3 Operações com expressões algébricas → PÁGINA 25 DO LIVRO MATEMÁTICA 1 PARA OS CURSOS DE ECONOMIA, ADMINISTRAÇÃO E CIÊNCIAS CONTÁBEIS (MEDEIROS, 5ª EDIÇÃO, EDITORA ATLAS)

3.1 Adição, subtração, multiplicação e divisão

① $(4b + 3c - a) + (4a - 3b - 2c)$

$4b + 3c - a + 4a - 3b - 2c$

$3a + b + c$

② $(5ab - 3c + 4d) + (-2d + 3c - 4ab)$

$5ab - 3c + 4d - 2d + 3c - 4ab$

$ab + 2d$

③ $(xy - 3x^2 + 1) + (3 + 5x^2 - 3xy)$

$xy - 3x^2 + 1 + 3 + 5x^2 - 3xy$

$2x^2 - 2xy + 4$

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

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

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

⑤ $(5xy - x^3 + 4y) + (5 + 2x^3 - 4y - 6xy)$

$5xy - x^3 + 4y + 5 + 2x^3 - 4y - 6xy$

$-xy + x^3 + 5$

⑥ $(10x + 20y) - (5x + 15y)$

$10x + 20y - 5x - 15y$

$5x + 5y$

7) $(xy^3 - 2xy + 1) - (4xy + 5 + 2xy^3)$

$xy^3 - 2xy + 1 - 4xy - 5 - 2xy^3$

$-xy^3 - 6xy - 4$

8) $(x^2 + 2xy + 3y^2) - (x^2 - 2xy + 3y^2)$

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

$4xy$

9) $\left(\frac{1}{4}xy - 3x^2 + 10y^2\right) - \frac{1}{4}\left(xy - \frac{1}{3}x^2 + y^2\right)$

$\frac{1}{4}xy - 3x^2 + 10y^2 - \frac{1}{4}xy + \frac{1}{12}x^2 - \frac{1}{4}y^2$

$-3x^2 + \frac{1}{12}x^2 + 10y^2 - \frac{1}{4}y^2$

$\frac{-36x^2 + 1x^2}{12} + \frac{40y^2 - 1y^2}{4}$

$-\frac{35x^2}{12} + \frac{39y^2}{4}$

10) $(-x^3 + 2xy + 4) - (2x^3 + 2xy + 8)$

$-x^3 + 2xy + 4 - 2x^3 - 2xy - 8$

$-3x^3 - 4$

11) $(4x^2 - 3y + xy) + (3y - xy + 2x^2) - (xy - x^2)$

$4x^2 - 3y + xy + 3y - xy + 2x^2 - xy + x^2$

$7x^2 - xy$

12) $-2(x - y + z^2) + 4(z^2 + y - x) + (1 - x - y)$

$-2x + 2y - 2z^2 + 4z^2 + 4y - 4x + 1 - x - y$

$-7x + 5y + 2z^2 + 1$

13) $\left(\frac{3}{5}x^2y - 2zk\right) + \left(1 + 2zk + \frac{2}{5}x^2y\right) - (x^2y + 1)$

