FRACCIONES ALGEBRÁICAS

SUMA:

Ejerc 1:

$$\frac{a-1}{a^2-4}+\frac{a-2}{a^2-a-6}+\frac{a+6}{a^2-5a+6}=$$

Ejerc 2:

$$\frac{1}{3x+3}+\frac{1}{2x-2}+\frac{1}{x^2-1}=$$

Ejerc 3:

$$\frac{1}{3x-2y}+\frac{x-y}{9x^2-4y^2}=$$

Ejerc 4:

$$\frac{x}{a^2-ax}+\frac{a+x}{ax}+\frac{a}{ax-x^2}=$$

Ejerc 5:

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

Ejerc 6:

$$\frac{2}{a^2-ab}+\frac{2}{ab+b^2}=$$

Ejerc 7:

$$\frac{x+5}{x^2+x-12}+\frac{x+4}{x^2+2x-15}+\frac{x-3}{x^2+9x+20}=$$

Ejerc 8:

$$\frac{ab}{9a^2-b^2}+\frac{a}{3a+b}=$$

Ejerc 9:

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

RESTA:

Ejerc 10:

$$\frac{x-1}{4x+4}-\frac{x+2}{8x-8}$$

Ejerc 11:

$$\frac{a+2}{2a+2}-\frac{7a}{8a^2-8}+\frac{a-3}{4a-4}=$$

Ejerc 12:

$$\frac{1}{4a+4}-\frac{1}{8a-8}+\frac{1}{12a^2+12}=$$

Ejerc 13:

$$\frac{2}{2x^2+5x+3}-\frac{1}{2x^2-x-6}+\frac{3}{x^2-x-2}=$$

MULTIPLICACIÓN

Ejerc 14:

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

Ejerc 15:

$$\frac{2x^2+2x}{2x^2}\cdot\frac{x^2-3x}{x^2-2x-3}=$$

Ejerc 16:

$$\frac{a^2-ab+a-b}{a^2+2a+1}\cdot\frac{3}{6a^2-6ab}$$

Ejerc 17:

$$\frac{(x-y)^3}{x^3-1}\cdot\frac{x^2+x+1}{(x-y)^2}=$$

Ejerc 18:

$$\frac{1-x}{a+1}\cdot\frac{a^2+2a}{x-x^2}\cdot\frac{x^2}{a}=$$

Ejerc 19:

$$\frac{x^2+2x}{x^2-16}\cdot\frac{x^2+2x-8}{x^3+x^2}\cdot\frac{x^2+4x}{x^2+4x+4}=$$

DIVISIÓN

Ejerc 20:

$$\frac{a^2-6a+5}{a^2-15a+56}\div\frac{a^2+2a-35}{a^2-5a-24}=$$

Ejerc 21:

$$\frac{3a^2}{a^2+6ab+9b^2}\div\frac{5a^3}{a^2b+3ab^2}=$$

Ejerc 22:

$$\frac{1}{a^2-a-30}\div\frac{2}{a^2+a-42}=$$

Ejerc 23:

$$\frac{20x^2-30x}{15x^2+15x^3}\div\frac{4x-6}{x+1}=$$

Ejerc 24:

$$\frac{a^2-6a+5}{a^2+15a+56}\div\frac{a^2+2a-35}{a^2-5a-24}=$$

Ejerc 25:

$$\frac{8x^2+26x+15}{16x^2-9}\div\frac{6x^2+13x-5}{6x^2-1}=$$

Ejerc 26:

$$\frac{a^4-1}{a^3-a^2}\div\frac{a^4+4a+3}{3a^3+9a^2}=$$

Ejerc 27:

$$\frac{x^3+125}{x^2-64}\div\frac{x^3-5x^2+25x}{x^2+x-56}=$$

Ejerc 28:

$$\frac{a^2-6a}{a^3+3a^2}\div\frac{a^2+3a-54}{a^2+9a}=$$

SOLUCIONES

SUMA:

