Centro de Formação Científica‘ALBERT EINSTEIN’

(CACUACO - VILA)

Fascículo de Matemática

Parte. 02

Ano lectivo '2011-2012'

Nome do Aluno:

Explicador

Turno:

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Reduzir as seguintes expressões

1º) $(3a+2b)(4a-6b)-(2a-b)(6a+8b)+2ab$

2º) $(2x-3y)(x+4u)-(3x-2y)(4x+6y)$

3º) $(a+b+c)(a+b-c)-(a-b+c)(-a+b+c)$

4º) $(9a^2-4b^2)(a-1)-(3a-2b)(3a^2+ab-3a-2b)$

5º) $(5x-2y)(x^2-2xy+3y^2-8)+(2x^2+2xy-5y^2+10)(5x-2y)—(3x^2-$
$-2y^2+2)(5x-2y)$

6º) $(a-c)[(a-b)-c(b+c)]-b(a-b)(b+c)-(a^2-b^2-c^2)(a-b-c)$

7º) $(x+1)\left(-0{,}5x+\frac{1}{2}\right)3x-5x\left[\frac{1}{2}x+\left(\frac{1}{2}x+1\right)\left(-\frac{1}{3}-0,\overline{3}\right)+0{,}5\right]$

8º) $[2ab(a-3b)-(a+b)(4a^2-2ab+b^2)+5a(b^2+2a^2)]\cdot\left(a^3+\frac{1}{6}b^3\right)$

9º) $\left(y+\frac{1}{2}x\right)\left[\frac{1}{4}y^2+x-\frac{1}{2}y\left(4+\frac{1}{2}y\right)\right]\left[\frac{1}{2}x(4x+8y)-4y(x-2y)\right]$ $R\%x^4-16y^4$

10º) $[a(b-c)+(b+a-a)+b(a+c)(a+c-b)+c(a+b)(a+b-c)]x$ $R\%6abcx$

11º) $a(b-c)+(c-a)+c(a-b)-\{(a-b)(c-d)-\left[(c-b)(a-d)—(c-a)\left(b—d\right)\right]\}$ $R\%0$

12º) $\{(3x^2+5y^2)[(x+5y)(3x-y)-14xy]+24y^4\}(9x^4+y^4)$ $R\%81x^8-y^8$

13º) $\left[\left(x+\frac{1}{2}y\right)\left(\frac{2}{3}a+b\right)-\frac{1}{3}ay-bx\right](6ax-12by)+5by(ax+by)$

14º) $-xy\left[3xy\left(x^2-3xy-\frac{1}{3}y^2\right)-(x^2-xy)(y^2+3xy)\right]-(-xy)^3$ $R\%8x^4y^2$

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

16º) $b^2\left\{\left[-3ab\left(2a-\frac{1}{3}b\right)+6a^2b\right]+b^2\right\}(a+2)-3ab^3\left(b+\frac{1}{3}ab\right)$ $R\%2b^2$

17º) $a^5-2a\left\{4a^3-5a^2+2a\left[\left(\frac{3}{2}a-2\right)\left(\frac{1}{3}a-1\right)\left(\frac{3}{4}a-\frac{1}{2}\right)-\frac{1}{24}(3a^3+3a^2+2a)\right]\right\}$

18º) $2xy^2(x^22xy-3y^2)-xy(x^2-4xy^2-6y^3)$ $R\%x^2y^2$

19º) $2ab(9a-2b)-3b^2(a+b)-b(18a^2-3b^2)+12ab^2$ $R\%5ab^2$

20º) $3x^2(5-7x+6x^2)-5x(6x^3-4x^4-7x^2)-x^3(5x+2x^2-2)$

21º) $6(ax+3x^2+4x^3)-x^2(a+9+13x)+5x(a+2x+3x^2)$

22º) $3x^3[4x^4-7x(9x^3-11x^2)+59x^3(x-1)]+2(-3x^2)^3$

23º) $x(x-y)-y(x-y)+2xy-(a^2-b^2)+a(a+b)-b(a+b)$ $R\%x^2+y^2$

24°) $(2a+3b)a-2b(2a+3b)-(8b^2+ab)-2a^2+b(2a+3b)$

25°) $-\frac{2}{3}xy^2\left\{(2x-y)(-x^2)—\frac{1}{2}x(4x^2-2xy)+3a(b-a)-3ab\right]$