$\frac{3}{5}x^2y - 2zk + 1 + 2zk + \frac{2}{5}x^2y - x^2y - 1$

$\frac{5}{5}x^2y - x^2y$

$x^2y - x^2y$

0

14) $(5a)(-7c)$

$-35ac$

15) $(4a^2b)(-7ab^2)$

$-28a^3b^3$

16) $(-5xy^3)(-7x^3y)$

$35x^4y^4$

17) $\left(\frac{4}{5}xy\right)^2(4x)$

$\left(\frac{16}{25}x^2y^2\right)(4x)$

$\frac{64}{25}x^3y^2$

18) $(x + y^2 + 4)(x + 1)$

$x^2 + xy^2 + 4x + x + y^2 + 4$

$x^2 + xy^2 + 5x + y^2 + 4$

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

$3x^3-2x^2y+6xy-4y^2$

20) $(x+y)(x-y)$

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

x^2-y^2

21) $(4x-3y)(4x+3y)$

$16x^2+12xy-12xy-9y^2$

$16x^2-9y^2$

22) $4x^2(3x-2y+5)$

$12x^3-8x^2y+20x^2$

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

$\frac{2}{5}x^2-\frac{4}{5}x^5+\frac{2}{20}x^3$

$\frac{2}{5}x^2-\frac{4}{5}x^5+\frac{1}{10}x^3$

24) $xy(x^2-y^2)$

x^3y-xy^3

25) $(x^2y-3xy^2)(4xy)$

$4x^3y^2-12x^2y^3$

26) $(x+y-z)(-x+y+z)$

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

$-x^2+2xz+y^2-z^2$

27) $(x-y)(x+y)(2z)$

$(x^2+xy-xy-y^2)(2z)$

$(x^2-y^2)(2z)$

$2x^2z-2y^2z$

28) $\left(\frac{4}{3}xy^2-1\right)(2x-xy^2)$

$\frac{8}{3}x^3y^2-2x-\frac{4}{3}x^2y^4+xy^2$

29) $\left(-\frac{4}{5}x+2y\right)\left(2y+\frac{5}{4}x\right)$ → $\frac{9}{10}xy-x^2+4y^2$

$-\frac{8}{5}xy-x^2+4y^2+\frac{5}{2}xy$

$-\frac{8}{5}xy+\frac{5}{2}xy-x^2+4y^2$

$\frac{-16xy+25xy}{10}-x^2+4y^2$

30) $(8x^2)\div(4x^2)$

$\frac{2\,8x^2}{1\,4x^2}=2$

31) $(xy)\div(4xy^2)$

$\frac{1\,xy}{4\,xy^2}=\frac{1}{4y}=\frac{1}{4}y^{-1}$

32) $4x^2y^3\div 10xy^3$

$\frac{2\,4x^2y^3}{5\,10xy^3}=\frac{2x}{5}$

(33) $3a^2b^4 \div 5a^4b^2$

$$\frac{3a^2b^4}{5a^4b^2} = \frac{3b^2}{5a^2}$$

(34) $(5x^2y^3 + 4x^4y - 3xy^2) \div (2xy)$

$$\frac{5x^2y^3 + 4x^4y - 3xy^2}{2xy} = \frac{xy(5xy^2 + 4x^3 - 3y^2)}{2xy} = \frac{5xy^2 + 4x^3 - 3y^2}{2}$$

$$= \frac{5xy^2}{2} + 2x^3 - \frac{3y^2}{2}$$

(36) $(a^{2m} + b^{2m+1}) \div (4a^{-m})$

$$\frac{a^{2m} + b^{2m+1}}{4a^{-m}}$$

$$\frac{a^{2m}}{4a^{-m}} + \frac{b^{2m+1}}{4a^{-m}}$$

$$\frac{a^{3m}}{4} + \frac{b^{2m+1}}{4a^{-m}}$$

$$\rightarrow \frac{a^{3m}}{4} + \frac{b^{2m+1} \cdot a^m}{4}$$

(35) $\left(\frac{1}{5}x^3y + 4x + \frac{1}{8}y\right) \div \frac{5}{8}x^2y$

$$\frac{1/5\, x^3y}{5/8\, x^2y} + \frac{4x}{5/8\, x^2y} + \frac{1/8\, y}{5/8\, x^2y}$$

$$\frac{1}{5}\cdot\frac{8}{5}\cdot x + 4\cdot\frac{8}{5xy} + \frac{1}{8}\cdot\frac{8}{5x^2}$$

$$\frac{8}{25}x + \frac{32}{5xy} + \frac{1}{5x^2}$$

(37) $\frac{5x+y}{4} \div \frac{7}{5x+y}$

$\left(\frac{5x+y}{4}\right)\cdot\left(\frac{5x+y}{7}\right)$

$\frac{25x^2+5xy+5xy+y^2}{28}$

$\frac{25x^2+10xy+y^2}{28}$

38) $[4x(y^2-2y)] \div 12xy$

$\frac{[4x(y^2-2y)]}{12xy}$

$\frac{4xy^2-8xy}{12xy}$

$\frac{4xy(y-2)}{3\cancel{12xy}}$ → $\frac{1}{3}(y-2) = \frac{y-2}{3}$

39) $(4xy-2)^2 \div 16xy$

$\frac{(4xy-2)^2}{16xy}$

$\frac{16x^2y^2-16xy+4}{16xy}$

$\frac{\cancel{16xy}(xy-1)}{\cancel{16xy}} + \frac{4}{16xy}$ → $xy-1+\frac{\cancel{4}}{\cancel{16xy}}$