Ejerc 1:

$$\frac{a-1}{a^2-4}+\frac{a-2}{a^2-a-6}+\frac{a+6}{a^2-5a+6}=\frac{a-1}{(a+2)(a-2)}+\frac{a-2}{(a-3)(a+2)}+\frac{a+6}{(a-3)(a-2)}=$$

$$=\frac{(a-3)(a-1)+(a-2)^2+(a+2)(a+6)}{(a+2)(a-2)(a-3)}=\frac{a^2-4a+3+a^2-4a+4+a^2+8a+12}{(a+2)(a-2)(a-3)}=\frac{3a^2+19}{(a^2-4)(a-3)}$$

Ejerc 2:

$$\frac{1}{3x+3}+\frac{1}{2x-2}+\frac{1}{x^2-1}=\frac{1}{3(x+1)}+\frac{1}{2(x-1)}+\frac{1}{(x+1)(x-1)}=\frac{2(x-1)+3(x+1)+6}{6(x+1)(x-1)}=\frac{5x+7}{6(x+1)(x-1)}$$

Ejerc 3:

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

Ejerc 4:

$$\frac{x}{a^2-ax}+\frac{a+x}{ax}+\frac{a}{ax-x^2}=\frac{x}{a(a-x)}+\frac{a+x}{ax}+\frac{a}{x(a-x)}=\frac{x(x)+a+x(a-x)+a(a)}{ax(a-x)}=\frac{x^2+a^2-x^2+a^2}{ax(a-x)}=$$

$$=\frac{2a^2}{ax(a-x)}$$

Ejerc 5:

$$\frac{3}{2x+4}+\frac{x-1}{2x-4}+\frac{x+8}{x^2-4}=\frac{3}{2(x+2)}+\frac{x-1}{2(x-2)}+\frac{x+8}{(x+2)(x-2)}=\frac{3(x-2)+(x-1)(x+2)+(x+8)2}{ax(a-x)}=$$

$$=\frac{3x-6+x^2+x-2+2x+16}{2(x-2)(x+2)}=\frac{x^2+6x+8}{2(x-2)(x+2)}$$

Ejerc 6:

$$\frac{2}{a^2-ab}+\frac{2}{ab+b^2}=\frac{2}{a(a-b)}+\frac{2}{b(a+b)}=\frac{2b(a+b)+2a(a-b)}{ab(a+b)(a-b)}=\frac{2ab+2b^2+2a^2-2ab}{ab(a^2-b^2)}=\frac{2a^2+2b^2}{ab(a^2-b^2)}$$

Ejerc 7:

$$\frac{x+5}{x^2+x-12}+\frac{x+4}{x^2+2x-15}+\frac{x-3}{x^2+9x+20}=\frac{x+5}{(x+4)(x-3)}+\frac{x+4}{(x+5)(x-3)}+\frac{x-3}{(x+4)(x+5)}=$$

$$=\frac{(x+5)(x+5)+(x+4)(x+4)+(x-3)(x-3)}{(x+4)(x-3)(x+5)}=\frac{x^2+10x+25+x^2+8x+16+x^2-6x+9}{(x+4)(x-3)(x+5)}=\frac{3x^2+12x+50}{(x+4)(x+5)}$$

Ejerc 8:

$$\frac{ab}{9a^2-b^2}+\frac{a}{3a+b}=\frac{ab}{(3a-b)}+\frac{a}{3a+b}=\frac{ab(3a+b)+a(3a-b)}{(3a-b)(3a+b)}=\frac{3a^2b+ab^2+3a^2-ab}{(9a^2-b^2)}=\frac{ab+(3a-b)a}{9a^2-b^2}$$

$$=\frac{3a^2}{9a^2-b^2}$$

Ejerc 9:

$$\frac{x+a}{x+3a}+\frac{3a^2-x^2}{x^2-9a^2}=\frac{x+a}{x+3a}+\frac{3a^2-x^2}{(x-3a)(x+3a)}=\frac{(x-3a)(x+a)+3a^2-x^2}{(x-3a)(x+3a)}=\frac{x^2-2ax-3a^2+3a^2-x^2}{x^2-9a^2}=$$