26°) $x^2y^2-2x\left\{\frac{3}{4}y+2x\left[-3-\frac{1}{2}y\left(3x-\frac{1}{2}y\right)\right]+3x^2y\right\}+\frac{3}{2}xy \quad R\%12x^2$

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

28°) $2x\left[\frac{1}{6}-\left(9a-\frac{2}{15}ax+\frac{2}{3}\right)-\left(1-\frac{2}{3}ax\right)—\frac{1}{5}ax+\frac{3}{2}\right)+3x(2+6a)$

29°) $\left[\left(-\frac{1}{2}x^3\right)^2-\left(-\frac{1}{2}x^2\right)^3-\frac{3}{8}x^6-2\left(x^6-\frac{1}{10}\right)\right](-5x)+x$

30°) $6x^3—[y(-4y^2+x^2)-x^2(-3x+4y)]-y(2y^2-5x^2)+2y(4x^2+y^2)$

31°) $x\{3x^3+[(-xy+y^2-2x^2)x+xy(x+y)-y^3]\}-[(-2xy)^2-2(-xy)^2]$

32°) $a\{5a-[7ab-(1+2ab-3a)-(ab-5)]\}-2a(a-2ab-2)-$
$\{-[-(a)^2]^3\}^2$

33°) $3a(2a-5b)-b(3a-4b)-6a(a-3b)$

34°) $2x(3x+y)-[4x(x-2y)-2x(3x+3y)]$

35°) $2m[3m^2-2n(3m-n)]-3n[m^2-2m(m-2n)]-3m^2(2m-3n)$

36°) $7c(3a+2b)-5b(3a-6c)+3a(5b-7c)$

37°) $4x^3-\{2xy(2x-3y)-[2x^2(2y-3x)+2x(x^2-3y^3)]\}$

38°) $3a^2b-\{2a(a^2-2b^2)-[3a^2(a+2b)-a^2(9b+a)]\}$

39°) $\frac{1}{4}x^2(x-2b)+\frac{1}{2}bx(x+3b)-\frac{3}{4}b^2(2x-b)$

40°) $3pq^2-\left[pq(3p+q)-\frac{1}{2}p^2(p+q)\right]-p(3p^2+2q^2)$

41°) $4x+(3y+z)-2(2x-y+z)-8(x-4y-4z)$

42°) $\left\{\left[\frac{4}{3}xy^3\left(-\frac{3}{5}ay+\frac{1}{6}yz^3+\frac{1}{5}xt^3\right)\right]\left(-\frac{2}{3}abxy\right)\right\}(x^3y)$

43°) $(a-m)(a^5+a^4m+a^3m^2+a^2m^3+am^4+m^5)$

44°) $(70y^{m-p-1}-65y^{2-3m-2p}+5y^{2p+m})\frac{3}{5}y^{2p-m+1}$

Decompor em factores (pôr em evidencia)

1º) $5ax - 5bx$
2º) $6a^2b - 2a^2b^2 + 8ab^2$
3º) $3a^2 + a - 2a^3$
4º) $2a(x - y) - 3b(x - y)$
5º) $(a - b)(x - 2) + 3x(b - a)$
6º) $(x + y)(3a + 2) - (x + y)$
7º) $2(x - 1)(a + b) + a(1 - x)$
8º) $(a + 1)^2 + 2(a + 1)$
9º) $3(2 - x)^2 - 3(x - 2)^3$
10º) $a - 2b - ax$
11º) $ac + bc + ad + bd$
12º) $1 + a - x - ax$
13º) $x^2 + x^3 + x + 1$
14º) $2a^2 - 3a - 2a^3 + 3a^2$

Decompor em factores $(a^2 \pm 2ab + b^2)$

1º) $a^2 + 4a + 4$
2º) $1 - 6x + 9x^2$
3º) $2a^2b - b^2 - a^4$
4º) $(a + b)^2 + 2x(a - b) + x^2$
5º) $6x - 3x^2 - 3$
6º) $x^5 - 8x^2 + 16x$
7º) $a^4 + a^2 + \frac{1}{4}$

Decompor em factores $(a^3 \pm b^3)$

1º) $8x^3 - 1$
2º) $x^3 + \frac{1}{27}$
3º) $(x - y)^3 - y^3$
4º) $1 - 8(a + b)^3$
5º) $x - x^4$

Decompor em factores $(a^3 \pm 3a^2b + 3ab^2 \pm b^3)$

1º) $8 - 12a + 6a^2 - a^2$
2º) $a^3 + a^2 + \frac{ab^2}{3} + \frac{b^3}{27}$
3º) $8a^6 + 36a^4b + 27b^3 + 54a^2b^2$
4º) $a^7 - 3a^5 + 3a^3 - a$
5º) $16a^4 + 2a + 24a^3 + 12a^2$