$xy-1+\frac{1}{4xy}$

10) $(12x^3y^3-16x^4y^3+20x^5y^2) \div (4x^2y)$

$\frac{12x^3y^3-16x^4y^3+20x^5y^2}{4x^2y}$

$\frac{\cancel{4x^2y}(3xy^4-4x^2y^2+5x^3y)}{\cancel{4x^2y}}$

$3xy^4-4x^2y^2+5x^3y$

(1) $(x^4 - 16) \div (x+2)$

$\frac{x^4 - 16}{x+2}$

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

$x^4 - 16 \quad | x+2$

$-x^4 - 2x^3 \quad\quad x^3 - 2x^2 + 4x - 8$

$-2x^3 + 4x^2 - 16$

$2x^3 + 4x^2 - 16$

$-4x^2 - 8x - 16$

$+8x + 16$

(2) $(3xy)^{-1} \div 4xy^2$

$\frac{1/3xy}{4xy^2}$

$\frac{1}{3xy} \cdot \frac{1}{4xy^2}$

$\frac{1}{12x^2y^3}$

(3.2) Produtos notáveis → PÁGINA 28 DO LIVRO MATEMÁTICA 1 PARA OS CURSOS DE ECONOMIA, ADMINISTRAÇÃO E CIÊNCIAS CONTÁBEIS (MEDEIROS, 5ª EDIÇÃO, EDITORA ATLAS)

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

$(x+1)(x+1)$

$x^2 + x + x + 1$

$x^2 + 2x + 1$

(2) $(2x+5)^2$

$(2x+5)(2x+5)$

$4x^2 + 10x + 10x + 25$

$4x^2 + 20x + 25$

(3) $(1+2y)^2$

$(1+2y)(1+2y)$

$1 + 2y + 2y + 4y^2$

$1 + 4y + 4y^2$

④ $(3x+7y)(3x+7y)$

$9x^2+12xy+12xy+16y^2$

$9x^2+25xy+16y^2$

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

$\left(\frac{1}{2}x+\frac{1}{4}\right)\left(\frac{1}{2}x+\frac{1}{4}\right)$

$\frac{1}{4}x^2+\frac{1}{8}x+\frac{1}{8}x+\frac{1}{16}$

$\frac{1}{4}x^2+\frac{2}{8}x+\frac{1}{16}$

$\frac{1}{4}x^2+\frac{1}{4}x+\frac{1}{16}$

⑥ $\left(\sqrt{2}+\frac{x}{\sqrt{2}}\right)^2$

$\left(\sqrt{2}+\frac{x}{\sqrt{2}}\right)\left(\sqrt{2}+\frac{x}{\sqrt{2}}\right)$

$\sqrt{2^2}+\sqrt{2}\cdot\frac{x}{\sqrt{2}}+\frac{x}{\sqrt{2}}\cdot\sqrt{2}+\frac{x^2}{\sqrt{2^2}}$

$2+x+x+\frac{x^2}{2}$

$2+2x+\frac{x^2}{2}$

⑦ $(x-1)^2$

$(x-1)(x-1)$

$x^2-x-x+1$

x^2-2x+1

(8) $(1-2y)^2$

$(1-2y)(1-2y)$

$1-2y-2y+4y^2$

$1-4y+4y^2$

(9) $(3x-5y)^2$

$(3x-5y)(3x-5y)$

$9x^2-15xy-15xy+25y^2$

$9x^2-30xy+25y^2$

(10) $\left(\frac{4}{5}x-\frac{2}{3}y\right)^2$

$\left(\frac{4}{5}x-\frac{2}{3}y\right)\left(\frac{4}{5}x-\frac{2}{3}y\right)$

$\frac{16}{25}x^2-\frac{8}{15}xy-\frac{8}{15}xy+\frac{4}{9}y^2$

$\frac{16}{25}x^2-\frac{16}{15}xy+\frac{4}{9}y^2$

(11) $\left(\frac{2x-3}{5}\right)^2$

$\left(\frac{2x-3}{5}\right)\left(\frac{2x-3}{5}\right)$

$\frac{4x^2-6x-6x+9}{25}$

$\frac{4x^2-12x+9}{25}$

(12) $\left(\frac{4-3x}{7}\right)^2$

$\left(\frac{4-3x}{4}\right)\left(\frac{4-3x}{4}\right)$

$\frac{16-12x-12x+9x^2}{16}$

$\frac{16-24x+9x^2}{16}$

13) $\left(\frac{x+1}{x-1}\right)^2$

$\left(\frac{x+1}{x-1}\right)\left(\frac{x+1}{x-1}\right)$ → $\frac{x^2+2x+1}{x^2-2x+1}$

