24. Simplifica les fraccions algebraiques següents.

a) $\dfrac{2x^4 + x^3 - 11x^2 + 11x - 3}{2x^3 + 3x^2 - 8x + 3}$

b) $\dfrac{x^3 - 2x^2 - 9x + 18}{x^3 - 7x^2 + 16x - 12}$

c) $\dfrac{x^4 - 5x^3 + 9x^2 - 7x + 2}{x^4 - 6x^3 + 13x^2 - 12x + 4}$

a) $\dfrac{2x^4 + x^3 - 11x^2 + 11x - 3}{2x^3 + 3x^2 - 8x + 3} = \dfrac{(x+3)(x-1)^2(2x-1)}{(x-1)(x+3)(2x-1)} = x - 1$

b) $\dfrac{x^3 - 2x^2 - 9x + 18}{x^3 - 7x^2 + 16x - 12} = \dfrac{(x-2)(x+3)(x-3)}{(x-3)(x-2)^2} = \dfrac{x+3}{x-2}$

c) $\dfrac{x^4 - 5x^3 + 9x^2 - 7x + 2}{x^4 - 6x^3 + 13x^2 - 12x + 4} = \dfrac{(x-1)^3(x-2)}{(x-1)^2(x-2)^2} = \dfrac{x-1}{x-2}$

25. Fes les operacions següents amb fraccions algebraiques i simplifica el resultat.

a) $\dfrac{a^2}{a \cdot b} + \dfrac{a \cdot b^2}{b^4} - a$

e) $\dfrac{a+x}{x^2 - a^2} \cdot \dfrac{x-a}{x+a}$

b) $\dfrac{6}{2+x} - \dfrac{4}{2-x} + \dfrac{16}{x^2 - 4}$

f) $1 + \dfrac{1}{1 + \dfrac{1}{1 + \dfrac{1}{x}}}$

c) $\dfrac{2x^2 - 7x + 6}{x^2 + 2x + 1} \cdot \dfrac{x^2 + 6x + 5}{2x - 3}$

g) $\dfrac{\dfrac{1}{x}}{\dfrac{1}{x+1} + \dfrac{1}{1-x}}$

d) $(x^2 - y^2) : \left(\dfrac{1}{x} + \dfrac{1}{y} \right)$

h) $1 + \dfrac{\dfrac{2x+1}{x-1}}{\dfrac{1}{x-1} + \dfrac{x}{x+1}}$

a) $\dfrac{a^2}{a \cdot b} + \dfrac{a \cdot b^2}{b^4} - a = \dfrac{a^2 b^3 + a^2 b^2 - a^2 b^4}{ab^4} = \dfrac{a^2 b^2 \left(b + 1 - b^2 \right)}{ab^4} = \dfrac{ab + a - ab^2}{b^2}$

b) $\dfrac{6}{2+x} - \dfrac{4}{2-x} + \dfrac{16}{x^2 - 4} = \dfrac{6(x-2) + 4(x+2) + 16}{(x+2)(x-2)} = \dfrac{6x - 12 + 4x + 8 + 16}{(x+2)(x-2)} = \dfrac{10x + 12}{x^2 - 4}$

c) $\dfrac{2x^2 - 7x + 6}{x^2 + 2x + 1} \cdot \dfrac{x^2 + 6x + 5}{2x - 3} = \dfrac{(x-2)(2x-3)}{(x+1)^2} \cdot \dfrac{(x+1)(x+5)}{2x - 3} = \dfrac{(x-2)(x+5)}{x+1} = \dfrac{x^2 + 3x - 10}{x+1}$

d) $(x^2 - y^2) : \left(\dfrac{1}{x} + \dfrac{1}{y} \right) = \dfrac{(x-y)(x+y)}{\dfrac{x+y}{xy}} = \dfrac{xy(x-y)(x+y)}{x+y} = x^2 y - xy^2$

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

f) $1 + \dfrac{1}{1 + \dfrac{1}{1 + \dfrac{1}{x}}} = 1 + \dfrac{1}{1 + \dfrac{1}{\dfrac{x+1}{x}}} = 1 + \dfrac{1}{1 + \dfrac{x}{x+1}} = 1 + \dfrac{1}{\dfrac{2x+1}{x+1}} = 1 + \dfrac{x+1}{2x+1} = \dfrac{3x+2}{2x+1}$

g) $\dfrac{\dfrac{1}{x}}{\dfrac{1}{x+1} + \dfrac{1}{1-x}} = \dfrac{\dfrac{1}{x}}{\dfrac{(1-x)+(x+1)}{(x+1)(1-x)}} = \dfrac{\dfrac{1}{x}}{\dfrac{2}{1-x^2}} = \dfrac{1-x^2}{2x}$