$$=\frac{-2ax}{x^2-9a^2}$$

RESTA

Ejerc 10:

$$\frac{x-1}{4x+4}-\frac{x+2}{8x-8}=\frac{x-1}{4(x+1)}-\frac{x+2}{8(x-1)}=\frac{2(x^2-2x+1)-(x^2+3x+2)}{8(x+1)(x-1)}=\frac{2x^2-4+2-x^2-3x-2}{8(x+1)(x-1)}=\frac{x^2-7x}{8(x^2-1)}$$

Ejerc 11:

$$\frac{a+2}{2a+2}-\frac{7a}{8a^2-8}+\frac{a-3}{4a-4}=\frac{(a+2)(4(a-1)-7a-(2(a+1))(a-3)}{8(a+1)(a-1)}=$$

$2(a+1)$ $\quad 8(a+1)(a-1)$ $\quad 4(a-1)$

$m.c.m=8(a+1)(a-1)$

$$\frac{4a^2+4a-8-7a-2a^2+4a+6}{8(a+1)(a-1)}=\frac{2a^2+a-2}{8(a^2-1)}$$

Ejerc 12:

$$\frac{1}{4a+4}-\frac{1}{8a-8}+\frac{1}{12a^2+12}=\frac{1}{4(a+1)}-\frac{1}{8(a-1)}+\frac{1}{12(a^2+1)}=\frac{6(a-1)(a^2+1)-3(a+1)(a^2+1)-2(a+1)(a-1)}{24(a+1)(a-1)(a^2+1)}=$$

$$=\frac{6a^3-6a^2+6a-6-3a^3-3a^2-3a-3-2a^2+2}{24(a+1)(a-1)(a^2+1)}=\frac{3a^3-11a^2+3a-7}{24(a^2-1)(a^2+1)}=\frac{3a-11a^2+3a-7}{24(a^4-1)}$$

Ejerc 13:

$$\frac{2}{2x^2+5x+3}-\frac{1}{2x^2-x-6}+\frac{3}{x^2-x-2}==\frac{2(x-2)-(x+1)+3(2x+3)}{(2x+3)(x+1)(x-2)}=\frac{2x-4-x-1+6x+9}{(2x+3)(x+1)(x-2)}=$$

$$(2x+3)(x+1)\quad(x-2)(2x+3)\quad(x-2)(x+1)$$

$$=\frac{7x+4}{(2x+3)(x+1)(x-2)}$$

MULTIPLICACIÓN

Ejerc 14:

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

Ejerc 15:

$$\frac{2x^2+2x}{2x^2}\cdot\frac{x^2-3x}{x^2-2x-3}=\frac{2x(x+1)}{2x^2}\cdot\frac{x(x-3)}{(x-3)(x+1)}=\frac{2x(x)}{2x^2}=\frac{2x^2}{2x^2}=1$$

Ejerc 16:

$$\frac{a^2-ab+a-b}{a^2+2a+1}\cdot\frac{3}{6a^2-6ab}=\frac{(a^2+a)-(ab+b)}{(a+1)(a+1)}\cdot\frac{3}{6a(a-b)}=\frac{a(1+a)-b(a+1)}{(a+1)(a+1)}\cdot\frac{3}{6a(a-b)}=\frac{3(a-b)}{6a(a-b)}=\frac{1}{2a(a+1)}$$

Ejerc 17:

$$\frac{(x-y)^3}{x^3-1}\cdot\frac{x^2+x+1}{(x-y)^2}=\frac{(x+y)^3}{(x-1)(x^2+x+1)}\cdot\frac{x^3+x+1}{(x-y)^2}=\frac{(x-y)^3}{(x-1)(x-y)^2}=\frac{(x-y)}{(x-1)}$$

Ejerc 18:

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

Ejerc 19:

$$\frac{x^2+2x}{x^2-16}\cdot\frac{x^2+2x-8}{x^3+x^2}\cdot\frac{x^2+4x}{x^2+4x+4}=\frac{x(x+2)}{(x-4)(x+4)}\cdot\frac{(x-2)(x+4)}{x^2(x+1)}\cdot\frac{x(x+4)}{(x+2)(x+2)}\cdot=\frac{x^2(x+2)(x-2)(x+4)^2}{x^2(x+1)(x+2)^2(x+4)(x-4)}=$$

$$=\frac{(x-2))x+4)}{(x+1)(x+2)(x-4)}$$

DIVISIÓN

Ejerc 20:

$$\frac{a^2-6a+5}{a^2-15a+56}\div\frac{a^2+2a-35}{a^2-5a-24}\Rightarrow\frac{(a-5)(a-1)}{(a-7)(a-8)}\div\frac{(a+7)(a-5)}{(a-8)(a+3)}=\frac{(a-5)(a-1)}{(a-7)(a-8)}\cdot\frac{(a-8)(a+3)}{(a+7)(a-5)}=$$

$$=\frac{(a-1)(a+3)}{(a-7)(a+7)}=\frac{a^2+2a-3}{a^2-49}$$

Ejerc 21:

$$\frac{3a^2}{a^2+6ab+9b^2} \div \frac{5a^3}{a^2b+3ab^2} = \frac{3a^2}{(a+3b)^2} \cdot \frac{ab(a+3b)}{5a^3} = \frac{3b}{5(a+3b)}$$

Ejerc 22:

$$\frac{1}{a^2-a-30} \div \frac{2}{a^2+a-42} = \frac{1}{(a-6)(a+5)} \cdot \frac{(a+7)(a-6)}{2} = \frac{(a+7)}{(a+5)2} = \frac{a+7}{2a+10}$$

Ejerc 23:

$$\frac{20x^2-30x}{15x^2+15x^3} \div \frac{4x-6}{x+1} = \frac{10x(2x-3)}{15x^2(1+x)} \cdot \frac{x+1}{2(2x-3)} = \frac{10x}{15x^2} = \frac{2}{3x}$$

Ejerc 24:

$$\frac{a^2-6a+5}{a^2+15a+56} \div \frac{a^2+2a-35}{a^2-5a-24} = \frac{(a-5)(a+)}{(a-7)(a-8)} \cdot \frac{(a-8)(a+3)}{(a+7)(a-5)} = \frac{(a+1)(a+3)}{(a+7)(a-7)} = \frac{a^2+2a-3}{a^2-49}$$

Ejerc 25:

$$\frac{8x^2+26x+15}{16x^2-9} \div \frac{6x^2+13x-5}{6x^2-1} = \frac{(2x+5)(4x+3)}{(4x+3)(4x-3)} \cdot \frac{(3x+1)(3x-1)}{(2x+5)(3x-1)} = \frac{3x+1}{4x-3}$$

Ejerc 26:

$$\frac{a^4-1}{a^3-a^2} \div \frac{a^4+4a+3}{3a^3+9a^2} = \frac{(a^2-1)(a^2+1)}{a^2(a-1)} \div \frac{3a^2(a+3)}{(a^2+3)(a^2+1)} = \frac{3(a-1)(a+3)}{a^2+3}$$

Ejerc 27:

$$\frac{x^3+125}{x^2-64} \div \frac{x^3-5x^2+25x}{x^2+x-56} = \frac{(x+5)(x^2-5x+25)}{(x+8)(x-8)} \div \frac{(x+8)(x-7)}{x(x^2-5x+25)} = \frac{(x+5)(x-7)}{(x-8)x}$$

Ejerc 28:

$$\frac{a^2-6a}{a^3+3a^2} \div \frac{a^2+3a-54}{a^2+9a} = \frac{(a)(a-6)}{a^2(a+3)} \div \frac{a(a+9)}{(a-6)(a+9)} = \frac{1}{a+3}$$