$\frac{x^2+x+x+1}{x^2-x-x+1}$

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

$\left(\frac{1}{x}-y\right)\left(\frac{1}{x}-y\right)$

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

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

15) $\left(\frac{x}{2}-\frac{1}{x}\right)^2$

$\left(\frac{x}{2}-\frac{1}{x}\right)\left(\frac{x}{2}-\frac{1}{x}\right)$

$\frac{x^2}{4}-\frac{x}{2x}-\frac{x}{2x}+\frac{1}{x^2}$ → $\frac{x^2}{4}-\frac{2x}{2x}+\frac{1}{x^2}$

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

96 $(x+1)^3$

$(x+1)(x+1)(x+1)$

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

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

$x^3+x^2+2x^2+2x+x+1$

x^3+3x^2+3x+1

97 $(x-1)^3$

$(x-1)(x-1)(x-1)$

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

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

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

x^3-3x^2+3x-1

98 $(2-x)^3$

$(2-x)(2-x)(2-x)$

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

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

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

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

99 $\left(\frac{1}{2}+x\right)^3$

$\left(\frac{1}{2}+x\right)\left(\frac{1}{2}+x\right)\left(\frac{1}{2}+x\right)$

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

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

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

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

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

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

(20) $(2x-y)^3$

$(2x-y)(2x-y)(2x-y)$

$(4x^2-2xy-2xy+y^2)(2x-y)$

$(4x^2-4xy+y^2)(2x-y)$

$8x^3-4x^2y-8x^2y+4xy^2+2xy^2-y^3$

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

(21) $\left(\frac{1}{2}-3xy\right)^3$

$\left(\frac{1}{2}-3xy\right)\left(\frac{1}{2}-3xy\right)\left(\frac{1}{2}-3xy\right)$

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

$\left(\frac{1}{4}-\frac{6}{2}xy+9x^2y^2\right)\left(\frac{1}{2}-3xy\right)$

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

$\frac{1}{8}-\frac{3}{4}xy-\frac{3}{2}xy+\frac{9}{2}x^2y^2+\frac{9}{2}x^2y^2-27x^3y^3$

$\frac{1}{8}-\frac{3xy-6xy}{4}+\frac{18x^2y^2+9x^2y^2}{2}-27x^3y^3$

$\frac{1}{8}-\frac{9}{4}xy+\frac{27}{2}x^2y^2-27x^3y^3$

(22) $(-2x+4y)^3$

$(-2x+4y)(-2x+4y)(-2x+4y)$

$(4x^2-8xy-8xy+16y^2)(-2x+4y)$

$(4x^2-16xy+16y^2)(-2x+4y)$

$-8x^3+16x^2y+32x^2y-64xy^2-32xy^2+64y^3$

$-8x^3+48x^2y-96xy^2+64y^3$

(23) $(\sqrt{2}+x)^3$

$(\sqrt{2}+x)(\sqrt{2}+x)(\sqrt{2}+x)$

$(2+x\sqrt{2}+x\sqrt{2}+x^2)(\sqrt{2}+x)$

$(2+2x\sqrt{2}+x^2)(\sqrt{2}+x)$

$2\sqrt{2}+2x+2x\cdot 2+2x^2\sqrt{2}+x^2\sqrt{2}+x^3$

$2\sqrt{2}+2x+4x+3x^2\sqrt{2}+x^3$

$2\sqrt{2}+6x+3x^2\sqrt{2}+x^3$

(20) $(2x-y)^3$

$(2x-y)(2x-y)(2x-y)$

$(4x^2-2xy-2xy+y^2)(2x-y)$

$(4x^2-4xy+y^2)(2x-y)$

$8x^3-4x^2y-8x^2y+4xy^2+2xy^2-y^3$

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

(21) $\left(\frac{1}{2}-3xy\right)^3$

$\left(\frac{1}{2}-3xy\right)\left(\frac{1}{2}-3xy\right)\left(\frac{1}{2}-3xy\right)$

