b^2\right)^3$ $\left[\frac{3}{32}a^6-8b^6-a^4b^2+6a^2b^4\right]$

299 $\left[\frac{1}{2}ab-\left(\frac{1}{4}a+b\right)^2+\left(b+\frac{1}{4}a\right)\left(-\frac{1}{4}a+b\right)\right]a+\left(b+\frac{1}{2}a\right)^3-b^2\left(\frac{3}{4}a+b\right)$ $\left[\frac{3}{4}a^2b\right]$

300 $\left\{[z^2(z-1)-z(z^2+1)]^2-z^2(1+z)^2-\left(\frac{1}{2}z\right)^2\right\}(z+8)+\frac{1}{8}z^4$ $[-z^3]$

301 $\left[b^2(a-1)^2-(ab-3)(ab+3)+2a(b-1{,}5)^2-(b-3)^2-\frac{9}{2}a\right](6ab+6b)$ $[-36a^2b^2+36b^2]$

302 $[(3x^2-2xy+y^2)(3x^2-2xy-y^2)+12x^3y-(3x^2+y^2)^2]^3+(2y^4-2x^2y^2)^3$ $[-48x^2y^{10}-16x^6y^6]$

303 $[(a-3b+1)^2+(a+3b+1)^2-2(a-3b+1)(a+3b+1)]:36b-2b\}^4$ $[b^4]$

304 $[(a-1)(a+1)(a^2+1)]^2-[(2a-3)(2a+3)(4a^2+9)]^2-81(32a^4-81)$ $[1-2a^4-255a^8]$

Eseguire le seguenti divisioni di un polinomio per un monomio:

305 $(3x^2+4x^3-ax^5+a^3x^2):(3x)$ $\left[x+\frac{4}{3}x^2-\frac{1}{3}ax^4+\frac{1}{3}a^3x\right]$

306 $\left(4a^3b^4-2a^2b^3+a^6b^2-\frac{1}{2}a^5b^4\right):2a^2b^2$ $\left[2ab^2-b+\frac{1}{2}a^4-\frac{1}{4}a^3b^2\right]$

307 $(x^5 - x^2 + 2x^3) : (-x^2)$ $[-x^3 + 1 - 2x]$

308 $\left(\frac{2}{3}a^4 - \frac{1}{3}a^2 + a\right) : \left(\frac{1}{2}a\right)$ $[2a^3 - a + 3]$

309 $\left(-a^6b^2 + 2a^5b^3 - \frac{ab^4}{2}\right) : (-ab^2)$ $\left[a^5 - 2a^4b + \frac{1}{2}b^2\right]$

310 $\left(\frac{3}{2}a^5 - \frac{4}{3}a^2 + \frac{1}{3}a^3\right) : \left(\frac{2}{3}a^2\right)$ $\left[\frac{9}{4}a^3 - 2 + \frac{1}{2}a\right]$

311 $\left(5a^4b^5c^2 - 2a^3c^4 + \frac{1}{2}a^2b^3c\right) : (-a^2c)$ $\left[-5a^2b^5c + 2ac^3 - \frac{1}{2}b^3\right]$

312 $\left(-x^4y^2z^3 + \frac{2}{5}x^3y^3z^2 - \frac{1}{5}xyz\right) : \left(-\frac{1}{5}xyz\right)$ $[5x^3yz^2 - 2x^2y^2z + 1]$

313 $(-81x^6 + 9x^4y^4 - x^5y) : (-9x^4)$ $\left[9x^2 - y^4 + \frac{1}{9}xy\right]$

314 $\left(\frac{8}{5}x^4y^2 - \frac{3}{2}x^5 + x^4z^2\right) : (-2x^3)$ $\left[-\frac{4}{5}xy^2 + \frac{3}{4}x^2 - \frac{1}{2}xz^2\right]$

315 $(2a^2b^3 - ab^2)^3 : (-2ab^2)^2$ $\left[2a^4b^5 - 3a^3b^4 + \frac{3}{2}a^2b^3 - \frac{1}{4}ab^2\right]$

316 $[(3a - 2b)^2 - (5a + 2b)^2] : (-4a)$ $[4a + 8b]$

317 $[(2x^2 - xy)^2 - x^2y^2] : (2x)^3$ $\left[\frac{1}{2}x - \frac{1}{2}y\right]$

318 $(2a^5b^2 - 4a^2b^3 - ab^3) : (-2a^3b^3)$ $\left[-a^2b^{-1} + 2a^{-1} + \frac{1}{2}a^{-2}\right]$

319 $\left(-\frac{3}{2}ab^3 - \frac{1}{2}abc + a^2c^2\right) : \left(\frac{1}{2}abc\right)$ $[-3b^2c^{-1} - 1 + 2ab^{-1}c]$

Eseguire le operazioni indicate:

320 $\{[(xy - 3x^2y^3)(xy + 3x^2y^3)] : (-0{,}5x^2y^2)\} : (-6) - \frac{1}{3}$ $[-3x^2y^4]$

321 $[(a + 1)^3 + (12a^2 - 6a^3 + 9a^4 - 6a^5) : (-3a^2) + 3] : (3a)$ $\left[a^2 + \frac{5}{3}\right]$

322 $\left\{20x^2 - \left[\left(\frac{3}{4}x^3 - \frac{1}{8}x^2\right) : \left(\frac{1}{2}x\right)^2\right]^2 - \left(3x + \frac{1}{2}\right)^2 + (10x^4 + x^2) : 2x^2\right\}^2 : x^4$ $[49]$

323 $\{[(3x - 2y)^2 - (2y + 9x^2)^2 + 12xy] : [4y^2 - (2y - 3x)(2y + 3x)] + 4y - 1\}^3$ $[-729x^6]$

324 $\left\{\left[(b^6 - b^{10} - b^{14}) : \left(-\frac{1}{2}b^6\right) + 2\right]^2 : (-2b^4)^2 - 2b^4\left(1 + \frac{1}{2}b^4\right) - 1\right\}^2$ $[0]$

325 $\left\{-\frac{2}{3}xy^2-\frac{1}{2}b+\frac{1}{2}xy^2+\left[\frac{3}{4}b-xy^2+\left(\frac{1}{2}b+\frac{1}{9}xy^2\right)\right]-\left(\frac{3}{4}b-\frac{19}{18}xy^2\right)\right\}:xy$ [0]

326 $\left\{\frac{4}{5}a^2b^2-\frac{2}{3}b\left[-\frac{3}{4}a-\frac{2}{3}ab\left(\frac{1}{2}a-\frac{1}{2}\right)+b\left(a^2-\frac{1}{3}a\right)\right]-ab\right\}:\frac{ab}{2}+1$ $\left[\frac{32}{45}ab\right]$

327 $\left[\left(\frac{3}{2}x+\frac{1}{2}y\right)^3+3\left(\frac{3}{2}x+\frac{1}{2}y\right)^2\left(\frac{3}{2}x-\frac{1}{2}y\right)+3\left(\frac{3}{2}x+\frac{1}{2}y\right)\left(\frac{3}{2}x-\frac{1}{2}y\right)^2+\right.$

$\left.+\left(\frac{3}{2}x-\frac{1}{2}y\right)^3\right]:x^2+x$ [28x]

328 $\{[b(b+3)(b+2)-(b+1)^3]^2-(2b^2+1)^2\}:(-2b)+3(2b^2-1)$ $\left[-\frac{1}{2}b\right]$

329 $\left\{\left[\left(a-\frac{1}{3}\right)^2-\frac{1}{9}\right]\left(a^2+\frac{2}{3}a\right)\right]+\left[\left(a+\frac{1}{3}\right)^2-\frac{1}{9}\right]\left(a^2-\frac{2}{3}a\right)-\frac{a^2}{9}\Big\}^2:a^4-4a^4$ $[-4a^2+1]$

330 $\left(\frac{3}{4}a^2b^2\right):\left\{\left[\frac{1}{2}ab-\left(\frac{1}{4}a+b\right)^2+\left(b+\frac{1}{4}a\right)\left(-\frac{1}{4}a+b\right)\right]a+\right.$

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

331 $\left[4x^2\left(2x^2-\frac{y^2}{3}\right)\left(2x^2+\frac{y^2}{3}\right)+\left(\frac{1}{3}y^2-2x^2\right)^3-\left(\frac{1}{3}y^2+2x^2\right)^3\right]:x^2y^4+2$ $\left[\frac{2}{9}\right]$

332 $\left\{\frac{x^3}{18}\cdot\left[13x\left(\frac{1}{6}x+y\right)^2-\frac{4}{3}xy\left(4x+\frac{143}{16}y\right)-2\left(\frac{1}{2}x-\frac{1}{3}y\right)^3+\right.\right.$

$\left.\left.-3\left(\frac{1}{3}x-\frac{1}{2}y\right)^3-\frac{97}{216}y^3\right]+2\right\}:5-0{,}4$ [0]

333 $[[(ax-by)(ax+by)+(by+1)^2-(ax+1)^2]^2-4(b^2y^2+a^2x^2)]:8ay$ $[-bx]$

Eseguire le seguenti divisioni tra polinomi di una sola variabile ed effettuare poi la verifica nei casi in cui non è riportato il risultato:

334 $(2x^3-4x^2+x+2):(2x^2+x-1)$ $\left[Q=x-\frac{5}{2};\ R=\frac{9}{2}x-\frac{1}{2}\right]$

335 $(x^3+2x^2-1):(x^2-2x+1)$ $[Q=x+4;\ R=7x-5]$

336 $(2x^3+3x^2-2x-3):(2x+3)$ $[Q=x^2-1;\ R=0]$

337 $(3a^4+2a^2-3a+1):(3a^2+1)$ $\left[Q=a^2+\frac{1}{3};\ R=-3a+\frac{2}{3}\right]$

338 $(-2a^4+a^3-1):(a^2+1)$ $[Q=-2a^2+a+2;\ R=-a-3]$

339 $\left(\frac{2}{3}a^3+2a^2-a^4+1\right):(a^3-2)$ $\left[Q=-a+\frac{2}{3};\ R=2a^2-2a+\frac{7}{3}\right]$

340 $\left(-x^2+\frac{3}{2}x^3-2\right):(3x^2+2x)$ $\left[Q=\frac{1}{2}x-\frac{2}{3};\ R=\frac{4}{3}x-2\right]$

341 $\left(-\frac{3}{5}a^4-2-6a^3-\frac{1}{5}a\right):(-3a^3-1)$ $\left[Q=\frac{1}{5}a+2;\ R=0\right]$

342 $\left(\frac{8}{3}x^7+\frac{2}{3}x^2-1\right):(1-4x^5)$ $\left[Q=-\frac{2}{3}x^2;\ R=\frac{4}{3}x^2-1\right]$

343 $(a^{10}-1):(a^2-1)$ $[Q=a^8+a^6+a^4+a^2+1;\ R=0]$

344 $(a^6-64):(a^2-4)$ $[Q=a^4+4a^2+16;\ R=0]$

345 $(81a^4-16):(3a+2)$ $[Q=27a^3-18a^2+12a-8;\ R=0]$

346 $\left(-\frac{3}{2}a^3+2a^2+1-3a\right):\left(-\frac{5}{2}a^2-1\right)$ $\left[Q=\frac{3}{5}a-\frac{4}{5};\ R=-\frac{12}{5}a+\frac{1}{5}\right]$

Eseguire le seguenti divisioni tra polinomi di due variabili, prima rispetto ad una di esse e poi rispetto all'altra; confrontare quindi i quozienti ed i resti ottenuti:

347 $(a^2-3ab+2b^2):(a-2b)$ $[Q_1=Q_2=a-b;\ R_1=R_2=0]$

348 $(2x^2-xy-3y^2):(2x-3y)$ $[Q_1=Q_2=x+y;\ R_1=R_2=0]$

349 $(a^2+4ab+8b^2):(a+2b)$ $[Q_1=a+2b,\ R_1=4b^2;\ Q_2=4b,\ R_2=a^2]$

350 $(a^3-b^3):(a^2-ab+b^2)$ $[Q_1=a+b,\ R_1=-2b^3;\ Q_2=-b-a,\ R_2=2a^3]$

351 $(8a^3-b^3):(4a^2+2ab+b^2)$ $[Q_1=Q_2=2a-b;\ R_1=R_2=0]$

Eseguire le operazioni indicate:

352 $[a+(2a^4+a^3-3a^2+a):(a^2+a-1)]^2-5a^4$ $[-a^4]$

353 $\{[(x^3-8):(x^2+2x+4)+2x+1]^2-(3x+1)^2\}:\left(-\frac{3}{2}x\right)-2$ [6]

354 $\{(a^2+3a-1)[(3a^4+10a^3+3a^2-3-8a):(a+3a^2-3)]+1\}:(-a)^2$ $[a^2+6a+9]$

355 $\{[(x-y)^2+(x+y)^2](2x^2-2y^2)+8y^2(x^2+y^2)-(2x^2+2y^2)^2+(x^2+y^2)(y^2-x^2)\}:(x^2+y^2)$ $[y^2-x^2]$