Decompor em factores $(a^2 - b^2)$

1º)$x^2 - 4$
2º)$a^2 - 9b^2$
3º)$x^4 - y^6$
4º)$-16a^2 + 9b^4$
5º)$5a^2 - 5b^2$
6º)$x^2 - \frac{1}{25}$
7º)$(a-b)^2 - a^2$
8º)$(a+b)^3 + (a+b)$
9º)$(a-2b)^2 - (2a+5b)^2$
10º)$a^6b^4 - a^2$
11º)$4(a+b)^2 - 9b^2$
12º)$\frac{3}{5}x^2 - \frac{5}{3}y^2$

Decompor em factores (Artifício de cálculo)

1º) $a^4 + 4$
2º) $x^4 + y^4 + x^2y^2$
3º) $x^3 + 2x - 3$
4º) $a^5 - 2a^3 + 1$
5º) $x^4y - 3x^2y + 2xy$
6º) $x(x+3) - y(y+3)$
7º) $(a-b)^2 + 4ab$

8º) $c(a^2 - c) + a(a - c^2)$

Decompor em factores

1º) $x^2 + 7x + 12$
2º) $2x^2 - 10x + 12$
3º) $6a + 7a^2 + a^3$
4º) $a^2 - 8ab + 12b^2$
5º) $x^4 - 3x^2 - 4$
6º) $(a + b)^2 - (a + b) - 6$
7º) $12x^2 + 8 - 28x$
8º) $8a^2 - 2ab2 - 15b^2$
9º) $2a^4 + 3a^2 - 5$
10º) $2x^2 + 7x + 3$
11º) $1 - x^2y^2$
12º) $8a^6 - 1$
13º) $1 - x^5$
14º) $a^4 + 1 - 2a^2$
15º) $a^3 + a^2 + 1 + a$
16º) $2a^3 - 6a^2 + 6a - 2$
17º) $a^2 + 2ab - x^2 + b^2$
18º) $x^3 + x^2 - 6x$
19º) $a(a + c) - b(b - c)$
20º) $(a^2 - 1) + 4(a + 1) + (a + 1)^2$
21º) $x^4 - 2x^2y^2 + y^4$
22º) $a^6 - b^6$
23º) $2a^2 - 4a - 6$
24º) $a^2 + 1 - b^2 - 2a$
25º) $ax^8 - a$
26º) $2(a + b) - (a - b)^2$
27º) $2x^2 - 7x + 3$
28º) $(a^2 + b^2)^2 - 4a^2b^2$
29º) $a^3 - b^3 - a^2 + b^2$

30º) $(a-b)^3-(a^3-b^3)$
31º) a^5-b^5
32º) x^5+32
33º) a^8-a
34º) $(-a-b)^3-4(a+b)$
35º) $a^4+b^4-2a^2b^2$
36º) $(x^2-1)^2-3(x^2-1)$
37º) a^3-a+2a^2-2
38º) x^2+5x+6
39º) a^3-3a^2+7+3a
40º) $x(a-b)+3(b-a)$
41º) a^3-125
42º) $4a^2-1024d$

Divisão de polinómio

1º) $\left(\frac{2}{3}a^4+\frac{5}{6}a^2-2a+1\right)\div(-a+3)$

2º) $(3x^4+21x^3-17x^2+9x-2)\div(3x^2-x+2)$

3º) $\left(\frac{3}{4}x^4+5x^2-2\right)\div(x^2-3)$

4º) $(a^4-a^3+a^2+1)\div(a^2-a+1)$

5º) $\left(4x^3+\frac{3}{2}x^2-x+2\right)\div(x^2+1)$

6º) $(7a^3-2a^2+3)\div(a-1)$

7º) $\left(\frac{3}{2}x^2-\frac{3}{2}x^2+\frac{3}{2}x-\frac{3}{2}\right)\div(x-1)$

