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

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

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

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

* **g)** $\frac{1}{x+1}+\frac{2x}{x^2-1}-\frac{1}{x-1}$ $\left(\text{Soluc}: \frac{2}{x+1}\right)$

h) $1-\frac{x}{y}$ $\left(\text{Soluc}: \frac{y-x}{y}\right)$

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

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

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

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

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

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

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

p) $\frac{x-y}{xy}+\frac{y-z}{yz}$ $\left(\text{Soluc}: \frac{x-z}{xz}\right)$

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

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

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

* **t)** $\frac{x-2}{x+2}-\frac{1}{x-2}+\frac{6x-x^2}{x^2-4}$ $\left(\text{Soluc}: \frac{1}{x-2}\right)$

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

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

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

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

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

z) $\frac{2x}{x-1}+\frac{3x+1}{x-1}-\frac{1-x}{x^2-1}$ $\left(\text{Soluc}: \frac{5x^2+7x}{x^2-1}\right)$

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

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

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

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

ε) $\frac{1}{x^2-9x+20}-\frac{1}{x^2-11x+30}+\frac{1}{x^2-10x+24}$ $\left(\text{Soluc}: \frac{x-7}{x^3-15x^2+24x-120}\right)$

8. Efectuar los siguientes productos y cocientes, dando el <u>resultado simplificado</u>:

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

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

c) $\frac{\frac{x+1}{x+2}}{\frac{x+1}{x+3}}=$ $\left(\text{Soluc}: \frac{x+3}{x+2}\right)$

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

e) $\frac{3x-1}{x^2}\cdot\frac{x+1}{x^5}$ $\left(\text{Soluc}: \frac{3x^2+2x-1}{x^7}\right)$

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

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

h) $\frac{x^3-3ax^2+3a^2x-a^3}{\frac{x+a}{x-a}}=$ $(\text{Soluc}: x^2-2ax+a^2)$

i) $\frac{9\frac{x+2y}{3}+6z}{3}=$ $(\text{Soluc}: x+2y+2z)$

j) $\frac{\frac{x}{3}}{x-\frac{x}{3}}=$ $(\text{Soluc}: 1/2)$

k) $\frac{A}{B}(1-B)+A=$ (Soluc : A/B)

l) $\dfrac{\dfrac{x^3-x}{2x^2+6x}}{\dfrac{5x^2-5x}{2x+6}}=$ $\left(\text{Soluc : } \frac{x+1}{5x}\right)$

m) $\dfrac{\dfrac{2}{a}-1}{\dfrac{\dfrac{2}{a}}{-\dfrac{1}{2}}}=$ (Soluc : $a - 2$)

9. Efectuar las siguientes operaciones combinadas con F.A. y simplificar:

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

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

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

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

10. Demostrar que: **a)** $\frac{a}{b}=\frac{c}{d}\Rightarrow\frac{a-c}{b-d}=\frac{a}{b}$ **b)** $\frac{(a+b)^2}{4}-\frac{(a-b)^2}{4}=a\cdot b$