356 $\{[(a^6-1):(a^3-1)-2]:(a-1)-a\}^2$ $[a^4+2a^2+1]$

357 $\{[2x^2(x^3-x-3)-x(x^3-3)+4]:(x^2-x-1)-2(x^3-2)\}:(x+1)$ $[x]$

358 $\{[(2a^3-a^2+3a+6):(a+1)-6]:(2a-3)-1\}^3:(a-1)^2$ $[a-1]$

359 $\left\{\left[\left(2a-\frac{3}{2}b+\frac{a}{2}\right)^2-\left(0{,}5a-\frac{b}{2}+2b-a\right)^2\right](6a^2+6ab)\right\}:(a^2-b^2)$ $[36a^2]$

360 $[3x^2-(6x^4+x^2y-15y^2):(5y+3x^2)]^3-(x^2-3y)^3-54y^3$ $[18x^4y]$

361 $\left\{2(a-b)^2-\left[a^3+\frac{3}{2}b^3+ab\left(\frac{4}{3}a+\frac{3}{4}b\right)\right]:\left(\frac{1}{2}a+\frac{3}{4}b\right)-\frac{1}{3}ab\right\}^3$ $[-64a^3b^3]$

Eseguire le seguenti divisioni con la regola di Ruffini ed effettuare poi la verifica nei casi in cui non è riportato il risultato:

362 $(2a^3-a^2+3a-1):(a-1)$ $[Q=2a^2+a+4;\ R=3]$

363 $(-a^2+1-3a):(a+1)$ $[Q=-a-2;\ R=3]$

364 $(3a^4-a^2+2-a):(a-2)$ $[Q=3a^3+6a^2+11a+21;\ R=44]$

365 $(x-2x^2-3x^4):(x+2)$ $[Q=-3x^3+6x^2-14x+29;\ R=-58]$

366 $(x^2-x^3+18):(x-3)$ $[Q=-x^2-2x-6;\ R=0]$

367 $(5a^4-2a^2+3-a):\left(a+\frac{1}{5}\right)$

368 $\left(-x^2+\frac{1}{2}x+4\right):\left(x-\frac{1}{2}\right)$

369 $(a^5-32):(a-2)$ $[Q=a^4+2a^3+4a^2+8a+16;\ R=0]$

370 $(27a^3-8):\left(a-\frac{2}{3}\right)$ $[Q=27a^2+18a+12;\ R=0]$

371 $(x^5-243):(x-3);\quad (3x^2-500):(x+20)$

372 $(x^5-243):(x+3);\quad (14-3x+x^2):\left(x-\frac{3}{2}\right)$

373 $(2y^2-y^3+y^4):(y-1);\quad (12x^2-3x^3+2x-1):(x+2)$

Eseguire le seguenti divisioni rispetto alla variabile a con la regola di Ruffini ed effettuare poi la verifica nei casi in cui non è riportato il risultato:

374 $(a^2-3ab+b^2):(a-b)$ $[Q=a-2b;\ R=-b^2]$

375 $(2a^2-ab+4b^2):(a-2b)$ $[Q=2a+3b;\ R=10b^2]$

376 $(a^4-3a^3b+b^4):(a+b)$ $[Q=a^3-4a^2b+4ab^2-4b^3;\ R=5b^4]$

377 $(2a^3-m^2a+1):(a+m)$ $[Q=2a^2-2ma+m^2;\ R=1-m^3]$

378 $(-a^5 + 3a^2b^3 - 4b^5) : (a + 3b)$

379 $\left(-\frac{1}{2}a^3 + \frac{2}{3}a^2b - b^3\right) : (a + 2b)$

380 $(b^2 - 3ab + 4a^2) : (a - 5b)$

381 $\left(-a^3 + na^2 + \frac{2}{3}n^3 + 1\right) : (a - n)$ $\left[Q = -a^2;\ R = \frac{2}{3}n^3 + 1\right]$

382 $\left(-a^3 + na^2 + \frac{2}{3}n^3 + 1\right) : (a + n)$ $\left[Q = -a^2 + 2na - 2n^2;\ R = \frac{8}{3}n^3 + 1\right]$

Eseguire le seguenti divisioni con la regola di Ruffini ed effettuare poi la verifica nei casi in cui non è riportato il risultato:

383 $(2x^2 - 3x + 1) : (2x + 1)$ $[Q = x - 2;\ R = 3]$

384 $(3x^2 - 3 + 2x) : (3x - 2)$ $\left[Q = x + \frac{4}{3};\ R = -\frac{1}{3}\right]$

385 $(a^2 - 2a + 4) : (3a + 1)$

386 $(8a^3 - 27) : (2a - 3)$ $[Q = 4a^2 + 6a + 9;\ R = 0]$

387 $(27a^3 - 125) : (3a - 5)$

388 $(2y^4 - 3 + 4y) : (-y + 2)$ $[Q = -2y^3 - 4y^2 - 8y - 20;\ R = 37]$

389 $(-4 + 2y^2 - 3y^3) : (-2y + 1)$ $\left[Q = \frac{3}{2}y^2 - \frac{1}{4}y - \frac{1}{8};\ R = -\frac{31}{8}\right]$

Calcolare il resto delle seguenti divisioni senza eseguire le divisioni stesse (con la regola del resto):

390 $(4a^2 - 2a + 1) : (a - 2)$ $[R = 13]$

391 $(2a^3 - 3a + a^2 - 2) : (a + 1)$ $[R = 0]$

392 $\left(\frac{1}{2}a^3 - 3a^2 + 4\right) : (a - 1)$ $\left[R = \frac{3}{2}\right]$

393 $(2x^4 - 3x^2 + x - 1) : (x + 2)$ $[R = 17]$

394 $\left(\frac{1}{2}x^2 - 3x + \frac{1}{2}\right) : \left(x - \frac{1}{2}\right)$ $\left[R = -\frac{7}{8}\right]$

395 $(a^5 - 32) : (a - 2)$ $[R = 0]$

396 $(32x^5 - 1) : \left(x - \frac{1}{2}\right)$ $[R = 0]$

397 $(3a^4 - 3a^2 - 1 + a) : (a + 3)$ $[R = 212]$

398 $\left(-b^3 + \frac{1}{2}b^2 - 3b + 1\right) : (b - 4)$ $[R = -67]$

399 $(3x^4 - 3 - x) : (x + 2)$ $[R = 47]$

Dire quali dei seguenti polinomi sono divisibili per il binomio $x - 2$:

400 $x^2 - 4x + 4$; $x^5 - 32$

401 $x^3 - 8x^2 - 6x + 12$; $-x + 2$

402 $x^4 + 4x^2 + 4$; $x + 2$

403 $-\frac{1}{2}x^3 + 4 - 3x + \frac{3}{2}x^2$; $x^3 - 2x^2 + 8$

404 $x^5 + 32$; $x^6 - 64$

405 $x^5 - 32x^4 + 8x - 16$; $x^6 + 64$

Dire quale valore numerico si deve attribuire alla variabile m che compare nelle seguenti divisioni affinché esse risultino esatte (cioè con $R = 0$):

406 $(a^2 - 3a + m) : (a - 1)$ $[m = 2]$

407 $(2a^3 - 2a + 1 - m) : (a + 1)$ $[m = 1]$

408 $(x^2 + 4x - 2m) : (x - 2)$ $[m = 6]$

409 $(2x^2 - mx + 4 - m) : (x + 2)$ $[m = -12]$

410 $[-a^3 + (1 + m)\,a - 1] : (a + 1)$ $[m = -1]$

411 $[2a^2 - (2 + 3m)\,a - 4m + 1] : (a - 1)$ $\left[m = \frac{1}{7}\right]$

412 $(mx^2 + 2x - 3m + 2) : (x + 3)$ $\left[m = \frac{2}{3}\right]$

413 $(a^2 - 2a - m) : (a + 1)$ $[m = 3]$

414 $(-a^3 - 2a^2 + a + m - 1) : (a - 1)$ $[m = 3]$

415 $(a^3 - ma^2 + ma - 1) : (a - 1)$ [ogni valore di m]

416 $(a^3 - ma^2 - ma + 1) : (a + 1)$ [ogni valore di m]

Scomporre i seguenti polinomi raccogliendo i fattori comuni:

1 $2a^2b + 6ab^2$; $3ab + 6a^2 + 9a$ $[2ab(a + 3b);\ \ldots]$

2 $8x^4 - 4x^3 + 2x^2$; $25x^3y^4 - 5x^2y^3 + 5x^2y^2$ $[2x^2(4x^2 - 2x + 1);\ \ldots]$

3 $2a^3x^2y - 4a^2x^3y^2 + 6ax^2y^2$; $0{,}20a^2x^3 - 0{,}15a^3x + 0{,}40ax^2$

4 $\frac{1}{3}ab^3c^2 - \frac{1}{9}a^2bc^4$; $3x^2 - 27x^3y + 3x^2y^2$

5 $15x^2y^3 - 6x^3y^2 - 3xy^2$; $12a^2b^3 + 30a^3b + 6ab$

6 $25ab^2c - 30ac^2 + 10a^2b$; $x^5y^3 - x^2y + x^4y^5 + 2x^3y^2$

7 $6a^4 + 9a^3 - 12a^7$; $0{,}5b^3 - 0{,}25b^5 + \frac{1}{2}b^2$

8 $24x^3y^5 - 12x^4$; $a^2 - 5a^2b + 10a^3b^2 - 15a^5$

9 $\frac{1}{2}x^2y^3 - \frac{1}{4}xy^5 + \frac{1}{6}x^3y - \frac{5}{4}xy$

10 $0{,}09a^7b^2 + 0{,}3a^5b^3 - 0{,}6a^2b^4 - 1{,}2ab^5$

11 $5(a+b) - a(a+b)$; $x(a+b) - y(a+b)$ [$(a+b)(5-a)$; ...]

12 $2a(a+b) + (a+b)$; $(a+b)^2 - 2(a+b)$ [$(a+b)(2a+1)$; ...]

13 $(3a-b)^3 - 2a(3a-b)^2 + 4b(3a-b)$; $(a-4b)^3 - (a-4b)$

14 $(x-y)^3 + 2x(x-y)^2 + 3xy(x-y)$; $3(a+2b)^2 - 2a(a+2b)$

15 $(3-a)^2 + (3-a)(5+a) - (3-a)$; $(7+2x)^3 + (3-x)(7+2x)^2$

16 $(a+b)^4 - (a+2b)(a+b)^2$; $(3a-b)^2 + 5a(3a-b) - b(3a-b)$

17 $(3a+2b-1)^2 + (3a-b)(3a+2b-1)$ $(a-b+1)^2 - (a+b)(a-b+1)$

18 $(a-b)^4 + 2a(a-b)^3 - (a+b)^2(a-b)^2$; $(x+2)^3 - 2(x-3)(x+2)^2$

19 $(2a-3b+1)^3 - (a-b)(2a-3b+1)^2$; $(a+b-5)^2 - 3(a-b)(a+b-5)$

20 $6x^{n+1} - 8x^n$; $2x^n + 4x^{n+2} - 8x^{n+3}$ [$2x^n(3x-4)$; ...]

21 $6x^{n+1}y^2 - 12x^{n+3}y^3 + 8x^ny$; $2x^{n+m}y^m - 4x^ny^{2m}$

22 $x^{n+2m}y^{n+m} - x^{2n+m} + x^{n+m}y^{2m}$; $a^{n+2}b^n - 5a^nb^n - ab^{n+1}$

Scomporre i seguenti polinomi facendo prima dei raccoglimenti parziali a fattor comune:

23 $ab - ac + 4b - 4c$; $a^2 + ab + 3a^2c + 3abc$ [$(b-c)(a+4)$; ...]