8º) $(x^3-6x^2+11x-6)\div(x^2-25)$

9º) $(a^3+4a^2+a-6)\div(a^2-5a+4)$

10º) $(-4a^2b^2+5a^3b+1)\div(b-2)$

11º) $(x^4+ax^3+a^2x^2-2a^3x+a^4)\div(x-4)$

12º) $\left(\frac{3}{2}x^3-2ax^2+3a^2x-2\right)\div\left(\frac{1}{2}x+2a\right)$

13º) $(x^3-y^3)\div(x^2+xy+y^2)$

14º) $(a^5-b^5)\div(a-b)$

15º) $(x^3y^3-x^2y^2+xy-1)\div(xy+1)$

16º) $(4x^2y^2+3xy-2)\div(xy-2)$

17º) $(x^3-2x^2+x+1)\div(x-1)$

18º) $(2x^5-6x^4+x+2)\div(x^2-2x+1)$

19º) $(a^3+2a^2-9a-18)\div(3a-6)$

20º) $\left(\frac{3}{2}x^6+5x^3-2x+2\right)\div(x^3-2x+1)$

21º) $(2x^5-7x^4-x^3+6x^2+x+1)\div(x^2-1)(5x^4-6x^3+2x-1)\div$
$\div\left(\frac{1}{2}x^2-1\right)$

22º) $(4x^3y^3+5x^2y^2+2yx+3)\div(x^2y^2+3)$

23º) $(3x^3y^3-1)\div(x^3y^3)$

24º) $(5a^2x^2-3ax+2)\div\left(\frac{2}{3}ax-3\right)$

25º) $\left(8x^3y^3-\frac{1}{3}x^2y^2-3\right)\div(4x^2y^2-3)$

26º) $(3x^4y^4+2xy-2x^2y^2-3)\div(x^3y^3-2xy+1)$

27º) $(5a^3x^3-4a^2x^2+ax-2)\div(ax-1)$

28º) $(-15x^3y+2x^2y^2-6y^4-4xy^3)\div(5xy+y^2)$

29°) $[x^{2m} + (a+b)x^m + ab] \div (x^m + a)$

Simplificação

1º) $\left(\frac{-x^2+4x-3}{-x^3+3x^2+x-3}-\frac{1}{x+1}\right)\div\frac{x^{19}}{x^{18}+1}$

2º) $\left(\frac{x^2-10x-11}{2x^3-21x^2-12x+11}+\frac{2x+1}{4x^2-1}\right)\div\frac{1}{2x-1}$

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

4º) $\left(\frac{a+3}{a+1}-\frac{a+1}{a+3}\right)\div\frac{4a^2+16a+16}{a^2+4a+3}$

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

6º) $\left(\frac{a^2-b^2}{a^2+2ab+b^2}+\frac{1}{a+b}\right)\div\frac{a-a(b-a)}{a+b}$

7º) $(3a+12)\div\left(\frac{4}{a+3}-\frac{a}{a^2+6a+9}\right)\cdot\left(\frac{1}{a+3}\right)$

8º) $\left[\left(1-\frac{1}{x^2-4x+4}\right)\cdot\frac{x+2}{x-1}\right]\div\frac{x-3}{x-2}$

9º) $\left(\frac{-8}{x^3+2x^2+4x+8}\right)\div\left[\frac{1}{x^2+4}-(x^2-4)^{-1}\right]$

10º) $\left[\left(\frac{1}{x-a}-\frac{x-a}{x^2+2ax+a^2}\right)\cdot\frac{x^2-a^2}{4ax}-\frac{1}{x-a}\right]\cdot(x^2-a^2)$

11º) $\left(-\frac{1}{3y}+\frac{1}{3y-2}\right)\cdot(3y-1)\div\left(\frac{1}{y}+\frac{3}{3y-2}\right)$

12º) $\left(\frac{x+8}{x^3-8}-\frac{x-4}{x^2+2x+4}+\frac{x+2}{x-2}\right)\div\frac{x^2+4x+4}{x^2+2x+4}$

13º) $\left[\left(\frac{1}{1-b}+\frac{1}{1+b}\right)\div\left(\frac{1}{1-b}-\frac{1}{1+b}\right)\right]\div\frac{1}{1+b^2}$

14º) $\frac{x-1-y}{x-1+y}-\frac{x-1+y}{x-1-y}-\frac{xy-y}{x-1-y}\div\frac{y-x+1}{4}$

15º) $\left(\frac{xy}{xy-x}+\frac{x}{xy+x}\right)\div\left(\frac{xy}{xy-x}-\frac{x}{xy+x}\right)+\frac{x^2-2x^2y-x^2y^2}{x^2+x^2y^2}$

16º) $\left(\frac{1}{x-1}-\frac{2x^2-3x+1}{x^3-3x^2+3x-1}\right)\div\frac{x^2}{x^2 2x+1}$

