

1. Simplifica, si es posible, las siguientes fracciones algebraicas:

$$\text{a) } \frac{x^2 - 3x + 2}{x^2 - x - 2} \quad \left(\text{Soluc: } \frac{x-1}{x+1} \right)$$

$$\text{b) } \frac{x^2 + x - 2}{x^2 + 3x + 2} \quad \left(\text{Soluc: } \frac{x-1}{x+1} \right)$$

$$\text{c) } \frac{x^2 - 5x + 6}{x^2 + 5x + 6} \quad (\text{Soluc: irreducible})$$

$$\text{d) } \frac{2x^2 - 3x + 1}{2x^2 - x - 1} \quad \left(\text{Soluc: } \frac{2x-1}{2x+1} \right)$$

$$\text{e) } \frac{x^3 - 6x^2 + 11x - 6}{x^3 - 2x^2 - x + 2} \quad \left(\text{Soluc: } \frac{x-3}{x+1} \right)$$

$$\text{f) } \frac{x^2 + x + 2}{x^2 - x + 1} \quad (\text{Soluc: irreducible})$$

$$\text{g) } \frac{x^3 + 6x^2 + 11x + 6}{x^3 - 4x^2 + x + 6} \quad \left(\text{Soluc: } \frac{x^2 + 5x + 6}{x^2 - 5x + 6} \right)$$

$$\text{h) } \frac{x^3 - 3x^2 + 3x - 1}{x^2 - 2x + 1} \quad (\text{Soluc: } x-1)$$

$$\text{i) } \frac{4x^2 - 1}{4x^2 + 4x + 1} \quad \left(\text{Soluc: } \frac{2x-1}{2x+1} \right)$$

$$\text{j) } \frac{x^3 - x^2 - 10x - 8}{x^2 + 3x - 4} \quad (\text{Soluc: irreducible})$$

$$\text{k) } \frac{x^3 - 2x^2 - 5x + 6}{x^3 + 4x^2 + x - 6} \quad \left(\text{Soluc: } \frac{x-3}{x+3} \right)$$

$$\text{l) } \frac{4x^3 + 7x^2 + 2x - 1}{x^3 + 3x^2 + 3x + 1} \quad \left(\text{Soluc: } \frac{4x-1}{x+1} \right)$$

$$\text{m) } \frac{2x^3 - x^2 - 8x + 4}{x^3 + 8} \quad \left(\text{Soluc: } \frac{2x^2 - 5x + 2}{x^2 - 2x + 4} \right)$$

$$\text{n) } \frac{4x^3 - 2x^2 - 4x + 2}{2x^3 - 5x^2 + 4x - 1} \quad \left(\text{Soluc: } \frac{2x+2}{x-1} \right)$$

$$\text{o) } \frac{2x^3 - x^2 - 2x + 1}{2x^3 - 5x^2 + 4x - 1} \quad \left(\text{Soluc: } \frac{x+1}{x-1} \right)$$

$$\text{p) } \frac{x^3 - 3x^2 - x + 3}{x^3 - 3x^2 + 4x - 12} \quad \left(\text{Soluc: } \frac{x^2 - 1}{x^2 + 4} \right)$$

$$\text{q) } \frac{x^2 + x + 1}{x^3 - 1} \quad \left(\text{Soluc: } \frac{1}{x-1} \right)$$

$$\text{r) } \frac{4x^3 - 8x^2 - x + 2}{2x^3 - x^2 - 8x + 4} \quad \left(\text{Soluc: } \frac{2x+1}{x+2} \right)$$

$$\text{s) } \frac{x^2 - 4}{x^3 - 7x - 6} \quad \left(\text{Soluc: } \frac{x-2}{x^2 - 2x - 3} \right)$$

2. Realiza las siguientes sumas y restas de fracciones algebraicas:

$$\text{a) } \frac{3}{2x+4} + \frac{2x}{x^2-4} \quad \left(\text{Soluc: } \frac{7x-6}{2x^2-8} \right) \quad \text{b) } \frac{x^2-1}{x^3} - \frac{2x}{x^2+7} \quad \left(\text{Soluc: } \frac{-x^4+6x^2-7}{x^5+7x^3} \right)$$

$$\text{c) } \frac{x}{x^2-1} + \frac{1}{x^2-x-2} \quad \left(\text{Soluc: } \frac{x^2-x-1}{x^3-2x^2-x+2} \right) \quad \text{r) } \frac{a+b}{a-b} - \frac{2ab}{a^2-b^2} \quad \left(\text{Soluc: } \frac{a^2+b^2}{a^2-b^2} \right)$$

$$\text{d) } \frac{x-2}{x+2} + \frac{x+2}{x-2} \quad \left(\text{Soluc: } \frac{2x^2+8}{x^2-4} \right) \quad \text{s) } \frac{1}{x-2} - \frac{x^2+4x+8}{(x+2)^2(x-2)} + \frac{1}{x^2-4} \quad \left(\text{Soluc: } \frac{1}{x^2+4x+4} \right)$$

$$\text{e) } \frac{2x}{x^2-4} + \frac{x+1}{4x-8} \quad \left(\text{Soluc: } \frac{x^2+11x+2}{4x^2-16} \right) \quad \text{t) } \frac{x-2}{x+2} - \frac{1}{x-2} + \frac{6x-x^2}{x^2-4} \quad \left(\text{Soluc: } \frac{1}{x-2} \right)$$