24 $2a^2 - 2ay + ab^2 - b^2y$; $5 - 5a + b - ab$

25 $a^2x - a^2y - x + y$; $3ab - 6a^2 - b^2 + 2ab$

26 $15a - 10ab + 8b^2 - 12b$; $2 - 2a - a^2 + a^3$

27 $2ac + b - a - 2bc$; $a^4 + a^3 - a^2 - a$

28 $a + 1 + ab + b$; $a + b + 1 + xa + xb + x$

29 $4a^2 - ax - 4a + x$; $2x + 2y + 2x^2 + 2xy$

30 $3a^2b^2 + 1 + 3a^2 + b^2$; $ax + ay + 2x + 2y + bx + by$

31 $2a + 2b + ab + a^2$; $3x^3 - x + 3x^2 - 1$

32 $(a + b)^2 - 3ab - 3b^2$; $2xy + 2x - 2(y + 1)^2$

33 $x + y + ax + ay + bx + by$; $x^2 + 2x - bx - 2b + ax + 2a$

34 $x^3 + x^2 + x + x^2y + xy + y$; $2(2a - b)^2 - 2a + b$

35 $4x^2 - xy - 4x + y$; $8a^3 - 6a^2 - 12ab + 9b$

36 $a(x + y) - 2x - 2y$; $a(x + y) - b(x + y) - x - y$

37 $a(by - y) - b + 1$; $6ax - 2ay - 3bx + by - 2a + b$

38 $2x^3 + 2x^2y + 2ax^3 + 2ax^2y + 2bx^3 + 2bx^2y$ $[2x^2(x + y)(1 + a + b)]$

39 $a^3 - a^2 - a^2b + ab$; $3a(a + b)^2 - 3a^2x - 3abx$

40 $2ax^4 + 6a^4x + 6a^3x^2 + 2a^2x^3$ $[2ax(a + x)(3a^2 + x^2)]$

41 $a^3 - a^2 + 2a(a - 1)^2 + 3a^2(a - 1)$ $[2a(a - 1)(3a - 1)]$

42 $(a - 2b)(2a + b) - 3a^2 + 6ab + a - 2b$ $[(a - 2b)(b - a + 1)]$

43 $3(x + 2y)^3 - 2x(x + 2y)^2 - 4x^2 - 8x^2y$ $[(x + 2y)(12y^2 + 8xy - 3x^2)]$

44 $2a + 2b - ax - bx + ay + by - a^2 - ab$

45 $(x - y)(x + y) - 3ax - 3ay + xy^2 + y^3 + x + y$

Scomporre i seguenti polinomi ricordando che $a^2 - b^2 = (a + b)(a - b)$:

46 $a^2 - b^2$; $4a^2 - 25$; $a^2 - 9b^2$

47 $4x^2 - 9y^2$; $\frac{25}{9} - a^2$; $x^2 - \frac{9}{4}$

48 $64x^2 - 1$; $x^6 - y^4$; $1 - 4y^2x^2$

49 $x^4 - y^4$; $64 - a^4$; $16 - a^4$

50 $81x^4 - 16y^4$; $100 - 81a^2$; $a^8 - 1$

51 $x^{2n} - y^{2n}$; $x^{4n} - y^{4n}$

52 $1 - (a + b)^2$; $4a^2 - (a - b)^2$

53 $(x - 2y)^2 - (2x + y)^2$; $(2x - y + 2)^2 - (x + y - 1)^2$

54 $9x^2y^2 - 4(x + 4y)^2$; $8 - 2a^4$

55 $3a^4 - 3$; $27 - \frac{3}{4}a^2$

56 $32x^{2n} - 2y^{2n}$; $3a^3 - 27ab^2$

57 $a(x - y)^2 - a(x + 3y)^2$; $8x^3 - 2x(x + y)^2$

58 $\frac{81}{4}ax^2 - \frac{9}{16}ay^2$; $x^3 - x^5$; $x^8 - 1$

59 $(3a + 2b - 1)^2 - (a - b + 2)^2$; $x^2 - (3x - 2)^2$

60 $9a^2b^3 - b$; $4a^8 - a^6$; $a^2 - 4(a + 3b)^2$

61 $(5a - b + 2)^2 - 1$; $3x^2 - 3(2x - y)^2$

62 $100a^3b^2 - 9a^5b^4$; $a^2 - b^2 - 2a + 2b$

63 $x^2 - y^2 + xy^2 + y^3$; $4a^2 - b^2 + 2a + b$

64 $(5a - 3b + 2c)^2 - (a + b - c)^2$; $\frac{a^2}{8} - \frac{b^2}{18}$

65 $7by^3 - 28b^3y$ $[7by(y - 2b)(y + 2b)]$

66 $8a^4 - 32a^2b^2 + 4a^3 - 16ab^2$ $[4a(2a + 1)(a + 2b)(a - 2b)]$

67 $4ax^2y - 16ay + 4ax^2 - 16a$ $[4a(y + 1)(x - 2)(x + 2)]$

68 $(2a - b)^2 - (4a - 3b)^2$ $[4(b - a)(3a - 2b)]$

Scomporre i seguenti polinomi tenendo presente il prodotto notevole quadrato di un polinomio:

69 $a^2 + b^2 + 2ab$; $a^2 + 4b^2 - 4ab$

70 $4x^2 + 9y^2 + 12xy$; $x^2 + 1 - 2x$

71 $\frac{x^2}{4} + 4 + 2x$; $\frac{9}{4}x^2 + 25y^2 + 15xy$

72 $4a^2b^2 + \frac{1}{16} - ab$; $a^2 + 16 - 8a$

73 $8x^2 + 18y^2 - 24xy$; $2ax^2 + 2a - 4ax$

74 $a^3 + 4ab^2 + 4a^2b$; $a^2 + b^2 + c^2 + 2ab + 2ac + 2bc$

75 $x^2 + y^2 + 1 - 2xy + 2x - 2y$; $x^2 + 4y^2 + 9 + 4xy + 6x + 12y$

76 $\frac{1}{4}x^2 + y^2 + 4 - xy - 2x + 4y$; $8x^2 + 50 - 40x$

77 $x^3 + 9xy^2 + \frac{1}{4}x - 6x^2y + x^2 - 3xy$; $9a^4 - 12a^3b + 4a^2b^2$

78 $x^2 + y^2 + z^2 + 1 - 2xy + 2xz - 2x - 2yz + 2y - 2z$

79 $a^2 + (a + b)^2 + 2a(a + b)$; $x^2 - 2x(3x + y) + (3x + y)^2$

80 $(a - 2b)^2 + 2(a - 2b)(a + 2b) + (a + 2b)^2$

81 $(x - 2y)^2 - 6x(x - 2y) + 9x^2$; $1 - 2(x + 3y) + (x + 3y)^2$

82 $(x - y + 1)^2 + 2(x - y + 1)(2x + y - 1) + (2x + y - 1)^2$

83 $x^{2n} + y^{2n} + 2x^n y^n$; $x^{2n} + 4 + 4x^n$ 84 $x^{2n} + 4y^{4n} + 4y^{2n}x^n$; $4x^{2n} + x^6 - 4x^{n+3}$

Scomporre i seguenti polinomi tenendo presenti gli esercizi precedenti:

85 $a^2 + 2ab + b^2 - 1$; $x^2 + y^2 - 2xy - 4$ 86 $4x^2 + y^2 + 4xy - z^2$; $a^2 - 4ab + 4b^2 - 9$

87 $25 - 10x + x^2 - y^2$; $9a^2 + 12ab + 4b^2 - 1$ 88 $9 - a^2 - b^2 + 2ab$; $1 - x^2 - \frac{1}{4}y^2 + xy$

89 $4a^2b^2 - 9a^2 - b^2 + 6ab$; $x^2 + y^2 - 2xy - a^2 - b^2 - 2ab$

90 $x^2 - 2x + 1 - y^2 - z^2 - 2yz$; $a^2 - 9x^2 + 4b^2 - 4ab$

91 $x^2 + y^2 + z^2 + 2xy + 2xz + 2yz - 1$; $8 - 2x^2 - 2y^2 + 4xy$

92 $4 - 4x^2 - y^2 - 4xy$; $4x^2 + y^2 - a^2 - b^2 - 2ab - 4xy$

93 $2a^2 + 2b^2 + 4ab - 8$; $x^3 - 4x^2y + 4xy^2 - xz^2$

94 $a^2 - 2ab + b^2 + a^3 - ab^2$; $x^2 - 2xy + y^2 + x - y$

95 $2a - 6b + a^2 + 9b^2 - 6ab$ 96 $a^2 + 2a(a + 3b) + (a + 3b)^2 - 9$

97 $(2x + y)^2 - 2(2x + y)(x - 3y) + (x - 3y)^2 - z^2$

Scomporre i seguenti polinomi tenendo presente il prodotto notevole cubo di un binomio:

98 $a^3 + 3a^2b + 3ab^2 + b^3$; $a^3 - 3a^2b + 3ab^2 - b^3$

99 $8x^3 + 12x^2 + 6x + 1$; $x^3 - 8y^3 - 6x^2y + 12xy^2$

100 $x^3 + \frac{1}{27}y^3 + x^2y + \frac{1}{3}xy^2$; $a^3b^3 - 9a^2b^2 + 27ab - 27$

101 $2x^3 - 12x^2y + 24xy^2 - 16y^3$; $54a^4 - 54a^3 + 18a^2 - 2a$

102 $-1 - 6z - 12z^2 - 8z^3$; $\frac{1}{27}a^4 - \frac{1}{3}a^3b + a^2b^2 - ab^3$

103 $x^3 + 3x^2y + 3xy^2 + y^3 + x^2 + 2xy + y^2$

104 $a^3 - 3a^2b + 3ab^2 - b^3 - 2a^2 + 4ab - 2b^2$

105 $16x^3 + \frac{1}{4}y^3 + 12x^2y + 3xy^2$; $81 - 81a + 27a^2 - 3a^3$

106 $27 + 27\,(a - b) + 9\,(a - b)^2 + (a - b)^3$

107 $(a + b)^3 + 3\,(a + b)^2\,(a - 2b) + 3\,(a + b)\,(a - 2b)^2 + (a - 2b)^3$

108 $a^3 - 3a^2\,(2a - b) + 3a\,(2a - b)^2 - (2a - b)^3$

109 $(x + 1)^3 - 3\,(x + 1)^2\,(2x + 1) + 3\,(x + 1)\,(2x + 1)^2 - (2x + 1)^3$

110 $x^{3n} + 3x^{2n}y^n + 3x^ny^{2n} + y^{3n}$; $a^{3n} - 6a^{2n}b^n + 12a^nb^{2n} - 8b^{3n}$

111 $a^{3n} + 9a^{2n+1} + 27a^{n+2} + 27a^3$

Scomporre i seguenti polinomi tenendo presente che $a^3 \pm b^3 = (a \pm b)\,(a^2 \mp ab + b^2)$:

112 $a^3 - 8$; $8a^3 + 27$ 113 $a^3 - 1$; $b^3 + 8$

114 $8x^3 - 27$; $a^3b^3 + \frac{1}{27}$ 115 $\frac{1}{8} - 64x^3y^6$; $a^6 + b^3$

116 $a^6 - b^3$; $9x^3 - 243$ 117 $\frac{3}{8} + 81a^3$; $2a^3 - 54$

118 $\frac{x^4}{27} - \frac{xy^3}{8}$; $2x + 16x^4$ 119 $1 + (a + b)^3$; $x^3 - (x + 2y)^3$

120 $8a^3 + (2a - b)^3$; $(a - 2b)^3 - (a + 3b)^3$ 121 $x^{3n} - y^{3m}$; $a^3 - b^{3n}$

122 $8 - a^{3n}$; $27x^{6n} - y^3$ 123 $a^3 + b^3 + 5a + 5b$; $a^3 - b^3 + a^2 - b^2$

124 $x^3 + y^3 + x^2 - xy + y^2$; $a^3 - 8b^3 + a - 2b$

125 $a^3 - b^3 + a^2 - 2ab + b^2$; $2x^3 + 16y^3 + 2x + 4y$

126 $a^4 + ab^3 + a^3 + 2a^2b + ab^2$; $5x^3 - 135y^3 - 4x + 12y$

127 $x^3 + y^3 + 3x^2y + 3xy^2 - 1$; $a^3 + b^3 + 3a^2b + 3ab^2 + 1$

128 $x^3 - 3x^2 + 3x - 1 - y^3$; $8a^3 - 12a^2 + 6a - 1 + b^3$

129 $16a^3 - 24a^2 + 12a - 2 - 2b^3$; $3 - 9x + 9x^2 - 3x^3 - 24y^3$

Scomporre i seguenti binomi (somme e differenze di potenze simili):

130 $32x^5 - y^5$; $32x^5 + y^5$ 131 $128 - x^7y^7$; $1 + 128a^7$

132 $64a^6 - 1$; $64a^6 + 1$ 133 $x^7y^7 - 1$; $256 - a^8$

134 $a^8 - \frac{b^8}{256}$; $x^6 - 64$ 135 $243 - 32a^5$; $1 - 32x^5y^5$

Scomporre i seguenti trinomi:

136 $x^2 - 3x + 2$; $x^2 - 2x - 3$

137 $x^2 + 8x + 7$; $x^2 + x - 12$

138 $x^2 + 10x - 11$; $x^2 + 9x + 20$

139 $x^2 - 4x - 12$; $a^2 - 15a + 56$

140 $b^2 + 7b + 10$; $b^2 + b - 72$

141 $2x^2 - 2x - 40$; $3x^2 + 21x + 36$

142 $3a^3 + 12a^2 - 63a$; $x^4 - 12x^3 + 35x^2$

143 $5b^3 - 10b^2 - 15b$; $-x^3 - 2x^2 + 8x$

144 $3a^3b + 45a^2b + 42ab$; $-2a^3 - 4a^2 + 30a$

145 $x^2y^2 + 6xy + 5$; $a^2b^2 - ab - 6$

146 $ax^2 - ax - 380a$; $2a^3 + 6a^2 - 540a$

147 $x^3 - x^2 - 2x$; $2ax^2 + 2ax - 220a$

148 $x^2 - 3ax + 2a^2$; $x^2 - ax - 6a^2$

149 $a^2 - ab - 12b^2$; $a^2 + 9ab + 8b^2$

150 $x^2 - (a + b)x + ab$; $x^2 + (2a + 3b)x + 6ab$

151 $(x + y)^2 + 4(x + y) + 3$; $(a - 2b)^2 - 6(a - 2b) + 5$

152 $(2a + 3b)^2 + 8(2a + 3b) + 15$; $x^{2n} + 8x^n + 7$

Scomporre i seguenti polinomi applicando la regola di Ruffini:

153 $x^3 - 6x^2 + 11x - 6$; $x^3 - 3x^2 + 4x - 2$

154 $x^3 + 2x^3 - 13x + 10$; $x^3 - 8x + 8$

155 $x^4 - x^3 + 12x$; $2x^4 - 10x^3 + 4x^2 + 4x$

156 $x^4 - 3x^3 + 4x^2 - 6x + 4$; $x^4 - 10x^3 + 35x^2 - 50x + 24$

157 $x^4 + 4x^3 + 6x^2 + 5x + 2$; $x^5 - 3x^3 + 2x$

158 $2x^2 + x - 3$; $3x^2 - 7x + 2$

159 $3x^2 + 8x + 4$; $3x^2 - 4x - 4$

160 $x^4 - 10x^3 + 33x^2 - 44x + 20$ $x^4 - 4x - 8$; $6x^3 - 21x^2 - 42x - 15$

161 $x^4 - 5x^3 + 7x^2 - 3x$; $3x^2 + 5ax - 2a^2$

162 $x^3 + 2ax^2 - a^2x - 2a^3$;

Esercizi di ricapitolazione sulla scomposizione di polinomi (non sono in ordine di difficoltà):

163 $a^2 - 1 + a^2x - x$

164 $x^5 - 32$

165 $2x^4 - 32$

166 $(2x - 1)^2 - 9x^2$

167 $(x - 3)^2 - 4(x - 3)$

168 $2x^5 - 32x$

169 $ax - a - x + 1$

170 $a^2b - 2a^2 - 4b + 8$

171 $5a^6 + 5a$

172 $3x^6 - 192$

173 $(a + 4b)^2 + 2\,(a + 4b)\,(a - b) + (a - b)^2$

174 $x^6 - y^6 + x^3 - y^3$

175 $x^5 - 6x^4 + 12x^3 - 8x^2$

176 $3x\,(4 - x^2) - 2x + x^2$

177 $a^2 - 4a + 4 + ab - 2b$

178 $a^4 - b^4 + 5a^2 + 5b^2$

179 $x^4 - y^4 + 3ax^2 - 3ay^2$

180 $a^3 + 4a^2 - 21a$

181 $a^2 + 4a - 21 + ax - 3x$

182 $x\,(x - 1) + x^3 - 1$

183 $x^5 - x - 2x^4 + 2$

184 $(x^2 - 2y^2)^2 - (3x^2 + y^2)^2$

185 $3x^3 + x^2 - 27x - 9$

186 $x^2 + 4y^2 + \frac{1}{4} - 4xy + x - 2y$

187 $(x + 2y - 1)^2 - 1$

188 $x^2 - 4y - y^2 - 4$

189 $(a^2 - 9)^2 + a^2 - 6a + 9$

190 $m^2 + 4m + 3 + mx + 3x$

191 $x^3 - 3x^2 + 3x + 1 + yx - y$

192 $2a^2 - 7a - 4$

193 $4a^2b^2 - (a^2 + b^2 - 4)^2$

194 $a^6 - a^4 - a^2b^4 + b^4$

195 $a^2 - 4 + 3a\,(a - 2)$

196 $x^4 - a^4 + x^3 + a^2x - ax^2 - a^3$

197 $a^3 - 8 + 5\,(a^2 + 2a + 4)$

198 $x^3 - 3x - 2$

199 $(x + 2y)^2 - 4y\,(x + 2y) + 4y^2$

200 $x^6 + 2x^3 + 1$

201 $16 - x^2 + 2xy - y^2$

202 $2x^2 + 2x - 24 + ax + 4a$

203 $4a^2b^2 - (ab - a^2)^2$

204 $ax^2 + 2a^2x - 15a^3$

205 $x^3 + 9y^2 + x^2 + 9xy^2$

206 $4\,(a - 5b)^2 - a^2$

207 $ax^3 - 3bx^3 + 3b - a$

208 $x^3 - y^3 - 1 - 3y^2 - 3y$

209 $(x^2 + y^2 - 2)^2 - (x^2 - y^2 + 6)^2$

210 $ax + bx - a^3 - b^3$

211 $a^2 + b^2 + 2ab - ax - bx$

212 $x^6 + y^6 - 3x^2 - 3y^2$

213 $x^6 - y^6 + 2x^2 - 2y^2$

214 $x^{10} - 2x^7 + x^4$

215 $27x^4 + \frac{xy^3}{8}$

216 $54x^3 - \frac{y^3}{4}$

217 $x^2 - y^2 + ax^2 - 2axy + ay^2$

218 $2a^6 + 2$

219 $x^3 - y^3 - x^2 - xy - y^2$

220 $a^3 + 8 - a - 2$

221 $a^3 + 27 - 2a^2 + 6a - 18$

222 $27 - a^3 - b^3 - 3a^2b - 3ab^2$

223 $256 - (x - y)^4$

224 $x^{p+q} - x^{2p}$

225 $a^3 - x^3 + a\,(a^2 - x^2) + x\,(a - x)$

226 $x^{p+2} + 2x^{p+1}y + x^py^2$

227 $a^{3m} - b^{3n}$

228 $x^5 + 2x^4 - x - 2$

229 $a\,(a-2b)\,(a-b)-2b\,(a+2b)\,(a-b)$

230 $\frac{1}{27}a^3-a^2b+9ab^2-27b^3$

231 a^2-2a^3+1

232 a^6+16a^3+64

233 $(a^2-1)^2-a^3+2a^2-a$

234 $(x+1)^2-(x-2)^2+4x^2-1$

235 $x^2-9x+8-2x\,(x-8)$

236 x^3-6x^2-x+30

237 $x^2-xy-20y^2$

238 $(a-b)^2-a^3+b^3$

239 $x^3-1+y\,(x^2-1)-y\,(x-1)$

240 $(x^3-8)\,(x+2)+(x^3+8)\,(x-2)$

241 $a^8-b^8-2a^2b^2\,(a^4-b^4)$

242 $a^2-3a+2+x\,(a-2)$

243 $\frac{1}{4}(x+y)^2-(x+y)\,(x-y)+\ +(x-y)^2$

244 a^4-5a^2+4

245 $-a^4b^4+\frac{16}{81}$

246 $(7-a)^2-14+2a$

247 $4b^2c^2-(b^2+c^2-a^2)^2$

248 $x^{4m}-y^{4m}$

249 $0{,}25x^2+0{,}04-0{,}2x$

250 $x^2-3x+2+x\,(x-1)$

251 $2x^2-5x-18$

252 $2x^4-5x^2+2x+1$

253 $a^2+ab+b^2-a^3+b^3$

254 $64a^6-b^6$

255 $(x-1)^3+3\,(2-x)^2\,(x-1)+3\,(2-x)\,(x-1)^2+(2-x)^3$

256 $a^4+4a^3+6a^2+4a+1$

257 x^5-1

258 $32a^5+1$

259 $8x^3-(x-1)^3$

260 x^6-2x^4+1

261 $1+(x+1)^3$

262 $(x^2+y^2-20)^2-(x^2-y^2-12)^2$

263 $8-a^3-2\,(2-a)$

264 $(xy-1)^2-(2xy+1)^2$

265 $a^2\,(2a-3b)^2-(a^2+ab)^2$

266 $x^{4m}-16x^{4n}$

267 $x^2+(a-b)\,x-ab$

268 $x^4+5x^3+6x^2$

269 $x^{2m}+4x^m+4$

270 $x^{2m+2}-2x^{m+1}y^2+y^4$

271 x^6y^6-1

272 $\frac{x^6}{64}+1$

273 $(x^m-1)^2-(2-x^m)^2$

274 $1-\left(\frac{y}{2}\right)^2$

275 $x^{3m}-y^{3m}$

276 $x^{2m}-1$

277 $x^3-1+ax-a$

278 $(1-3x)^2-a^2\,(1-3x)^2$

279 $(1-a)^3-8a^3$

280 $a^p - 2a^{p+1} + a^{p+2}$

281 $2a^p - 4a^{p-2}$

282 $x^{6m} - 1$

283 $a^3 - 2a^2 + 4a - 3$

284 $2a^3 - 4a^2 + a - 2$

285 $x^{3m} + 3x^{2m} + 3x^m + 1$

286 $x^{3m} - 3x^{2m}y + 3x^m y^2 - y^3$

287 $a^3 - 8 + 3a^2 + 6a + 12$

288 $x^2 + 2x + 1 + ax + a$

289 $a^3 + b^3 - 2a^2 + 2ab - 2b^2$

290 $x^2 - 2x + 1 - (x + y)^2$

291 $x^2 + (a - 2b)\,x - 2ab$

292 $1 - (x - 1)^3$

293 $x^2 - (a + 2)x + 2a$

294 $x^2 - 1 + (x - 1)^2$

295 $4x^2 - 3x - 1$

296 $x^4 - 2x^2 + 1$

297 $a^4 - 3a^3 - 10a^2$

298 $(3x - y)^2 - (x + y)\,(3x - y) - 9x^2 + y^2$

299 $a^2 + 4a + 4 + ab + 2b + ax + 2x$

300 $a^3 - b^3 - a^2x - abx - b^2x + 2a^2 + 2ab + 2b^2$

301 $a^2 + b^2 + 1 + 2a + 2b + 2ab - c^2$

302 $x^2 + 3x - 4 + ax^2 + a - 2ax$

303 $(3x + 5)^3 + 3\,(3x + 5)^2\,(x - 1) + 3\,(3x + 5)\,(x - 1)^2 + (x - 1)^3$

304 $(2x + 3y)^3 - 3x\,(2x + 3y)^2 + 3x^2\,(2x + 3y) - x^3$

305 $x^{10} - xy^9$; $5a^8 - 5a^5b^3$; $x^6 - 16x^2 + x^5 - 16x$

306 $2a^7 - 2a^4b^3$; $a^9 - ab^8$; $x^6 + 3x^2y^4 - y^6 - 3x^4y^2$

307 $(x - 3)^2 - x^2 + 8x - 16$; $(x - 5)^2 - x^2 + 12x - 36$

308 $a^5b^2 + 9a - 6a^3b$; $x^3 - ax^2 - axy - y^3 - ay^2$

309 $3ax^7y - 9ax^5y + 9ax^2y - 3axy$; $9x^2 - 4a^2 - 4b^2 - 8ab$

310 $2ax^2y - 18ay + 2ax^2 - 18a$; $6x^4 - 24x^2y^2 + 3x^3 - 12xy^2$

Trovare il M.C.D. e il m.c.m. dei seguenti gruppi di polinomi:

311 $a^2 - b^2$; $a^3 - b^3$; $2a - 2b$

312 $a^3 - a$; $a^2 - 2a + 1$; $a^2 - a + 2a - 2$

313 $x^4 - y^4$; $3ax^2 + 3ay^2$; $2x^2 - 2y^2 + x - y$

314 $a^2x - a^2y + abx - aby$; $2a^4 - 2a^2b^2$

315 $3a - 3b - a^2 + ab$; $a^2 - 5a + 6$; $a^3 - 9a^2 + 27a - 27$

316 $x^3 - 8$; $x^2 - 4$; $x^2 + 3x - 10$; $x^3 - 4x^2 + 4x$

317 $x(3a - 2b)^2 - 4a^2x$; $50a^2x^2 + 8b^2x^2 - 20abx^2$

318 $1 + 3x + 3x^2 + x^3$; $4x^2 + 8x + 4$; $1 + x^3$; $2 + 2x + 2a + 2ax$

319 $a^2 - 3ab + 2b^2$; $2a^2 + 2ab - 4b^2$; $3a - 3b$

320 $(a + 1)^2 - (2a - 1)^2$; $3a^2 - 12a + 12$; $72a^2 - 9a^5$

321 $a^2 - b^2 - 1 - 2b$; $a^2 + b^2 + 1 + 2ab + 2a + 2b$; $5a + 5b + 5$

322 $2a^2 + 2ab + 2a$; $(a + b)^2 - 1$; $6a^2 + 6b^2 + 6 + 12ab + 12a + 12b$

323 $25 + 9b^2 - 30b$; $9b^2 - 25$; $10x - 10y - 6bx + 6by$

324 $x^2 + x + 1$; $3 - 3x^3$; $3x^3 + 3x^2 + 3x$; $x^3 + 2x^2 + 2x + 1$

325 $100 - 4b^2$; $40 - 8b$; $6b^2 - 60b + 150$

326 $x^2 - 8x + 15$; $x^2 - x - 6$; $x^2 + x - 12$

327 $a^2 - 4b^2 - c^2 - 4bc$; $a^2 + 4b^2 + c^2 - 4ab - 2ac + 4bc$

328 $27 - 54x + 36x^2 - 8x^3$; $18 - 8x^2$; $9 + 4x^2 + 12x$

329 $a^2 - 1$; $a^2 + 2a - 3$; $a^3 + 6a^2 + 9a$

330 $a^2 + 2a - 3$; $a^3 + 9a^2 + 27a + 27$; $a(a + 3) - a^2 + 9$

331 $a^2 + b^2 + 1 - 2ab + 2a - 2b$; $ax - bx + x - ay + by - y$

332 $x^2 - (a + b)x + ab$; $ax - a^2$; $bx - b^2$

333 $x^3 + 3x^2 + 4x + 12$; $x^3 + 4x^2 + 4x + 3$; $ax + 3a$

334 $9a^2 - 4$; $9a^2 - 12a + 4$; $3a^2 - 2a$

Ridurre ai minimi termini le seguenti frazioni algebriche letterali:

1 $\frac{4xy}{6x^2}$; $\frac{3x^3y^2}{12xy^4}$; $\frac{15a^6b^2c}{18a^2bc}$ $\left[\frac{2y}{3x}; \frac{x^2}{4y^2}; \frac{5a^4b}{6}\right]$

2 $\frac{5ab}{10a^2}$; $\frac{7a^6b^3}{21a^2b^3}$; $\frac{18a^9}{6a^3b^2}$ $\left[\frac{b}{2a}; \frac{a^4}{3}; \frac{3a^b}{b^2}\right]$

3 $-\frac{6ab^2c}{9a^2c^2}$; $-\frac{10x^4y^3}{15xy^2z}$; $\frac{7a}{21a^2b}$ $\left[-\frac{2b^2}{3ac}; -\frac{2x^3y}{3z}; \frac{1}{3ab}\right]$

4 $\frac{a^6b}{8a^2b}$; $\frac{-4a^2b^3c}{-2ab^4c}$; $\frac{2ac^2}{-4c}$ $\left[\frac{a^4}{8}; \frac{2a}{b}; -\frac{ac}{2}\right]$

5 $\frac{-14a^2b}{-21a^2b}$; $-\frac{2a^6}{6a^6}$; $\frac{-2a^3b}{a^3b}$ $\left[\frac{2}{3}; -\frac{1}{3}; -2\right]$

6 $\frac{2a}{a+a^2}$; $\frac{3ab}{2a+ab}$; $\frac{a^{n+2}}{a^n}$ $\left[\frac{2}{1+a}; \frac{3b}{2+b}; a^2\right]$

7 $\frac{3x}{9x+3xy}$; $\frac{a^3}{2a^2+a^4}$; $\frac{2x^{m+1}}{6x^m}$ $\left[\frac{1}{3+y}; \frac{a}{2+a^2}; \frac{x}{3}\right]$

8 $\frac{a^2-a}{2a}$; $\frac{a^2b+a^3b^2}{3ab}$ $\left[\frac{a-1}{2}; \frac{a(1+ab)}{3}\right]$

9 $\frac{3a^4-6a^2}{9a+3a^3}$; $\frac{a^4+a^5}{2a^2-3a^3}$ $\left[\frac{a(a^2-2)}{3+a^2}; \frac{a^2(1+a)}{2-3a}\right]$

10 $\frac{a^2+a}{2+2a}$; $\frac{a^3-2a}{a^2b-2b}$ $\left[\frac{a}{2}; \frac{a}{b}\right]$

11 $\frac{am+bm}{3a+3b}$; $\frac{6x-6y}{3x^2-3xy}$ $\left[\frac{m}{3}; \frac{2}{x}\right]$

12 $\frac{(x-y)^2}{(x-y)^3}$; $\frac{(2x+y)^2}{2x+y}$ $\left[\frac{1}{x-y}; 2x+y\right]$

13 $\frac{a^4-3a^2b}{a^2-3a^2b}$; $\frac{(2x+3y)^2}{4x+6y}$ $\left[\frac{a^2-3b}{1-3b}; \frac{2x+3y}{2}\right]$

14 $\frac{mx+my}{x^2+2xy+y^2}$; $\frac{ax-ay}{x^2-2xy+y^2}$ $\left[\frac{m}{x+y}; \frac{a}{x-y}\right]$

15 $\frac{x^2-y^2}{4x-4y}$; $\frac{4x^2-9y^2}{2ax+3ay}$ $\left[\frac{x+y}{4}; \frac{2x-3y}{a}\right]$

16 $\frac{7a^2-7b^2}{3a+3b}$; $\frac{4a^2-1}{4a^2+1+4a}$ $\left[\frac{7(a-b)}{3}; \frac{2a-1}{2a+1}\right]$

17 $\frac{4x^2y^2+1+4xy}{4x^2y^2-1}$; $\frac{x^3+y^3+3x^2y+3xy^2}{4x^2+8xy+4y^2}$ $\left[\frac{2xy+1}{2xy-1}; \frac{x+y}{4}\right]$

18 $\frac{a^3-3a^2+3a-1}{a^2-1}$; $\frac{a^2+2a+1}{a^3+1+3a+3a^2}$ $\left[\frac{(a-1)^2}{a+1}; \frac{1}{a+1}\right]$

19 $\frac{x^3-1}{x^2-2x+1}$; $\frac{x^3+1}{3x+3}$ $\left[\frac{x^2+x+1}{x-1}; \frac{x^2-x+1}{3}\right]$

20 $\frac{a^3b^3-8}{2ab-4}$; $\frac{1-27a^3}{1+27a^3+9a^2+27a^2}$ $\left[\frac{a^2b^2+2ab+4}{2}; \frac{1+3a+9a^2}{3}\right]$

21 $\frac{14x-7y}{4x^2-y^2}$; $\frac{a^2-5a+6}{a^2-4a+4}$ $\left[\frac{7}{2x+y}; \frac{a-3}{a-2}\right]$

22 $\frac{x^2+5x+6}{x^2+4x+4}$; $\frac{2x^2-10x+12}{x^2-6x+9}$ $\left[\frac{x+3}{x+2}; \frac{2(x-2)}{x-3}\right]$

23 $\frac{x^4-16}{x^4+16-8x^2}$; $\frac{16-a^4}{4+a^2-4a}$ $\left[\frac{x^2+4}{x^2-4}; \frac{(4+a^2)(2+a)}{2-a}\right]$

24 $\frac{8x^3 - y^3}{4x^2 - y^2}$; $\frac{8x^3 + y^3}{2xy + y^2}$ $\left[\frac{4x^2 + 2xy + y^2}{2x + y} ; \frac{4x^2 - 2xy + y^2}{y}\right]$

25 $\frac{4a^2 + 12ab + 9b^2}{14a + 21b}$; $\frac{4a^2 + 20ab + 25b^2}{18a + 45b}$ $\left[\frac{2a + 3b}{7} ; \ldots\right]$

26 $\frac{27x^3 - y^3}{18x^2 + 6xy + 2y^2}$; $\frac{8a^3 - b^3}{12a^2 + 6ab + 3b^2}$ $\left[\frac{3x - y}{2} ; \ldots\right]$

27 $\frac{a^2 + 2a + 1}{a^3 - a}$; $\frac{4b^2 + 4b + 1}{8b^3 - 2b}$; $\frac{a^3 + 1}{4a^3 - 4a^2 + 4a}$ $\left[\frac{a + 1}{a(a - 1)} ; \ldots\right]$

28 $\frac{a^2 - 3a - 4}{a^2 - 4a - 5}$; $\frac{a^2 - 3a + 2}{a^2 - 4a + 3}$; $\frac{x^4 - 2x^2 + 1}{x^3 - x + 3x^2 - 3}$ $\left[\frac{a - 4}{a - 5} ; \ldots\right]$

29 $\frac{x^3 - 3x^2 + 3x - 1}{x^2 - 2x + 1}$; $\frac{8a^3 - 12a^2 + 6a - 1}{4a^2 - 4a + 1}$ $[x - 1 ; \ldots]$

30 $\frac{x^5 - 1}{2x^4 + 2x^3 + 2x^2 + 2x + 2}$; $\frac{a^5 - b^5}{3a^4 + 3a^3b + 3a^2b^2 + 3ab^3 + 3b^4}$ $\left[\frac{x - 1}{2} ; \ldots\right]$

31 $\frac{ax + ay + x + y}{2x + 2y}$; $\frac{3x + 3y + ax + ay}{7x + 7y}$; $\frac{x(x^2 + 1)^2 - x^3}{x^6 - 1}$ $\left[\frac{a + 1}{2} ; \ldots\right]$

32 $\frac{3x - 3y + (x - y)^2}{(x - y)^2}$; $\frac{(a + 1)^2 + 2a + 2}{(a + 1)^2}$ $\left[\frac{3 + x - y}{x - y} ; \ldots\right]$

33 $\frac{2a^3 - a^2b - 2a^2 + ab}{12a^2 - 3b^2 - 12a^3 + 3ab^2}$; $\frac{x^4 - y^4 + 2xy(x^2 - y^2)}{x^4 - y^4}$ $\left[-\frac{a}{3(2a + b)} ; \ldots\right]$

34 $\frac{5x^3 + 15x^2 - 5x - 15}{(x^2 - 9)(2x + 2)}$; $\frac{a^3 + 2ax^2 - 2a^2x - 4x^3}{a^4 - 4x^4}$ $\left[\frac{5(x - 1)}{2(x - 3)} ; \ldots\right]$

35 $\frac{a^3 - 4a^2 - 3a + 18}{(a^2 + 4a + 4)(a^2 - 4a + 3)}$; $\left[\frac{a - 3}{(a + 2)(a - 1)}\right]$

36 $\frac{(a - 3b)^2 - (2a + b)^2}{(a + 4b)^2}$; $\frac{81x^2 - 3a^3x^2}{27x^3 + 9ax^3 + 3a^2x^3}$ $\left[\frac{-3a + 2b}{a + 4b} ; \ldots\right]$

37 $\frac{(x + 4y)^2 - (x - 2y)^2}{4x^2 + 4y^2 + 8xy}$; $\frac{8a^2x - 12abx + 18b^2x}{8a^3 - 27b^3}$ $\left[\frac{3y}{x + y} ; \ldots\right]$

38 $\frac{(x + y)^2 + 2(2x - 3y)(x + y) + (2x - 3y)^2}{(3x - 2y)^2}$ [1]

39 $\frac{(a - 2)^2 + 2(a - 2)(a + 1) + (a + 1)^2}{4a^2 - 1}$ $\left[\frac{2a - 1}{2a + 1}\right]$

40 $\frac{ax + ay + a - x - y - 1}{x^2 + y^2 + 1 + 2x + 2y + 2xy}$ $\left[\frac{a - 1}{x + y + 1}\right]$

41 $\frac{2x + 2y + 2 - ax - ay - a}{3x + 3y + 3}$ $\left[\frac{2 - a}{3}\right]$

42 $\frac{a^5 - a^3 + a}{a^5 - a^3 + a + a^4 - a^2 + 1}$ $\left[\frac{a}{a + 1}\right]$ 43 $\frac{x^2 + 2x + 1 - y^2}{x + 1 + y}$ $[x + 1 - y]$

44 $\dfrac{x^2-2x+1-4y^2}{x^2+1+4y^2-2x+4xy-4y}$ $\left[\dfrac{x-1-2y}{x-1+2y}\right]$

45 $\dfrac{1-x^2-y^2-2xy}{1+x^2+y^2+2x+2y+2xy}$ $\left[\dfrac{1-x-y}{1+x+y}\right]$

46 $\dfrac{a^2-b^2-c^2-2bc}{a^2+b^2-2ab-c^2}$ $\left[\dfrac{a+b+c}{a-b+c}\right]$

Ridurre le seguenti frazioni letterali al minimo comune denominatore:

47 $\dfrac{2}{3x}$; $\dfrac{1}{6x^2}$; $\dfrac{y}{2x}$ $\left[\dfrac{4x}{6x^2}; \dfrac{1}{6x^2}; \dfrac{3xy}{6x^2}\right]$

48 $\dfrac{a}{3b^2}$; $\dfrac{3}{2ab}$; $\dfrac{5b}{15a^2}$ $\left[\dfrac{2a^3}{6a^2b^2}; \dfrac{9ab}{6a^2b^2}; \dfrac{2b^3}{6a^2b^2}\right]$

49 $\dfrac{3}{a+b}$; $\dfrac{2}{a^2+ab}$ $\left[\dfrac{3a}{a(a+b)}; \dfrac{2}{a(a+b)}\right]$

50 $\dfrac{2x}{x-y}$; $\dfrac{4y}{x+y}$; $\dfrac{1}{x^2-y^2}$ $\left[\dfrac{2x^2+2xy}{(x-y)(x+y)}; \dfrac{4xy-4y^2}{(x-y)(x+y)}; \dfrac{1}{(x-y)(x+y)}\right]$

51 $\dfrac{2-x}{x^2+2xy+y^2}$; $\dfrac{3+y}{x^2-y^2}$ $\left[\dfrac{2x-2y-x^2+xy}{(x+y)^2(x-y)^2}; \dfrac{3x+3y+xy+y^2}{(x+y)^2(x-y)}\right]$