17º) $\left(1-\frac{x}{1+2x+x^2}\right)\div\left(1+\frac{x^2}{1+x}\right)-\frac{1}{1+x}$

18º) $\left(\frac{a^2-16}{a^3-a^2-9a+9}\div\frac{a+1}{a+3}\right)\cdot\frac{a^3-3a^2-a+3}{a-4}$

19º) $\left(\frac{1}{x-y}+\frac{1}{x+y}\right)^2\div\left(\frac{1}{x-y}-\frac{1}{x+y}\right)^2$

20º) $\left[\left(\frac{1}{x}+\frac{1}{x+1}\right)\div\left(\frac{1}{x+2}-\frac{1}{x+3}\right)\right]\div\frac{x^2+5x+6}{x^2+x}$

21º) $\left(\frac{x+y}{y}-\frac{x}{x+y}\right)^2\div\frac{x^2+y^2+xy}{x^2+y^2+2xy}-\frac{x^2+y^2+xy}{y^2}$

22º) $\left(\frac{2x^3+3x^2-2x-3}{x^2+3x-4}-\frac{2x^3-3x^2+10x-15}{x^2+5}\right)^2\div\frac{225}{(x+4)^2}$

23º) $\left(\frac{1}{x}-\frac{1}{x-2}+\frac{1}{x+4}\right)\cdot\left(\frac{x^2+2}{3x^3-x^2+6x-2}-\frac{x^3+3}{3x^4-x^3+9x-3}\right)$

24º) $\frac{a-3+\frac{5a}{2a+6}}{2a-1-\frac{15}{3-a}}+\frac{a\left(\frac{1+a}{1-a}-\frac{1-a}{1+a}\right)}{\left(\frac{1+a}{1-a}-1\right)\left(1-\frac{1}{1+a}\right)}$

25º) $\frac{\left[\frac{(a+b)^3}{3ab}-a-b\right]\left[\frac{(a-b)^3}{3ab}+a-b\right]}{\left[\frac{(a+b)^2}{4ab}-1\right][(a+b)^2-ab]}\cdot\frac{(b-a)^3-(b-a)\left(a^2+ab+b^2\right)}{(a+b)^3-3ab(a+b)}$

26º) $\left(\frac{\frac{1}{1+b}+\frac{b}{1-b}}{\frac{1}{1-b}-\frac{1}{1+b}}-\frac{\frac{1}{b}-1}{\frac{1}{b}+1}\right)\div\left(\frac{\frac{1}{b}-1}{\frac{1}{b}+1}+1\right)$

27º) $\frac{\frac{1}{xy}+\frac{1}{mn}+\frac{1}{ab}}{\frac{xy+mn}{mnxy}+\frac{ab+mn}{ab-mn}+\frac{ab+mn}{abxy}}$

28º) $\frac{\frac{\frac{x+1}{y}}{x+\frac{1}{y}}-\frac{xy+x}{xy+1}+1}{\frac{x+1}{xy+1}+\frac{y^2+y}{y^2+\frac{y}{x}}}$

29º) $\frac{\frac{a^2+b^2}{b}-a}{\frac{1}{b}-\frac{1}{a}}\div\frac{a^3+b^3}{a^2-b^2}-\frac{\frac{a^2}{b^2}+\frac{b}{a}}{\frac{a}{b^2}-\frac{1}{b}+\frac{1}{a}}$

30º) $\left[\left(\frac{2x}{x+2}-\frac{4}{x^2-4}+\frac{2}{x-2}\right)\div\left(\frac{x}{x^2-4}+\frac{1}{x+2}\right)\right]\div\frac{1}{x}$

31º) $\left[\left(\frac{3}{3+x}+\frac{x}{x-3}+\frac{x^2}{9+3x}+\frac{9}{x^23x}\right)\cdot\frac{3x}{81+18x^2+x^4}\right]$

32º) $\left(\frac{2b}{b+a}-\frac{a^2}{b^2-a^2}+\frac{a}{b-a}\right)\div\left(\frac{b}{b^2-a^2}+\frac{1}{b+a}\right)$

33º) $\left(\frac{x^2+ax}{x^2+ax+a^2}-\frac{x+a}{x-a}+\frac{ax^2+a^2x}{x^3-a^3}\right)\div\frac{-ax-a^2}{a^2-ax+x^2}$

34º) $\left(\frac{a}{a+b}+\frac{b}{b-a}+\frac{b^2}{a^2+ab}-\frac{a^2}{ab-b^2}\right)(b^2-a^2)$

