

1.- Simplifica las fracciones algebraicas siguientes:

$$\begin{array}{llll} \text{a)} \frac{x^2 - 5x + 6}{x^2 - 2x} = & \text{b)} \frac{x^3 + 3x^2 + 3x + 1}{x^3 + 2x^2 + x} = & \text{c)} \frac{-9 + x^2}{x^2 + 2x - 15} = & \text{d)} \frac{x^4 - 1}{x^4 - x^3 - x^2 - x - 2} = \\ \text{e)} \frac{4x^3 - 4x}{x^6 + x^5} = & \text{f)} \frac{-2x^2 + x}{-2x^2 + 9x - 4} = & \text{g)} \frac{9x - x^3}{x^3 + 3x^2} = & \end{array}$$

Soluciones: a) $\frac{x-3}{x}$ b) $\frac{x+1}{x}$ c) $\frac{x+3}{x+5}$ d) $\frac{x-1}{x-2}$ e) $\frac{4(x-1)}{x^4}$ f) $\frac{x}{x-4}$ g) $\frac{3-x}{x}$

2.- Suma y resta las siguientes fracciones algebraicas:

$$\begin{array}{llll} \text{a)} \frac{2x^2 - 5x}{x^2 - 9} - \frac{2x^2 - 4x + 3}{x^2 - 9} = & \text{b)} \frac{-3x + 1}{x + 1} - \frac{5x + 1}{x^2 + x} = & \text{c)} \frac{1}{x} - \frac{2-x}{x} + \frac{3-2x}{x} = \\ \text{d)} \frac{2}{x-2} - \frac{4}{x^2 - 2x} = & \text{e)} \frac{2}{x^2 - 16} - \frac{1}{x^2 + 4x} = & \text{f)} \frac{-2}{x^3} - \frac{5}{x^2} + \frac{3}{x} = \\ \text{g)} \frac{x}{x^2 - 3x - 4} - \frac{2x}{x^2 - 1} + \frac{x^2 - 6x - 4}{x^3 - 4x^2 - x + 4} = & & & \end{array}$$

Soluciones: a) $\frac{-1}{x-3}$ b) $\frac{-3x-1}{x}$ c) $\frac{2-x}{x}$ d) $\frac{2}{x}$ e) $\frac{1}{x(x-4)}$ f) $\frac{3x^2 - 5x - 2}{x^3}$ g) $\frac{1}{x^2 - 1}$

3.- Multiplica las fracciones algebraicas:

$$\begin{array}{llll} \text{a)} \frac{2x+1}{x^2-4} \cdot \frac{x+2}{x-5} = & \text{b)} \frac{2x+4}{x^2-9} \cdot \frac{x+3}{x+2} = & \text{c)} \frac{x^3 - 5x^2 + 6x}{x+1} \cdot \frac{x^2 - 1}{2x^3 - 6x^2} = \\ \text{d)} \frac{5x^3}{x+1} \cdot \frac{x^2 + 2x + 1}{x^2 + x} = & \text{e)} \left(1 + \frac{1}{x^2 - 1}\right) \cdot \left(\frac{x+1}{x}\right) = & \text{f)} \left(2 + \frac{8}{x-2}\right) \cdot \frac{1}{x+2} = \\ \text{g)} \left(\frac{1}{x} - \frac{2}{x-1}\right) \cdot \frac{x^2}{x+1} = & & & \end{array}$$

Soluciones: a) $\frac{2x+1}{(x-2)(x-5)}$ b) $\frac{2}{x-3}$ c) $\frac{(x-2)(x-1)}{2x}$ d) $5x^2$ e) $\frac{x}{x-1}$ f) $\frac{2}{x-2}$ g) $\frac{-x}{x-1}$

4.- Divide las fracciones:

$$\begin{array}{llll} \text{a)} \frac{1}{2x^2} : \frac{x+3}{4x} = & \text{b)} \frac{1}{8x^3} : \frac{4x+2}{3x^5} = & \text{c)} \frac{4x^2}{x+1} : \frac{x^2-x}{x^2-2x+1} = & \text{d)} \frac{x+2}{2x+3} : \frac{x^2-4}{-6x-4x^2} = \\ \text{e)} \frac{2x^2}{3x^2-3} : \frac{x}{x+1} = & \text{f)} \frac{x^2-5x+6}{2x+1} : \frac{x-2}{x} = & \text{g)} \frac{-x+7}{x^2-1} : \frac{-x^2+5x+14}{x^2+3x+2} = \end{array}$$

$$\text{Soluciones: } \text{a)} \frac{2}{x(x+3)} \quad \text{b)} \frac{3x^2}{16(2x+1)} \quad \text{c)} \frac{4x(x-1)}{x+1} \quad \text{d)} \frac{-2x}{x-2} \quad \text{e)} \frac{2x}{3(x-1)} \quad \text{f)} \frac{x-1}{x-5} \quad \text{g)} \frac{3}{x-1}$$

5.- Operaciones combinadas:

$$\begin{array}{llll} \text{a)} \frac{-8x}{x^2+4x+4} + \frac{3x}{x^2+3x+2} = & \text{b)} \frac{5x+5}{x^2+2x} - \frac{5}{x^2} + \frac{4x-5}{x+2} = & \text{c)} \frac{x^2-x-2}{x^3+7x^2+10x} + \frac{1}{x^2+5x} - \frac{1}{x^3} = \\ \text{d)} \frac{1}{x^2} \cdot \left(\frac{3x^3-3x^2-4x}{2x-3} - x^2 \right) = & \text{e)} \left(\frac{-3x^2}{x^2-1} + 4 \right) \cdot \left(\frac{x+1}{x^2-4} \right) = & \text{f)} \left(\frac{1}{x} - 2 + x \right) \frac{x^3}{x^2-1} = \\ \text{g)} \left(\frac{2x^2+21}{(x-3)^2} + \frac{7}{x-3} \right) : \frac{2x+7}{x^2-9} = & \text{h)} \left(1 - \frac{1}{x} \right) : \frac{3x-3}{x^6} + \frac{1}{x} = & \text{i)} \left(\frac{2x}{x-5} : \frac{3x^2}{x^2-25} \right) : \frac{2(x+5)}{x} = \end{array}$$

$$\begin{array}{llll} \text{Soluciones: } \text{a)} \frac{-x(5x+2)}{(x+2)^2(x+1)} & \text{b)} \frac{4x^3-10}{x^2(x+2)} & \text{c)} \frac{x^4-x^2-7x-10}{x^3(x+2)(x+5)} & \text{d)} \frac{x^2-4}{x(2x-3)} \quad \text{e)} \frac{1}{x-1} \quad \text{f)} \frac{x^2(x-1)}{x+1} \\ \text{g)} \frac{x(x+3)}{x-3} & \text{h)} \frac{x^6+3}{3x} & \text{i)} \frac{1}{3} \end{array}$$