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

$\left(\frac{1}{4}-\frac{6}{2}xy+9x^2y^2\right)\left(\frac{1}{2}-3xy\right)$

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

$\frac{1}{8}-\frac{3}{4}xy-\frac{3}{2}xy+\frac{9}{2}x^2y^2+\frac{9}{2}x^2y^2-27x^3y^3$

$\frac{1}{8}-\frac{3xy-6xy}{4}+\frac{18x^2y^2+9x^2y^2}{2}-27x^3y^3$

$\frac{1}{8}-\frac{9}{4}xy+\frac{27}{2}x^2y^2-27x^3y^3$

(22) $(-2x+4y)^3$

$(-2x+4y)(-2x+4y)(-2x+4y)$

$(4x^2-8xy-8xy+16y^2)(-2x+4y)$

$(4x^2-16xy+16y^2)(-2x+4y)$

$-8x^3+16x^2y+32x^2y-64xy^2-32xy^2+64y^3$

$-8x^3+48x^2y-96xy^2+64y^3$

(23) $(\sqrt{2}+x)^3$

$(\sqrt{2}+x)(\sqrt{2}+x)(\sqrt{2}+x)$

$(2+x\sqrt{2}+x\sqrt{2}+x^2)(\sqrt{2}+x)$

$(2+2x\sqrt{2}+x^2)(\sqrt{2}+x)$

$2\sqrt{2}+2x+2x\cdot 2+2x^2\sqrt{2}+x^2\sqrt{2}+x^3$

$2\sqrt{2}+2x+4x+3x^2\sqrt{2}+x^3$

$2\sqrt{2}+6x+3x^2\sqrt{2}+x^3$

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24) $(4+x)(4-x)$

$16 - 4x + 4x - x^2$

$16 - x^2$

25) $(x-3y)(x+3y)$

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

$x^2 - 9y^2$

26) $(1-3x)(3x+1)$

$3x + 1 - 9x^2 - 3x$

$1 - 9x^2$

27) $(-3+5x)(3+5x)$

$-9 - 15x + 15x + 25x^2$

$-9 + 25x^2$

28) $(5y^2-1)(5y^2+1)$

$25y^4 + 5y^2 - 5y^2 - 1$

$25y^4 - 1$

29) $(a+b+c)(a+b-c)$

$a^2 + ab - ac + ab + b^2 - bc + ac + bc - c^2$

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

30) $(2x^{-4} + 1)(2x^{-4} - 1)$

$4x^{-8} - 2x^{-4} + 2x^{-4} - 1$

$4x^{-8} - 1$

31) $(\sqrt{x} + \sqrt{y})(\sqrt{x} - \sqrt{y})$ $\rightsquigarrow x - y$

$\sqrt{x^2} - \sqrt{x}\sqrt{y} + \sqrt{x}\sqrt{y} - \sqrt{y^2}$

FORON:

(32) $(\sqrt{x}+1)(\sqrt{x}-1)$

$\sqrt{x^2}-\sqrt{x}+\sqrt{x}-1$

$x-1$

(33) $\left(\frac{1}{3-\sqrt{x}}\right)\left(\frac{9-x}{3+\sqrt{x}}\right)$

$\frac{9-x}{9+3\sqrt{x}-3\sqrt{x}-\sqrt{x^2}}$

$\frac{9-x}{9-x}$

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(3.3) Fatoração → PÁGINA 30 DO LIVRO MATEMÁTICA 1 PARA OS CURSOS DE ECONOMIA ADMINISTRAÇÃO E CIÊNCIAS CONTÁBEIS (MEDEIROS 5ª EDIÇÃO, EDITORA ATLAS)