35º) $\frac{\frac{1}{3}}{\frac{1}{a}-\frac{1}{b}} - \frac{2a^2b^2}{a^2-b^2} + \frac{1}{\frac{1}{a}+\frac{1}{b}} \cdot \frac{1}{\frac{ab}{a+b}} - \frac{b^2+a^2}{a^2-b^2}$

36º) $\frac{\frac{1}{x-1}+\frac{1}{x+1}}{\frac{x+1}{x-1}+1} + \frac{\frac{1}{x}-\frac{1}{y-2}}{\frac{1}{x}+\frac{1}{y-2}} \cdot \left(\frac{y^2+4-x^2}{4y} - 1\right)$

37º) $\left[\frac{1}{\frac{a-1}{a^2+a+1}-\frac{a+1}{a^3-1}}\right] \div \left(\frac{5}{a^2+a+1} - \frac{a}{a^3-1}\right)^{-1} - \frac{1}{9-a^2} + \frac{4a-3}{a^2-3a}$

38º) $\left[\frac{\frac{1}{a-b}}{\frac{1}{a+b}+\frac{1}{a-b}} \cdot \frac{2ab}{a^2-b^2}\right]^{-1} \cdot \frac{a+b}{a-b} - \left(\frac{1}{\frac{1}{a}+\frac{1}{b}}\right)^{-1}$

39º) $\left[\frac{\frac{2a}{a^3-a^2+a-1}+\frac{a-1}{a^3+a^2+a+1}}{\frac{a}{a-1}-\frac{a}{a+1}}\right]^{-1} \cdot \frac{3a^2+1}{a^2+1} - \frac{6a^2}{3a^2+1}$

40º) $\frac{b^2-3b+2}{b^2-4} \cdot \frac{b^2-9}{b^2-4b+3} \cdot \frac{b+2}{b+3}$

41º) $\left[\left(a+\frac{1}{a}\right)+1\right]\left[\left(a+\frac{1}{a}\right)-1\right] \cdot \frac{-1}{a^4+a^2+1}$

42º) $\left(\frac{m+n}{2(m-n)} - \frac{m-n}{2(m+n)} + \frac{2n^2}{m^2-n^2}\right) \cdot \frac{m-n}{2n}$

43º) $\left(\frac{x+1}{x-2} + \frac{3x-5}{x+3} - \frac{3x^2+7}{x^2+x-6}\right) \cdot \frac{x^2+4x+3}{x^2-4x-12}$

44º) $\left\{\left(1-\frac{x^2-y^2}{x^2+y^2}\right) \cdot \left[\frac{x^2(x^2+2y^2)}{y^2} + y^2\right] - 4xy\right\} \cdot \frac{1}{2z^2-2y^2}$

45º) $\frac{1}{m^2} \cdot \left[2-(m^2+m)\left(\frac{3m}{m+1} - \frac{3m-2}{m}\right)\right]$

46º) $\left[\frac{2x^2-3x+5}{x-1} \cdot \frac{x^2 2x-3}{(2x^2-3x+5)^2} \cdot \frac{x+3+2(x-1)^2}{x^2-9} + \frac{2}{x-2}\right] \cdot \frac{x^2 5x+6}{3x-8}$

47º) $\left[\left(\frac{x+1}{x-1} - \frac{2}{x+1}\right) \cdot \frac{x^3-1}{x^4-9} + \frac{x}{x^3+x^2-3x-3}\right] \cdot \frac{x^3+3x^2-3x-9}{3+2x-x^2}$

48º) $\frac{x^{2m}+y^{4m}+2x^m y^{2n}}{x^{2m}+y^{4m}-2x^m y^{2n}} \div \frac{1+\frac{2x^m y^{2n}}{x^{2m}+y^{4m}-2x^m y^{2n}}}{\frac{2x^m y^{2n}}{(x^m+y^{2n})^2}-1}$

49º) $\dfrac{\dfrac{1+\frac{1}{a}}{\frac{1}{a}}\cdot\dfrac{\frac{a-2}{2}+\frac{a^2+2}{2a}}{\frac{1}{a}}}{\dfrac{a^2+\frac{1}{a}}{\frac{1}{a}}}\cdot\dfrac{\frac{2}{2-a}-\frac{a}{2+a}}{\frac{a}{2-a}+\frac{2}{2+a}}$

50º) $\left(\dfrac{\frac{x}{y}+\frac{y}{x}}{\frac{y}{x}-\frac{x}{y}}+\dfrac{1}{1+\frac{y}{x}}-\dfrac{1}{1-\frac{y}{x}}\right)\cdot\dfrac{x+y}{x-y}$