52 $\dfrac{3}{x^2-2xy+y^2}$; $\dfrac{2}{x^2+2xy+y^2}$; $\dfrac{1}{x^2-y^2}$

$\left[\dfrac{3(x+y)^2}{(x+y)^2(x-y)^2} \quad \dfrac{2(x-y)^2}{(x+y)^2(x-y)^2}; \dfrac{(x+y)(x-y)}{(x+y)^2(x-y)^2}\right]$

Eseguire le seguenti somme algebriche tra frazioni letterali, semplificando i risultati:

53 $\dfrac{1}{ab}+\dfrac{1}{a^2}+\dfrac{1}{b^2}$; $\dfrac{z}{xy}+\dfrac{x}{yz}+\dfrac{y}{xz}$ $\left[\dfrac{ab+b^2+a^2}{a^2b^2}; \dfrac{z^2+x^2+y^2}{xyz}\right]$

54 $\dfrac{a+b}{2b}+\dfrac{a-b}{2a}$; $\dfrac{x+y}{2y}+\dfrac{y-x}{2x}$ $\left[\dfrac{a^2+2ab-b^2}{2ab}; \dfrac{x^2+y^2}{2xy}\right]$

55 $\dfrac{a-b}{b}-\dfrac{a}{2b}+\dfrac{a+b}{a}-\dfrac{a^2+b^2}{2ab}$ $\left[\dfrac{b}{2a}\right]$

56 $\dfrac{a+1}{a}+\dfrac{a+4}{2a}-\dfrac{2a+9}{3a}$ $\left[\dfrac{5}{6}\right]$

57 $\dfrac{x}{2}+\dfrac{2}{x}+1$ $\left[\dfrac{x^2+4+2x}{2x}\right]$

58 $\dfrac{1}{x+y}+\dfrac{1}{x-y}+\dfrac{2x}{x^2-y^2}$ $\left[\dfrac{4x}{x^2-y^2}\right]$

59 $\dfrac{1}{2a+2b}+\dfrac{1}{2(a+b)}+\dfrac{b-a}{a^2+2ab+b^2}$ $\left[\dfrac{2b}{(a+b)^2}\right]$

60 $\dfrac{3a}{3a+b} + \dfrac{b}{3a-b} + \dfrac{1-9a^2}{9a^2-b^2}$ $\left[\dfrac{1+b^2}{9a^2-b^2}\right]$

61 $\dfrac{a-b}{a^2} + \dfrac{a}{a^2+ab} + \dfrac{b-a}{b^2+ab}$ $\left[\dfrac{3a^2b-b^3-a^3}{a^2b(a+b)}\right]$

62 $\dfrac{x}{2x+2y} - \dfrac{2y}{3x-3y} - \dfrac{2}{3}$ $\left[-\dfrac{x^2+7xy}{6(x^2-y^2)}\right]$

63 $\dfrac{1}{x^2-y^2} + \dfrac{1}{x^2+2xy+y^2} - \dfrac{2}{x^2-2xy+y^2}$ $\left[\dfrac{-2y^2-6xy}{(x^2-y^2)^2}\right]$

64 $a - \dfrac{3a}{a^3-1} - \dfrac{a^3-a^2}{a^2+a+1}$ $\left[\dfrac{2a^3-a^2-4a}{a^3-1}\right]$

65 $\dfrac{2a^2+b^2}{a^3-b^3} - \dfrac{a}{a^2+ab+b^2} - \dfrac{1}{a-b}$ [0]

66 $\dfrac{a^2}{16-a^4} - \dfrac{1}{4+a^2} - \dfrac{2}{4-a^2}$ $\left[-\dfrac{12}{16-a^4}\right]$

67 $\dfrac{1}{a^2+ab} - \dfrac{1}{a^2-b^2} + \dfrac{1}{ab-b^2}$ $\left[\dfrac{a^2-b^2+ab}{ab(a+b)(a-b)}\right]$

68 $\dfrac{3}{a} - \dfrac{2}{b} + \dfrac{1}{a+b} - \dfrac{4}{a-b}$ $\left[\dfrac{-3ab^2-2a^3-3b^3}{ab(a-b)(a+b)}\right]$

69 $\dfrac{1}{a+2b} - \dfrac{1}{a-2b}$; $\dfrac{x}{x^2-xy} + 1 - \dfrac{y}{xy-y^2}$ $\left[\dfrac{-4b}{a^2-4b^2}; 1\right]$

70 $\dfrac{x-y}{x^2+2xy+y^2} - \dfrac{1}{3x+3y}$; $\dfrac{1}{x-1} - \dfrac{1+x}{x^2-2x+1}$ $\left[\dfrac{2x-4y}{3(x+y)^2}; \dfrac{-2}{(x-1)^2}\right]$

71 $\dfrac{1}{a^2-1} - \dfrac{1}{a^2-3a+2}$ $\left[-\dfrac{3}{(a-1)(a+1)(a-2)}\right]$

72 $\dfrac{6a}{9a^2-1} - \dfrac{1}{3a+1} - \dfrac{1}{3a-1}$; $\dfrac{5a-9}{a^2-4a+3} - \dfrac{2}{a-1} - \dfrac{3}{a-3}$ [0; 0]

73 $\dfrac{4(1+4x^2)}{(1-4x^2)^2} - \dfrac{1+2x}{1-4x+4x^2} - \dfrac{1-2x}{1+4x+4x^2}$ $\left[\dfrac{2}{1-4x^2}\right]$

74 $\dfrac{b^2-7b+10}{b^3-6b^2+12b-8} + \dfrac{b+1}{b^2-4b+4} - \dfrac{1}{b-2}$ $\left[\dfrac{1}{b-2}\right]$

75 $\dfrac{1}{x^2-9} + \dfrac{1}{x^3+3x^2-x-3} - \dfrac{1}{x^2-1} - \dfrac{1}{x^3-3x^2-x+3}$ $\left[\dfrac{2}{(x^2-9)(x^2-1)}\right]$

76 $\dfrac{3(a+b)-1-m}{a+b+ma+mb} + \dfrac{2a+2b}{a^2+2ab+b^2} - \dfrac{3+3m}{1+m^2+2m}$ $\left[\dfrac{1}{a+b}\right]$

77 $\dfrac{x+y+1}{x^2+2xy+y^2-1} - \dfrac{x-y+1}{x^2+y^2+1+2xy-2x-2y}$ $\left[\dfrac{2y-2}{(x+y-1)^2}\right]$

78 $\dfrac{2a}{a^2-b^2} - \dfrac{2}{a+b} + \dfrac{3}{b-a}$ $\left[\dfrac{-3a-b}{(a-b)(a+b)}\right]$

79 $\dfrac{a^2-4a+4}{a^3-6a^2+12a-8}+\dfrac{a}{4-a^2}$ $\left[\dfrac{2}{(a-2)(a+2)}\right]$

80 $\dfrac{2x^2}{x^3-8}-\dfrac{x^2+2}{x^2+2x+4}+\dfrac{1}{2-x}$ $\left[\dfrac{-2x}{x^3-8}\right]$

81 $\dfrac{1}{2a+b}-\dfrac{1}{2a-b}-\dfrac{2b}{b^2-4a^2}$ [0]

82 $\dfrac{1+m}{2a-2b+ma-mb}-\dfrac{1}{a-b}$ $\left[-\dfrac{1}{(a-b)(2+m)}\right]$

83 $\dfrac{x^2+y^2+z^2+2xy+2xz+2yz}{x^2-y^2-z^2-2yz}+\dfrac{x+y-z}{x-y-z}$ $\left[\dfrac{2x+2y}{x-y-z}\right]$

84 $\dfrac{1}{a^2+2a+1-b^2}-\dfrac{1}{a^2+1+b^2+2a+2b+2ab}$ $\left[\dfrac{2b}{(a+1+b)^2(a+1-b)}\right]$

85 $\dfrac{a^2-ab}{a^2+ab}-1+\dfrac{a+b}{b-a}+\dfrac{a^3+4a^2b}{a^3-ab^2}$ $\left[\dfrac{b^2}{a^2-b^2}\right]$

Eseguire le seguenti moltiplicazioni tra frazioni letterali:

86 $\dfrac{3a^2b}{4xy^2}\cdot\dfrac{2x^2}{3a^3b}\;;\quad\dfrac{1}{2}\cdot\dfrac{4a^6}{3b^2c}\cdot\dfrac{6b^2}{a^5}$ $\left[\dfrac{x}{2ay^2}\;;\;\dfrac{4a}{c}\right]$

87 $\dfrac{5a^4b^2c^3}{2x^6y^2z}\cdot\dfrac{4x^4yz}{10a^4c^3}\;;\quad\dfrac{2}{3}\cdot\left(-\dfrac{4a^2b}{3a^6}\right)\cdot\dfrac{9a}{b}$ $\left[\dfrac{b^2}{x^2y}\;;\;-\dfrac{8}{a^3}\right]$

88 $-\dfrac{8a^4x^2}{ay^4}\cdot\left(-\dfrac{2a}{x^3}\right)\cdot\left(-\dfrac{y^2}{8}\right)$ $\left[-\dfrac{2a^4}{xy^2}\right]$

89 $\dfrac{a^2-b^2}{2a}\cdot\dfrac{4}{3a+3b}$ $\left[\dfrac{2(a-b)}{3a}\right]$

90 $\dfrac{a^2+2a+1}{a^2-2a+1}\cdot\dfrac{2a-2}{3a+3}\cdot\left(-\dfrac{1}{1+a}\right)$ $\left[-\dfrac{2}{3(a-1)}\right]$

91 $\dfrac{1-a^3}{a^2-4a+4}\cdot\dfrac{a-2}{1-a}\cdot\left(-\dfrac{2-a}{a^2+a+1}\right)$ [1]

92 $\dfrac{a^2+4a-5}{ax-2a-3x+6}\cdot\dfrac{x^2+x-6}{ax-3a-x+3}\cdot\dfrac{ax-5a-3x+15}{ax-5a+5x-25}$ $\left[\dfrac{x+3}{x-3}\right]$

93 $\dfrac{a^2+ax+ay+xy}{a^2+ay}\cdot\dfrac{a^2-y^2}{a^2-ay+ax-xy}$ $\left[\dfrac{a+y}{a}\right]$

94 $\dfrac{a^3-ab^2}{a^2+2ab+b^2}\cdot\dfrac{ab+2b}{a^2b-ab^2}\cdot\dfrac{a^2+a+ab+b}{a^2+2a}$ $\left[\dfrac{a+1}{a}\right]$

95 $\dfrac{x^3-8}{x^2-4x+4}\cdot\left(-\dfrac{2-x}{x^3+2x^2+4x}\right)\cdot\dfrac{x}{4}$ $\left[-\dfrac{1}{4}\right]$

96 $\frac{3x}{4x-6y} \cdot \frac{4x^2-12xy+9y^2}{2x+3y} \cdot \left(-\frac{2}{x}\right)$ $\left[-\frac{6x-9y}{2x+3y}\right]$

97 $\frac{a-1}{a} \cdot \left(-\frac{a^2+a+1}{2-a}\right) \cdot \frac{a-2}{a^3-1}$ $\left[\frac{1}{a}\right]$

98 $\frac{2x-2}{x^2-6x+5} \cdot \frac{(x-5)^2}{4x} \cdot \left(-\frac{2x^2y}{5-x}\right)$ $[xy]$

99 $\frac{a^6-a^5}{b^5-b^4} \cdot \frac{b^3-b^2}{a^4-a^3} \cdot (-1)$ $\left[-\frac{a^2}{b^2}\right]$

100 $\frac{(a+b)^2-1}{(a-b)^2-1} \cdot \frac{(a-1)^2-b^2}{(a+1)^2-b^2}$ $\left[\frac{(a+b-1)^2}{(a-b+1)^2}\right]$

101 $\frac{(x-1)^2-y^2}{(x+1)^2-y^2} \cdot \frac{(x-y)^2-1}{(x+y)^2-1} \cdot \frac{x^2+y^2+1+2xy+2x+2y}{x^2+y^2+1-2xy-2x+2y}$ $[1]$

102 $\frac{a^2-b^2-1-2b}{a+b+1} \cdot \frac{3a+3b}{(a-b-1)^2} \cdot \frac{3a-3b-3}{a+b}$ $[9]$

103 $\frac{a+b+ca+cb}{c^2+2c+1} \cdot \frac{a}{a^2+2ab+b^2} \cdot \left(-\frac{1}{a}\right) \cdot (-2-2c)$ $\left[\frac{2}{a+b}\right]$

104 $\frac{3}{x^3-8y^3} \cdot (x^2-4xy+4y^2) \cdot \left(-\frac{x^2+2xy+4y^2}{6}\right)$ $\left[\frac{x-2y}{2}\right]$

Eseguire le seguenti divisioni tra frazioni letterali:

105 $\frac{12a^3b}{7c} : \frac{3a^2}{c^2}$; $\frac{25a^4b^3}{12a^2c^5} : \left(-\frac{5a^2b}{3c^5}\right)$ $\left[\frac{4abc}{7}; -\frac{5b^2}{4}\right]$

