FRACCIONES ALGEBRAICAS

1.- Simplificar la fracción algebraica:

$$\frac{2x^2-2}{3x^2-6x+3} \qquad \text{sol:} \quad \frac{2(x+1)}{3(x-1)}$$

2.- Calcular $\frac{3x-2}{x^2-1}+\frac{x+2}{x-1}=$ sol: $\frac{x^2+6x}{x^2-1}$

3.- Calcular $\frac{7x}{6x+12}-\frac{x+5}{2x^2-8}=$ sol: $\frac{7x^2-17x-15}{6x^2-24}$

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4.- Efectuar: $\frac{x+1}{x+2}:\frac{x+1}{x+3}=$ sol: $\frac{x^2+4x+3}{x^2+3x+2}$

5.- Calcular:

a) $\frac{2x}{7+x^2}+\frac{x^2-1}{x^3}=$ sol: $\frac{3x^4+6x^2-7}{x^5+7x^3}$

b) $\frac{2x}{7+x^2}+\frac{x^2-1}{x^3}-\frac{x}{x-1}=$ sol: $\frac{-x^6+3x^5-10x^4+6x^3-6x^2+7x-7}{x^3(x^2+7)(x-1)}$

c) $\frac{x^2-1}{x^3}-\frac{x}{x-1}-\frac{2x}{7+x^2}=$ sol: $\frac{-x^6-x^5-6x^4+6x^3-6x^2-7x+1}{x^3(x^2+7)(x-1)}$

d) $\frac{2x}{7+x^2}+\left(\frac{x^2-1}{x^3}\cdot\frac{x}{x-1}\right)=$ sol: $\frac{3x^3+x^2+7x+7}{x^4+7x^2}$

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

6.- Efectuar y simplificar:

$$\left(\frac{\frac{2}{x}+\frac{x}{2}}{\frac{2}{x}-\frac{x}{2}}+\frac{1}{1+\frac{x}{2}}-\frac{1}{1-\frac{x}{2}}\right):\left(\frac{1-\frac{2-3x}{2+x}}{\frac{6+x}{2-x}-3}\right)= \qquad \text{sol=1}$$

7.- Efectuar y simplificar:

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

8.- Suma las siguientes fracciones algebraicas:

$$\frac{x^2+1}{x+1}+\frac{x-3}{x^5-1}= \qquad \text{sol:}\ \frac{x^7+x^5+2x^2-2x-2}{x^6+x^5+x+1}$$

9.- Opera y simplifica: $\dfrac{x^2}{x+1}+\dfrac{x+6}{x^3+3x^2+3x+1}=$ sol: $\dfrac{x^4+2x^3+x^2+x+6}{(x+1)^3}$

10.- Opera y simplifica: $\dfrac{2x+3}{x^3+1}-\dfrac{x^2+3}{x^2-1}=$ sol: $\dfrac{-x^5-x^3-4x^2-2x}{(x^3+1)(x^2-1)}$

11.- Opera y simplifica: $\dfrac{x+1}{x^2-1}\cdot\dfrac{x}{x^2+1}=$ sol: $\dfrac{x}{x^3-x^2+x-1}$

12.- Opera y simplifica:

a) $\dfrac{x-1}{x^2}\div\dfrac{4}{3x+2}=$ sol: $\dfrac{3x^2-3x-2}{4x^2}$

b) $\dfrac{3x-y}{2}+\dfrac{6x+y}{4}+\dfrac{y-2x}{6}=$ sol: $\dfrac{32x-y}{12}$

c) $\dfrac{x}{y}+\dfrac{y}{x}+\dfrac{x+y}{x-y}=$ sol: $\dfrac{x^3+2xy^2-y^3}{xy(x-y)}$

d) $\dfrac{2a-3b}{a-b}+\dfrac{4a+b}{a+b}+\dfrac{ab-3a^2+4b^2}{a^2-b^2}=$ sol: $\dfrac{3a}{a+b}$

e) $\dfrac{3x}{x-2}-\dfrac{5x}{x+2}-\dfrac{6x^2}{x^2-4}=$ sol: $\dfrac{8x}{x+2}$

f) $\dfrac{3x^2y}{7m^2n^3}\cdot\dfrac{4m^2n^4}{5a^2bc^2}\cdot\dfrac{6a^3b^3c}{4xy^3}=$ sol: $\dfrac{18ab^2xn}{35cy^2}$

g) $\dfrac{x^4+y^4}{(x^2-y^2)^2}+\dfrac{4xy}{x^2-y^2}-\dfrac{(x+y)^2}{x^2-2xy+y^2}=$ sol: $-\dfrac{2xy^2(3x+4y)}{(x^2-y^2)^2}$

h) $\dfrac{-14x^2}{x^3-16x}+\dfrac{x+3}{x-4}-\dfrac{x-3}{x+4}=$ sol: 0

i) $\left(1-\dfrac{a-\frac{x}{y}}{b-\frac{x}{y}}\right):\left(1-\dfrac{b+\frac{x}{y}}{a+\frac{x}{y}}\right)=$ sol: $\dfrac{x+ay}{x-by}$

j) $\dfrac{1+\frac{a-b}{a+b}}{\frac{a+b}{a-b}-1}:\dfrac{\frac{1}{a}-\frac{1}{b}}{\frac{a+b}{a}-\frac{a+b}{b}}=$ sol: $\dfrac{a(a-b)}{b}$

k) $$\frac{x^2-y^2}{\frac{1}{x}+\frac{1}{y}}\cdot\frac{x-\frac{x^2}{x+y}}{y-\frac{y^2}{x+y}}\cdot\frac{\frac{1}{x}-\frac{1}{y}}{\frac{1}{x}+\frac{1}{y}}=$$ sol: $-\frac{xy(x-y)^2}{x+y}$

l) $$\left[\frac{\frac{2x}{x-y}}{\frac{4x}{x^2+2xy+y^2}}:\frac{\frac{x}{x+y}}{\frac{1}{x^2-y^2}}\right]^2:\left[\frac{1+\frac{y}{x}}{1-\frac{y}{x}}\right]^4=$$ sol: $\frac{1}{4x^2}$