51º) $\dfrac{\left(\frac{a+1}{a-1}-\frac{a-1}{a+1}\right)\left[\frac{(a+2)^2}{a}-\frac{(a+1)^2}{a}-\frac{(a+1)^3}{a^2}-\frac{1}{a}\right]}{\frac{\left(a^2+1\right)^2-\left(a^2-1\right)^2}{a^3}}$

52º) $\dfrac{1+\frac{a^2+x^2}{ax}-\frac{x^2}{a^2+ax}-\frac{a^2}{ax+x^2}}{\frac{1}{x}\cdot\left(\frac{1}{a+x}-\frac{1}{a+x}\right)}\cdot\dfrac{a\cdot\frac{1}{x-a}}{a\div\frac{1}{x+a}}$

53º) $\dfrac{\left[1-\frac{z^3}{(x+y)^3}\right]\div\frac{x+y}{(x+y+z)^2}\cdot\frac{x\cdot\frac{1}{x+y+z}}{1\div\left(-\frac{1}{x}\right)}}{\left[1+\frac{z}{x+y}+\frac{z^2}{x+y}\right]\cdot\left[1-\frac{z^2}{(x+y)^2}\right]}$

54º) $\left[\dfrac{ax}{b^3+x^3}\left(\dfrac{ab^3}{xy}-\dfrac{ax^5}{by}-\dfrac{b^3y}{ax}+\dfrac{x^5y}{ab}\right)\right]\div\left(\dfrac{ab}{y}-\dfrac{ax^3}{by}+b-\dfrac{x^3}{b}\right)$

55º) $\dfrac{a^3b^2+3a^2bc(a+b)^2}{3ac(a+b)^3+b(a+b)^3-(2a+b)(a+b)b^2}\div\dfrac{ab}{a+b}$

56º) $\left[\left(\dfrac{1}{1+x}+\dfrac{x}{1-x}\right)\div\left(\dfrac{1}{1-x}-\dfrac{x}{1+x}\right)-y\right]\div(1-y^2)$

57º) $\left(\dfrac{5}{x+2}+\dfrac{7}{x+3}-\dfrac{x-4}{x^2+5x+6}\right)\div\dfrac{22}{x+2}+\dfrac{1}{2}$

58º) $\left[\dfrac{22(a-b)^2}{21(a+b)}\cdot\dfrac{28}{3(b-a)}\cdot\left(-\dfrac{a+b}{8}\right)-\dfrac{a-b}{9}\right]\div\dfrac{a^5+1}{a^4-1}$

59º) $\left[\left(\dfrac{a}{a+b}+\dfrac{b}{a-b}\right)\div\left(\dfrac{b}{a+b}-\dfrac{a}{a-b}\right)+b^2\right]\div(1+b)+b$

60º) $\left[\left(\dfrac{x^{2n-1}}{xy}\div\dfrac{x^n}{x^2y}\right)\div x^{n-1}-y^2\right]\div(1-y)$

61º) $\left[\left(\dfrac{2a+b}{a}+2-\dfrac{2b-a}{b}\right)\div\dfrac{a+b}{ab}\right]\div\left[\left(\dfrac{a+b}{a}-\dfrac{a-b}{b}-2\right)\div\left(\dfrac{1}{a^2}-\dfrac{1}{b^2}\right)\right]$

62º) $\left[(x^9-y^9)\div\dfrac{x^2+xy+y^2}{x+y}\div\dfrac{x^4+x^2y^2+y^4}{x^2+y^2}\right]\div x^3$

63º) $\left[\left(\dfrac{2m+3n}{m-n}-\dfrac{4m-5n}{2m+n}\right)\div\dfrac{17mn-2n^2}{m^2-n^2}-\dfrac{mn+n^2}{2mn+n^2}\right]\div\dfrac{3mn+n^2}{m^2-2n^2}$

64º) $\left(\frac{x^{\frac{1}{2}}-y^{\frac{1}{2}}}{xy^{\frac{1}{2}}+x^{\frac{1}{2}}y}+\frac{x^{\frac{1}{2}}+y^{\frac{1}{2}}}{xy^{\frac{1}{2}}-x^{\frac{1}{2}}y}\right)\frac{x^{\frac{1}{2}}+y^{\frac{1}{2}}}{x+y}-\frac{2y}{x-y}$