106 $\frac{16a^4x^3y^2}{b^4c^2} : \frac{8a^4y^2}{3b^2c}$; $-\frac{7a^5b^2}{x^4y^3} : \left(-\frac{7a^5b}{xy^3}\right)$ $\left[\frac{6x^3}{b^2c}; \frac{b}{x^3}\right]$

107 $\frac{ax+ay}{3b+3c} : \frac{x^2+2xy+y^2}{6ab+6ac}$ $\left[\frac{2a^2}{x+y}\right]$

108 $\frac{a^2+4a+4}{a^2-4a+4} : \left(-\frac{a^2+a-2}{a^2-3a+2}\right)$ $\left[-\frac{a+2}{a-2}\right]$

109 $\frac{4a^2-1}{a^3-1} : \frac{4a+2}{3a^2+3a+3}$ $\left[\frac{3(2a-1)}{2(a-1)}\right]$

110 $\frac{a^3-9a^2+27a-27}{b^2+ab} : \frac{a^2b-6ab+9b}{2a+2b}$ $\left[\frac{2(a-3)}{b^2}\right]$

111 $\frac{a^2+2ab+b^2-c^2}{3x+3y} : \frac{a^2+2ac+c^2-b^2}{x^2-y^2}$ $\left[\frac{(a+b-c)(x-y)}{3(a+c-b)}\right]$

112 $\frac{x^2-3xy+2y^2}{x^2-4y^2} : \frac{y^2-x^2}{x^2+4xy+4y^2}$ $\left[-\frac{x+2y}{x+y}\right]$

113 $\left(\frac{4a^2-9}{a^4-a} : \frac{4a^2+12a+9}{1-a^2}\right) : \frac{2a^2-a-3}{a+a^2+a^3}$ $\left[-\frac{1}{2a+3}\right]$

114 $\left[\left(\frac{8-a^3}{6ab} : \frac{2a-4}{4+2a+a^2}\right) : \left(-\frac{3a^3b^2}{2}\right)\right] : \frac{(a^2+2a+4)^2}{18a^4}$ $\left[\frac{1}{b^3}\right]$

115 $\left(-\frac{a^2-2a+4}{a^2-4a+4} : \frac{a^3+8}{a^2-3a+2}\right) : \left[-\frac{2-2a}{3(a-2)^2}\right]$ $\left[-\frac{3(a-2)}{2(a+2)}\right]$

116 $\left[\frac{(a+b)(x+y)+x+y}{(a-b)(x-y)+x-y} : \frac{a^2+b^2+1+2ab+2a+2b}{2x-2y}\right] : \frac{4x+4y}{3a-3b+3}$ $\left[\frac{3}{2(a+b+1)}\right]$

Eseguire le seguenti divisioni e moltiplicazioni tra frazioni letterali:

117 $\left(\frac{4a^2b^2c}{3x^3y} \cdot \frac{6xy}{5ab^3c}\right) : \frac{a}{10b}$ $\left[\frac{16}{x^2}\right]$

118 $\left(\frac{3a^3}{2b^2} : \frac{6a}{b^5c}\right) \frac{3a}{2bc}$ $\left[\frac{3a^3b^2}{8}\right]$

119 $\left(\frac{a+b}{a-b} \cdot \frac{a^2+2ab+b^2}{3a-3b}\right) : \frac{6(a+b)^3}{a^2-2ab+b^2}$ $\left[\frac{1}{18}\right]$

120 $\left[-\frac{(a-2b)^2}{3a^3} : \frac{a^2-4b^2}{6ab}\right] \cdot \frac{a^2+4b^2+4ab}{2b^2}$ $\left[\frac{4b^2-a^2}{a^2b}\right]$

121 $\left(\frac{2a-8b}{a+3b} \cdot \frac{a^2+9b^2+6ab}{a-4b}\right) : \left(\frac{a^2-9b^2}{8a} \cdot \frac{6a^3}{7}\right)$ $\left[\frac{56}{3a^2(a-3b)}\right]$

122 $\left(-\frac{4a^2-1}{8a^3b} : \frac{2a+1}{4a^4b}\right) \cdot \left(\frac{2a^5}{6a-3} : \frac{a^2}{27}\right)$ $[-9a^4]$

123 $\left(\frac{a^2+4a+4-b^2}{a^2+b^2+2ab-4} : \frac{a^2+b^2+4+4a-2ab-4b}{a^2+b^2+4+2ab-4a-4b}\right) \cdot \left(-\frac{3a+6-3b}{2a+2b-4}\right)$ $\left[-\frac{3}{2}\right]$

124 $\frac{4-a^2-b^2+2ab}{b-2-a} : \left(\frac{4-2a+2b}{3a^2} : \frac{2}{a^3}\right)$ $\left[-\frac{3}{a}\right]$

125 $\left(-\frac{8-27a^3}{4a^2} : \frac{4+6a+9a^2}{3a-2}\right) \cdot \frac{2a^2}{4+9a^2-12a}$ $\left[\frac{1}{2}\right]$

126 $\left(\frac{x^2-5xy+4y^2}{8y-2x} : \frac{x^2+y^2-2xy}{3x}\right) \cdot \left(\frac{2y-2x}{4x} : \frac{6x}{x+y}\right)$ $\left[\frac{x+y}{8x}\right]$

127 $\left[\frac{4a^2-9b^2}{2a^3b} \cdot \left(-\frac{4a^2b^2}{3b-2a}\right)\right] : \frac{4a^2+9b^2+12ab}{3ab}$ $\left[\frac{6b^2}{2a+3b}\right]$

Svolgere le seguenti potenze di frazioni letterali:

128 $\left(\frac{2a^3b^2}{3c}\right)^2$; $\left(-\frac{3ab^5}{2c^6}\right)^2$ $\left[\frac{4a^6b^4}{9c^2}; \frac{9a^2b^{10}}{4c^{12}}\right]$

129 $\left(\frac{4x^2y^3}{5z}\right)^3$; $\left(-\frac{2x^6y}{z^2}\right)^3$ $\left[\frac{64x^6y^9}{125z^3}; -\frac{8x^{18}y^3}{z^6}\right]$

130 $\left(-\frac{2a}{3b^2}\right)^4$; $\left(\frac{bc^2}{5a^3}\right)^4$ $\left[\frac{16a^4}{81b^8}; \frac{b^4c^8}{625\,a^{12}}\right]$

131 $\left(\frac{a+b}{a-b}\right)^2$; $\left[\frac{3a^2\,(x-y)}{2x}\right]^2$ $\left[\frac{(a+b)^2}{(a-b)^2}; \frac{9a^4\,(x-y)^2}{4x^2}\right]$

132 $\left[-\frac{2a\,(a+b)^2}{3b}\right]^3$; $\left[\frac{(x-1)\,(x+2)}{3x^2}\right]^3$ $\left[-\frac{8a^3\,(a+b)^6}{27b^3}; \frac{(x-1)^3\,(x+2)^3}{27x^6}\right]$

Eseguire le operazioni indicate riducendo a forma più semplice le seguenti espressioni frazionarie:

133 $\left(\frac{1}{a+1}+\frac{1}{a-1}\right)\cdot\frac{a^2-1}{2a}$ [1]

134 $\left(\frac{2}{x-2}+\frac{3}{x-1}\right)\cdot\frac{x^2-3x+2}{10x-16}$ $\left[\frac{1}{2}\right]$

135 $\left(1-\frac{1}{a}+\frac{1}{a^2}\right):\frac{1-a+a^2}{2a^3}$ [2a]

136 $\left(\frac{1}{a-2}-\frac{2}{a-3}+1\right):\left(\frac{2a^2-1}{a^2-5a+6}-2\right)$ $\left[\frac{a^2-6a+7}{10a-13}\right]$

137 $\left(\frac{3}{x^2-4}-\frac{1}{x-2}+\frac{1}{x+2}\right):\frac{1}{x^2+4x+4}$ $\left[\frac{2+x}{2-x}\right]$

138 $\left(\frac{a+2}{a^2-4a+4}-\frac{1}{a-2}\right):\left(\frac{a}{2-a}+1\right)$ $\left[\frac{2}{2-a}\right]$

139 $\left(\frac{a+2}{a^3-8}-\frac{1}{a^2+2a+4}\right)\cdot\left(\frac{a}{2}-1\right)$ $\left[\frac{2}{a^2+2a+4}\right]$

140 $\left(1-\frac{27}{27-x^3}\right):\left(\frac{1}{9+3x+x^2}-\frac{1}{6-2x}\right)$ $\left[\frac{2x^3}{x^2+5x+3}\right]$

141 $\left(\frac{1}{a^2-4}+\frac{1}{2-a}-\frac{2}{2+a}\right)\cdot\frac{a+2}{a-1}$ $\left[\frac{-3}{a-2}\right]$

142 $\left(\frac{1}{a}+\frac{1}{a^2}+\frac{1}{a^3}\right)\cdot\left(\frac{1}{1-a^3}-1\right)$ $\left[\frac{1}{1-a}\right]$

143 $\left(\frac{3a-1}{2a-1}+\frac{a+1}{1-2a}\right):\frac{2a^2}{1-4a^2}$ $\left[\frac{(1-a)\,(2a+1)}{a^2}\right]$

144 $\left(\frac{1}{3x-y}-\frac{2}{y-3x}\right)\cdot(3x-y)^2$ [3 (3x − y)]

145 $\left(\frac{1}{x-2y}+\frac{2}{2x+y}\right)\cdot\left(\frac{2x}{x^2-1}-\frac{1}{x+1}-\frac{1}{x-1}\right)$ [0]

146 $\left(\frac{6x}{9x^2-1}-\frac{1}{3x+1}-\frac{1}{3x-1}\right)\cdot\left(\frac{2}{x+1}-3\right)$

147 $\left(\frac{3x+1}{3x-1}-\frac{3x-1}{3x+1}\right):\frac{4x^2}{1-3x}$

148 $\left[(2-x)^2\cdot\left(\frac{1}{x^2-4}+\frac{1}{x+2}\right)\right]:\left(\frac{x^2-2x+1}{x-1}\right)$

149 $\left(\frac{2x^2}{x^3-8}-\frac{x+2}{x^2+2x+4}+\frac{1}{2-x}\right)\cdot\frac{8-x^3}{4}$

150 $\left(1+\frac{1}{a}\right)\cdot\left(\frac{2}{a-1}+\frac{3}{a-3}-\frac{5a-9}{a^2-4a+3}\right)$

151 $\left(\frac{1}{a^2-1}-\frac{1}{a^2-3a+2}\right):\left(\frac{1}{a-1}-\frac{1}{a-2}\right)$

152 $\left(\frac{1}{2}+\frac{1}{x+y}-\frac{1}{4x+4y}\right):\frac{2x+2y+3}{x^2+2xy+y^2}$

153 $\left(\frac{2}{x-1}+\frac{4}{x+2}\right)^2:\left(\frac{x^2}{x^2-2x+1}-1\right)$

154 $\left(\frac{x^2+1}{x^2-3x-4}-\frac{x+1}{x-4}\right)^2:\left(\frac{1}{x-4}\right)^2$

155 $\left[\left(\frac{1}{3-x}+\frac{x}{x^2-9}\right):\left(\frac{x}{x+3}-1\right)\right]\cdot(x^2-6x+9)$

156 $\left[\left(\frac{1}{x+5}-\frac{1}{x-5}\right):\left(\frac{x}{5-x}+1\right)\right]\cdot\frac{x+5}{x-1}$

157 $\left(\frac{3}{9-6x+x^2}+\frac{1}{3-x}\right)^2:\frac{36-12x+x^2}{x^2-9}$

158 $\frac{ax+ay+x+y}{ax-ay+x-y}:\left(\frac{x+y}{x-y}-\frac{x-y}{x+y}\right)$

159 $\left[\frac{2a+2b+xa+xb}{2a-2b+xa-xb}:\left(\frac{a^2}{a^2-b^2}-1\right)\right]:\left(-\frac{1}{b}\right)^3$

160 $\left(\frac{a^2+1}{a^3+3a^2+3a+1}+\frac{2a}{a^2+2a+1}-\frac{1}{a+1}\right):\left(\frac{2a}{a+1}\right)^2$

161 $\left(\frac{x^2+1}{x^3-3x^2+3x-1}-\frac{2x}{x^2-2x+1}-\frac{1}{x-1}\right)^2:\left(\frac{2x}{x-1}\right)^4$

162 $\left(\frac{a+b}{9-a^2-b^2-2ab}+\frac{1}{a+b-3}\right)\cdot\frac{9+a^2+b^2-6a-6b+2ab}{9}$

163 $\frac{(x+y+z)^2}{x^2+2xy+y^2-z^2}\cdot\left(\frac{x-z}{x+y-z}-1\right)^2\cdot\frac{x^2+y^2+z^2+2xy-2xz-2yz}{x+y+z}$

164 $\left(\frac{5a+5}{a^2+3a+2}-1\right)\cdot\left(\frac{1}{2}+\frac{3a+6}{a^2-a-6}\right)\cdot(a+2)$ $\left[-\frac{a+3}{2}\right]$

165 $\left(\frac{1}{y}+\frac{x}{xy-y^2}-\frac{y^3-x^3}{xy^3-x^3y}+\frac{y}{x^2+xy}\right)\cdot\frac{xy-y^2}{x}-1$ [0]