(1) $2x+4x$

$6x$

(2) $2x+4y$

$2(x+2y)$

(3) $3x-9y+12$

$3(x-3y+4)$

(4) $4x^2-xy^2+3x$

$x(4x-y^2+3)$

(5) x^4-3x^2

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

(6) $\frac{x^5}{5}-\frac{x^4}{4}$

$x^5\left(\frac{x}{5} - \frac{1}{4}\right)$

(7) $4xy - 3x^2y^2 + 10x^3y$

$xy(4 - 3xy + 10x^2)$

(8) $\frac{2}{3}x^2y^5 + \frac{4}{3}x^3y^4 - \frac{2}{3}x^5y^3$

$\frac{2}{3}x^2y^3(y^2 + 2xy - x^3)$

(9) $10x^2 - 9x$

$x(10x - 9)$

(10) $7xy + 21xz$

$7x(y + 3z)$

(11) $7xy + 21xz + 2Ry + 6Rz$

$7x(y + 3z) + 2R(y + 3z)$

$(y + 3z)(7x + 2R)$

(12) $xy - 2x - 6 + 3y$

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

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

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

(13) $42x^3y - 70x^2y - 6x + 10 \quad (\div 2)$

$21x^3y - 35x^2y - 3x + 5$

$7x^2y(3x - 5) - (3x - 5)$

$(3x - 5)(7x^2y - 1)\ 2$

↳ porque eu divide primeiro tudo por dois

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

(74) $36x^2 - 9$

$9(4x^2 - 1)$

$9(2x+1)(2x-1)$

$4x^2 - 1$

(75) $16y^4 - 4x^2$

$4(4y^4 - x^2)$

$4(2y^2+x)(2y^2-x)$

$4y^2 - x^2$

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

(76) $a^4 - b^4$

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

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

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

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

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

(77) $1 - x^2$

$(1+x)(1-x)$

$1 - x^2$

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

(78) $x^2 - 1$

$(x+1)(x-1)$

$x^2 - 1$

$a2 - b^2 = (a+b)(a-b)$

(79) $-25x^2 + 36y^2$

$36y^2 - 25x^2$

$(6y)^2 - (5x)^2$

$(6y+5x)(6y-5x)$

$(6y)^2 - (5x)^2$

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

(80) $49 - (x+y)^2$

$7^2 - (x+y)^2$

$[7+(x+y)][7-(x+y)]$

$(7+x+y)(7-x-y)$

$7^2 - (x+y)^2$

$a2 - b^2 = (a+b)(a-b)$

21) $16a^2 - \frac{1}{9}$

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

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

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

$\left(4a + \frac{1}{3}\right)\left(4a - \frac{1}{3}\right)$

22) $x^2 + 6x + 9$

$(x+3)(x+3)$

23) $x^2 + 2x + 1$

$(x+1)(x+1)$

24) $x^2 - 2x + 1$

$(x-1)(x-1)$

25) $x^2 - 8x + 16$

$(x-4)(x-4)$

26) $x^2 + x + \frac{1}{4}$

$\left(x + \frac{1}{2}\right)\left(x + \frac{1}{2}\right)$

27) $\frac{x^2}{4} - x + 1$

$\left(\frac{x}{2} - 1\right)\left(\frac{x}{2} - 1\right)$

(28) $9x^4 - 30x^2 + 25$

$(3x^2 - 5)(3x^2 - 5)$

(29) $1 - 6x + 9x^2$

$(1 - 3x)(1 - 3x)$

(30) $4x^2 - 4xy + y^2$

$(2x - y)(2x - y)$

(3.4) Simplificação → PÁGINA 31 DO LIVRO MATEMÁTICA 1 PARA OS CURSOS DE ECONOMIA, ADMINISTRAÇÃO E CIÊNCIAS CONTÁBEIS (MEDEIROS, 5ª EDIÇÃO, EDITORA ATLAS)

(1) $\frac{6x}{3} = 2x$

(2) $\frac{4x + 6}{2}$

$\frac{2(2x + 3)}{2}$

$2x + 3$

(3) $\frac{3x^2 + 9x}{3x}$

$\frac{3x(x + 3)}{3x}$

$x + 3$

(4) $\frac{16xy^2 - 24x^2y}{xy}$ → $4(4y - 6x)$

$\frac{4xy(4y - 6x)}{xy}$

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(5) $\frac{3x^5 - 10x^2}{x^5 - x^2}$

$\frac{x^2(3x^2 - 10)}{x^2(x^3 - 1)}$

$\frac{3x^2 - 10}{x^3 - 1}$

(6) $\frac{x^2 - 9}{x - 3}$ $\quad x^2 - 3^2$

$\frac{x^2 - 3^2}{x - 3}$ $\quad a^2 - b^2 = (a+b)(a-b)$

$\frac{(x+3)(x-3)}{(x-3)}$

$x + 3$

(7) $\frac{x^2 - 16}{x + 4}$ $\quad x^2 - 4^2$

$\frac{x^2 - 4^2}{x + 4}$ $\quad a^2 - b^2 = (a+b)(a-b)$

$\frac{(x+4)(x-4)}{(x+4)}$

$x - 4$

(8) $\frac{x + 7}{x^2 - 49}$ $\quad x^2 - 7^2$

$\frac{x + 7}{x^2 - 7^2}$ $\quad a^2 - b^2 = (a+b)(a-b)$

$\frac{(x+7)}{(x+7)(x-7)} \rightarrow \frac{1}{x-7}$

FORON:

9) $\frac{x^2-9}{x^2-6x+9}$

$\frac{x^2-3^2}{(x-3)(x-3)}$

$\frac{(x+3)(x-3)}{(x-3)(x-3)}$

$\frac{x+3}{x-3}$

x^2-3^2 ↓ ↓ $a^2-b^2=(a+b)(a-b)$

10) $\frac{x^2+10x+25}{x+5}$

$\frac{(x+5)(x+5)}{(x+5)}$

$x+5$

11) $\frac{(x+3)^2}{x^2-9}$

$\frac{(x+3)(x+3)}{x^2-3^2}$

$\frac{(x+3)(x+3)}{(x-3)(x-3)}$

$\frac{x+3}{x-3}$

x^2-3^2 ↓ ↓ $a^2-b^2=(a+b)(a-b)$

12) $\frac{x^2-36}{(x-6)^2}$

$\frac{x^2-6^2}{(x-6)(x-6)}$

$\frac{(x+6)(x-6)}{(x-6)(x-6)} \Rightarrow \frac{x+6}{x-6}$

x^2-6^2 ↓ ↓ $a^2-b^2=(a+b)(a-b)$

13) $\frac{2x-2}{(x-1)^2}$

$\frac{2(x-1)}{(x-1)(x-1)}$

$\frac{2}{x-1}$

14) $\frac{x^2-36}{x^2+6x}$

$\frac{x^2-6^2}{x(x+6)}$

$\frac{(x+6)(x-6)}{x(x+6)}$

$\frac{x-6}{x}$

x^2-6^2

$\downarrow \quad \downarrow$

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

15) $\frac{4}{1-x}+\frac{5}{1+x}$

$\frac{4(1+x)+5(1-x)}{(1-x)(1+x)}$

$\frac{4+4x+5-5x}{(1-x)(1+x)}$

$\frac{9-x}{1-x^2}$

$(1-x)(1+x)$

$\downarrow \quad \downarrow$

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

16) $\frac{x}{3-x}+\frac{10x}{(3-x)^2}$

$\frac{x(3-x)^2+10x(3-x)}{(3-x)(3-x)^2}$

$\frac{(3-x)[x(3-x)+10x]}{(3-x)(3-x)^2}$

$\frac{x(3-x)+10x}{(3-x)^2}$

$\frac{3x-x^2+10x}{(3-x)^2}$

$\frac{13x-x^2}{(3-x)^2}$

17) $\frac{1}{xy} - \frac{x+y}{3x}$

$\frac{12x - xy(x+y)}{3x^2y}$

$\frac{12x - x^2y - xy^2}{3x^2y}$

$\frac{x(12 - xy - y^2)}{3x^2y}$

$\frac{12 - xy - y^2}{3xy}$

18) $\frac{x-1}{x+1} + \frac{x+1}{x-1}$

$\frac{(x-1)(x-1) + (x+1)(x+1)}{(x+1)(x-1)}$

$\frac{(x^2 - 2x + 1) + (x^2 + 2x + 1)}{(x+1)(x-1)}$

$\frac{x^2 - 2x + 1 + x^2 + 2x + 1}{(x+1)(x-1)}$

$\frac{2x^2 + 2}{(x+1)(x-1)}$

$\frac{2x^2 + 2}{x^2 - 1}$

19) $\frac{1}{(x-3)^2} - \frac{5}{(x-3)^3}$

$\frac{(x-3) - 5}{(x-3)^3}$

$\frac{x - 3 - 5}{(x-3)^3}$

$\frac{x - 8}{(x-3)^3}$

20) $\frac{y-z}{x+w} \div \frac{y^2 - z^2}{x^2 - w^2}$

$y^2 - z^2$ ↓ ↙ $\quad x^2 - w^2$ ↓ ↓

$a^2 - b^2 = (a+b)(a-b) \quad a^2 - b^2 = (a+b)(a-b)$

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$$\frac{y-z}{x+w} \cdot \frac{(x+w)(x-w)}{(y+z)(y-z)}$$

$$\frac{x-w}{y+z}$$