65º) $\frac{x-1}{x+x^{\frac{1}{2}}+1}\div\frac{x^{0,5}+1}{x^{1,5}-1}+\frac{2}{x^{-0,5}}$

66º) $\left(\frac{d^{-\frac{n}{4}}\cdot c^{\frac{1}{2}}}{a^{2-n}.b^{-\frac{3}{4}}}\right)^{\frac{4}{3}}\cdot\left(\frac{b^3\cdot c^4}{d^{2n}.a^{16-8n}}\right)^{\frac{1}{6}}$

67º) $a^{\frac{1}{2}}-\frac{1}{a^{\frac{1}{2}}-a^{-\frac{1}{2}}}+\frac{a^{-2}}{a^{\frac{1}{2}}+a^{-\frac{1}{2}}}+\frac{2}{a^{\frac{3}{2}}}$

68º) $\frac{a^2-a+2}{a^{n+1}-3a^n}\left[\frac{(a+2)^2-a^2}{4a^2-4}-\frac{3}{a^2-9}\right]$

69º) $\frac{2m-n}{m-n}+\frac{7m}{3m+3n}+\frac{4mn+2n^2-12m^2}{3m^2-3n^2}$

70º) $\frac{a+\sqrt{2}}{\sqrt{a^2+a}}+\frac{1}{\sqrt{4a^2+4a}}$

71º) $\sqrt{\frac{a+b}{a-b}}+\sqrt{\frac{a-b}{a+b}}$

72º) $\frac{1+\frac{1}{a+x}}{1-\frac{1}{a+x}}\cdot\left(\frac{2ax-1+a^2+x^2}{2ax}\right)\frac{x+3}{2a}$

73º) $\left(1+\frac{a}{b}\right)^3\cdot\left(\frac{a-b}{c}\right)^3\cdot\left(\frac{abc}{a^2-b^2}\right)^3$

74º) $\frac{b}{a}\cdot\left(\frac{1}{b-a}-\frac{1}{b+a}\right)\cdot\frac{b^2-a^2}{ab^2+a^2b}\div\frac{1}{a+b}$

75º) $\frac{m+1}{n}-\left(a+\frac{m-1}{n}\right)-\left(\frac{2}{n}-a\right)$

76º) $\frac{a-c}{a^2+ac+c^2}\cdot\frac{a^3-c^3}{a^2b-bc^2}\left(1+\frac{c}{a-c}-\frac{1+c}{c}\right)\div\frac{c(1+c)-a}{bc}$

Substituição algébrica

1º) $\frac{b-a}{a+b}\ para\ a=\frac{7}{12}\ e\ b=-\frac{5}{4}$

2º) $\frac{\frac{1}{a}\cdot 2\cdot(b-a)}{\frac{b}{a}-1}\ para\ a=1{,}5\ e\ b=0{,}001$

3º) $\frac{1}{\frac{1}{a}+\frac{1}{b}}\ para\ a=-\frac{3}{2}\ e\ b=\frac{1}{7}$

4º) $a+b\left(\frac{1}{a}-b\right)\ para\ a=0{,}1\ e\ b=-0{,}3$

5º) $\frac{1}{2}\left(\frac{a+b}{a-b}-\frac{a+b}{a-b}\right)\cdot\left(\frac{a^2+b^2}{2ab}-1\right)\ para\ a=1{,}5\ e\ b=-3$

6º) $\frac{4a^2b-5a^3\cdot\frac{a-3b}{a^2+b^2}}{(3a-b)2a-4ab^2}\ para\ a=-\frac{1}{2}\ e\ b=-1$

7º) $\left(1+\frac{ab}{a^2+b^2}\right)\div\left(1-\frac{ab}{a^2+b^2}\right)\cdot\frac{a^3+b^3}{a^3-b^3}-\frac{a+b}{a-b}\ para\ a=-2\ e\ b=-1{,}5$

8º) $\frac{6a-b}{a^2+3b^2}\cdot\frac{3ab^2-2b^3}{(3a-2b)(a^2-5ab^2)}\ para\ a=-1\ e\ b=-\frac{1}{2}$

9º) $\left(\frac{a^2-6a+5}{a+2}\div\frac{a^2-2b}{a^2+2a}\right)para\ a=\frac{1}{2}\ e\ b=3$

10º) $\frac{n}{n+2}+\left(1+\frac{n}{2}+\frac{n^2}{4}\right)\cdot\frac{8}{n^3+8}-\frac{2}{n+2}\ para\ n=\frac{2}{3}$