166 $\left(\frac{5x-13}{2x^2-2}+\frac{6x-21}{2x+2}-\frac{3x-5}{x-1}\right):\frac{3}{x^2+2x+1}+x$ $[-2x-3]$

167 $\left(\frac{1}{x-2}+\frac{x+2}{x^2+2x+4}+\frac{2x^2}{8-x^3}\right):\left(\frac{4}{x^2+2x+4}-1\right)+\frac{2}{x^2-4}$ [0]

168 $\frac{1+\frac{1}{2x}}{1-\frac{1}{2x}}-1;\qquad\frac{2-\frac{1}{a+2}}{1+\frac{2}{a+2}}$ $\left[\frac{2}{2x-1};\ \frac{2a+3}{a+4}\right]$

169 $\left\{\left[\left(\frac{1}{x-3}+\frac{1}{1-x}\right)\cdot(x^2-4x+3)-\frac{4}{3x-1}\right]\cdot\frac{1}{6}\right\}^2$ $\left[\frac{x^2-2x+1}{9x^2+1-6x}\right]$

170 $\left(\frac{3+a}{ab-a^2}-\frac{b+3}{b^2-ab}-\frac{3}{ab}\right)^2\cdot\left(\frac{1}{ab}-1+ab\right)$ [0]

171 $\frac{1+\frac{1}{x}+\frac{1}{x^2}}{1-\frac{1}{x}+\frac{1}{x^2}}:\frac{x^3-1}{x^3+1}-1$ $\left[\frac{2}{x-1}\right]$

172 $\frac{\frac{2x}{y^2-x^2}-\frac{1}{x+y}-\frac{1}{x-y}}{\left(\frac{2x}{x-y}\right)^2}$ $\left[\frac{y-x}{x(y+x)}\right]$

173 $\frac{\frac{a+1}{a^2-a}+1}{\frac{a-1}{a+1}+\frac{1}{a}};\qquad\frac{1-\frac{a^2-3}{a^2+1}}{\frac{3a^2+1}{a^2-1}-3}$ $\left[\frac{a+1}{a-1};\ \frac{a^2-1}{a^2+1}\right]$

174 $\left[\left(1+\frac{a^2+1}{2a}\right):\frac{a^2+1}{a}\right]:\frac{a^2-1}{2+2a^2}+1$ $\left[\frac{2a}{a-1}\right]$

175 $\left[\frac{xy+y^2}{x^2-2xy+y^2}:\frac{y^2}{x^2-y^2}+\frac{(x+y)^2}{y^2-xy}\right]:\frac{3x-y}{x^2-y^2}$ [0]

176 $\left[\left(\frac{2}{x-2}+\frac{1}{2x}-\frac{1}{x-1}\right):\left(3+\frac{2}{x^2-xy}\right)+\frac{1}{x-2}\right](x-2)^2+3$ $\left[\frac{3}{2}x\right]$

177 $\left[\left(\frac{4}{a^2-1}+\frac{a^2+3a+2}{a^2+a-2}-\frac{a^2-3a+2}{a^2-a-2}\right):\frac{4a}{5-5a}+\frac{20}{3a}\right]^2$ $\left[\frac{25}{9a^2}\right]$

178 $\left\{\left[\left(\frac{y+1}{y^2+9-6y}+\frac{y-2}{9-y^2}\right):\left(\frac{1}{3+y}-\frac{1}{3-y}\right)\right]\left(3-\frac{8y}{3y-1}\right)\right\}^3-\frac{3}{8y^3}$ $\left[\frac{3}{y^3}\right]$

179 $\left[\left(\frac{2a^2+a}{1-a^2}+\frac{3a}{2a-2}+\frac{2a}{3+3a}\right):\left(\frac{3}{1-a}+\frac{2}{1+a}+\frac{4}{a^2-1}\right)\right]:$

$:\left(\frac{1}{a+1}-\frac{1}{a^2+1}\right)+\frac{a^2}{3}$ $\left[\frac{a^2-1}{6}\right]$

180 $\left(\frac{1}{a^2}+\frac{2}{ab}-\frac{a^2+b^2}{a^2b^2}-\frac{3}{b^2}+\frac{12}{3b^2}\right):\left(\frac{1}{a}+\frac{1}{b}\right)-\frac{2}{a-b}$ $\left[-\frac{4b}{a^2-b^2}\right]$

181 $\left(\frac{5a^2}{a-1}\cdot\frac{a-3}{a-2}\cdot\frac{a^2-3a+2}{3a^2-9a}-\frac{8}{3}a\right)^3+(a^4-1):(a-1)$ $[a^2+a+1]$

182 $\left[\left(a+\frac{a}{a-1}-\frac{a}{a+1}\right)\cdot\frac{a^2-1}{a^2+1}+\left(\frac{1}{1-a}-\frac{1}{1+a}\right):\frac{2}{1-a^2}\right]:2a-1$ $[0]$

183 $\left[\left(\frac{1}{1-x}+\frac{2x}{1-x^2}\right)\frac{x-1}{x}+\left(\frac{x^2}{1-x^2}+\frac{2x}{1-x}\right)\frac{1-x}{2+3x}\right]:(3x+1-x^2)$ $\left[-\frac{1}{x(1+x)}\right]$

184 $\left[\frac{(a+2)^2(a^2-2a+4)}{a^5-32+8a^2-4a^3}:\frac{a^2+ab-a}{a^2-3a+ab-2b+2}+a\right]^2:(1+a^2)^2$ $\left[\frac{1}{a^2}\right]$

185 $1+b\left[\frac{5}{6b}+\frac{a}{3b^2-2a^2}\left(\frac{2a+b}{2a}-\frac{a+3b}{3b}\right)\right]$ $[2]$

186 $\left(\frac{x}{x+1}-\frac{y}{y+1}+\frac{x+y}{x^2+x+y+xy}\right)\frac{y+1}{y-1}-\frac{1}{y^2-1}$ $\left[\frac{y}{y^2-1}\right]$

187 $\left[\left(\frac{2a+b}{2}-\frac{3a-b}{3}\right)\frac{a}{5}+\frac{b}{2}\left(\frac{a+3b}{3}-\frac{a+2b}{2}\right)\right]:\frac{ab}{6}$ $\left[\frac{1}{2}\right]$

188 $\left(y-\frac{x^2y+xy^2}{x^2+xy+y^2}\right)\left(1+\frac{y}{x-y}\right)\left(1-\frac{x^3}{y^3}\right)$ $[-x]$

189 $\left(\frac{a+1}{b}+a\right)\left(\frac{a+1}{b}-a\right)-\left(\frac{a+1}{b}+2a\right)^2+a^2\left(\frac{4}{b}+5\right)$ $\left[-\frac{4a}{b}\right]$

190 $\left(\frac{a+1}{a-1}-\frac{a+3}{a-2}+\frac{2a+1}{a^2-3a+2}\right):\left(\frac{a^2-a+1}{a-1}-a\right)+1$ $[0]$

191 $\left(\frac{2x-2y}{xy+y^2}+\frac{3x+3y}{xy-y^2}+\frac{4x^2+4y^2}{-x^2y+y^3}\right)\left(\frac{2}{x+y}-\frac{1}{y}\right)$ $\left[-\frac{1}{y^2}\right]$

192 $\left\{\frac{1}{a+2b}-\frac{1}{(a+2b)^2}\left[a-\frac{12b^2-2a(a+b)}{a-2b}\right]\right\}:\left(\frac{1}{2b-a}+\frac{6b-a}{a^2-4b^2}\right)$ $[1]$

193 $\left(\frac{2ab}{a+b}-a\right):\left(\frac{1}{b}+\frac{1}{a-2b}\right)+\left(\frac{2ab}{a+b}-b\right):\left(\frac{1}{a}+\frac{1}{b-2a}\right)$ $[ab]$

194 $\left(\frac{2a}{1-a^2}+\frac{1}{a-a^2}-\frac{1}{1-a}\right)\cdot\left(1-\frac{2}{a^2+1}\right)\cdot\frac{a}{a-1}$ $\left[-\frac{1}{a-1}\right]$

195 $\left(\frac{1}{a-b}+\frac{1}{a+b}\right)\cdot\left(\frac{a+b}{a^3-b^3}+\frac{1}{b^2-a^2}\right)\cdot\frac{(a^2-b^2)(a^3-b^3)}{ab}$ $\left[\frac{2a}{a+b}\right]$

196 $\left(\frac{x+a}{x-a}-\frac{x-a}{x+a}\right):\left(1-\frac{x-a}{x+a}\right)$ $\left[\frac{2x}{x-a}\right]$

197 $\left[\left(\frac{x}{x^2-1}-\frac{x}{x^2+1}\right):\frac{2}{x^3-x^2+x-1}+\frac{x}{x+1}\right]:\frac{x}{x+1}$ [2]

198 $\left[\left(\frac{1}{a^2}+\frac{1}{b^2}\right)\cdot\frac{1}{a^2+2ab+b^2}+\left(\frac{1}{a}+\frac{1}{b}\right)\cdot\frac{2}{(a+b)^3}\right]:\left(-\frac{1}{ab}\right)$ $\left[-\frac{1}{ab}\right]$

199 $\left[\left(\frac{x+1}{x-1}-\frac{2}{x+1}\right)\cdot\frac{x^3-1}{x^4-9}+\frac{x}{x^3+x^2-3x-3}\right]\cdot\left(-\frac{x^3+3x^2-3x-9}{x^2-2x-3}\right)$ $\left[\frac{x+3}{3-x}\right]$

Tenendo presente la legge di annullamento del prodotto, secondo la quale il prodotto di due o più fattori è nullo quando e soltanto quando uno almeno dei fattori è nullo, stabilire per quali valori reali della lettera a si annullano i seguenti prodotti:

200 $(a+8)(7-a)(3a+9)(5a-10)$ $[-8, 7, -3, 2]$

201 $(a-1)(a+5)$; $(2a-4)(a+11)$ [1 e -5; 2 e -11]

202 $(a+9)(2a-5)$; $a\left(a-\frac{1}{2}\right)$ $\left[-9 \text{ e } \frac{5}{2};\ 0 \text{ e } \frac{1}{2}\right]$

203 $(3a+1)(2-a)\left(\frac{2}{3}+a\right)$ $\left[-\frac{1}{3},\ 2,\ -\frac{2}{3}\right]$

204 $a(a-8)$; $3a(a+5)$ [0 e 8; 0 e -5]

205 $(a^2+5)(a-3)$; $(2a^2+1)(a+8)$ [3; -8]

206 $(2a-3)(3a+1)(4-5a)$ $\left[\frac{3}{2},\ -\frac{1}{3},\ \frac{4}{5}\right]$

207 $8a(a^2+77)(a^2-4)$ $[0,\ 2,\ -2]$

208 $(a-5)^2(a+1)^7(a-8)^{20}$ $[5,\ -1,\ 8]$

209 $\frac{a+5}{2}\cdot\frac{a-3}{4}$ $[-5,\ 3]$

210 $5a\cdot\frac{a+2}{3}$ $[0,\ -2]$

211 $a^8(a-1)^3(8a^2+9)$ $[0,\ 1]$

Tenendo presente la legge di annullamento del prodotto (vedi esercizi precedenti), stabilire per quali valori reali della lettera b i seguenti prodotti assumono valori diversi da zero:

212 $(b-1)(b-3)(b+4)$ $[b\neq 1,\ b\neq 3,\ b\neq -4]$

213 $b(b+5)(2b-6)$ $[b\neq 0,\ b\neq -5,\ b\neq 3]$

214 $3b(b+8)(2b-3)(b+1)$ $\left[b \neq 0,\ b \neq -8,\ b \neq \frac{3}{2},\ b \neq -1\right]$

215 $(8-b)(3b^2+7)$ $[b \neq 8]$

216 $(4b+5)(8-b)(b^2+1)$ $\left[b \neq -\frac{5}{4},\ b \neq 8\right]$

217 $\frac{b+5}{8} \cdot \frac{3b-2}{12} \cdot (b-9)^5$ $\left[b \neq -5,\ b \neq \frac{2}{3},\ b \neq 9\right]$

Stabilire quali valori numerici non si possono attribuire alle lettere che compaiono nei termini delle seguenti frazioni:

218 $\frac{x+5}{x-3}$; $\frac{8}{a-5}$; $\frac{a^2}{a+2}$; $\frac{a+3}{a}$

219 $\frac{5}{x^2-4}$; $\frac{3x-1}{(x+3)(x-2)}$; $\frac{b^2+2b+1}{b(b-8)}$; $\frac{20}{a^2-16}$

220 $\frac{8-x}{2x-1}$; $\frac{x^2+5}{3x+2}$; $\frac{3a}{5a-10}$; $\frac{b-1}{4b+3}$

221 $\frac{2a}{a-b}$; $\frac{a^2+1}{a+b}$; $\frac{1}{a+b-5}$

222 $\frac{3x}{x^2+1}$; $\frac{a+b}{2a^3+3}$; $\frac{3-b}{b^2+4}$