$$\text{f) } \frac{x+1}{x-1} - \frac{x-1}{x+1} \quad \left(\text{Soluc: } \frac{4x}{x^2-1} \right) \quad \text{u) } \frac{1}{x-1} - \frac{3x+3}{x^2+x-2} + \frac{1}{x+2} \quad \left(\text{Soluc: } \frac{1}{1-x} \right)$$

$$\text{g) } \frac{1}{x+1} + \frac{2x}{x^2-1} - \frac{1}{x-1} \quad \left(\text{Soluc: } \frac{2}{x+1} \right) \quad \text{v) } \frac{x-1}{x^2-4} - \frac{x-2}{x^2+2x} + \frac{1}{x-2} \quad \left(\text{Soluc: } \frac{x^2+5x-4}{x^3-4x} \right)$$

$$\text{h) } 1 - \frac{x}{y} \quad \left(\text{Soluc: } \frac{y-x}{y} \right) \quad \text{w) } \frac{x+1}{x-2} + \frac{x-2}{x+2} - \frac{12}{x^2-4} \quad \left(\text{Soluc: } \frac{2x+3}{x+2} \right)$$

$$\text{i) } x - \frac{x^2-1}{x} \quad \left(\text{Soluc: } \frac{1}{x} \right) \quad \text{x) } \frac{x-2}{x^2+x-2} - \frac{x+1}{x^2-4} + \frac{x+3}{x^2-3x+2} \quad \left(\text{Sol: } \frac{x^2+x+11}{x^3-x^2-4x+4} \right)$$

$$\text{j) } \frac{3x-2}{x^2-1} + \frac{x+2}{x-1} \quad \left(\text{Soluc: } \frac{x^2+6x}{x^2-1} \right) \quad \text{y) } \frac{x^2-x+9}{x^3-9x} + \frac{1}{x^2-9} - \frac{1}{x-3} + \frac{1}{x} \quad \left(\text{Soluc: } \frac{1}{x+3} \right)$$

$$\text{k) } \frac{7x}{6x+12} - \frac{x+5}{2x^2-8} \quad \left(\text{Soluc: } \frac{7x^2-17x-15}{6x^2-24} \right) \quad \text{z) } \frac{2x}{x-1} + \frac{3x+1}{x-1} - \frac{1-x}{x^2-1} \quad \left(\text{Soluc: } \frac{5x^2+7x}{x^2-1} \right)$$

$$\text{l) } \frac{x+3}{x^2+1} + \frac{2x}{x-3} \quad \left(\text{Soluc: } \frac{2x^3+x^2+2x-9}{x^3-3x^2+x-3} \right) \quad \text{a) } \frac{4}{x+1} + \frac{x}{x^2+1} + \frac{x+1}{x-1} \quad \left(\text{Soluc: } \frac{x^4+7x^3-2x^2+5x-3}{x^4-1} \right)$$

$$\text{b) } \frac{3}{2x-4} + \frac{1}{x+2} - \frac{x+10}{2x^2-8} \quad \left(\text{Soluc: } \frac{2}{x+2} \right)$$

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| <p>m) $\frac{3x}{x^2-1} - \frac{x+2}{x+1}$</p> <p>n) $\frac{3}{x-1} + \frac{x}{x+1} - \frac{x+1}{x^2-1}$</p> <p>o) $\frac{x+2y}{x^2-y^2} + \frac{2x-5y}{x-y}$</p> <p>p) $\frac{x-y}{xy} + \frac{y-z}{yz}$</p> <p>q) $x + \frac{1}{x}$</p> | <p>(Soluc: $\frac{-x^2+2x+2}{x^2-1}$)</p> <p>(Soluc: $\frac{x^2+x+2}{x^2-1}$)</p> <p>(Soluc: $\frac{2x^2-5y^2-3xy+x+2y}{x^2-y^2}$)</p> <p>(Soluc: $\frac{x-z}{xz}$)</p> <p>(Soluc: $\frac{x^2+1}{x}$)</p> | <p>r) $\frac{x-x^2}{1-x^2} + \frac{1+x}{x^2+2x+1} - \frac{1-2x}{1+x}$</p> <p>s) $\frac{1}{x(x-1)} + \frac{2x+1}{x^2-1} + \frac{x}{(x+1)^2}$</p> <p>t) $\frac{1}{x^2-9x+20} - \frac{1}{x^2-11x+30} + \frac{1}{x^2-10x+24}$</p> | <p>(Soluc: $\frac{3x}{x+1}$)</p> <p>(Soluc: $\frac{3x^3+3x^2+3x+1}{x^4+x^3-x^2-x}$)</p> <p>(Soluc: $\frac{x-7}{x^3-15x^2+24x-120}$)</p> |
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3. Efectúa las siguientes operaciones combinadas de fracciones algebraicas, simplificando si es posible:

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

b) $\frac{x^2+1}{x^2-1} + \frac{x+2}{x-2} - \frac{x-1}{x+1} =$ (Soluc: $\frac{2x^3-2x^2-2x}{x^3-2x^2-x+2}$)

c) $\left(\frac{a^2+b^2}{a^2-b^2} - \frac{a+b}{a-b}\right) \frac{a+b}{ab} =$ (Soluc: $-\frac{2}{a-b}$)

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

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