

Đề bài

Thực hiện các phép tính sau:

$$\text{a)} \frac{x+1}{x-3} - \frac{1-x}{x+3} - \frac{2x(1-x)}{9-x^2}$$

$$\text{b)} \frac{3x+1}{(x-1)^2} - \frac{1}{x+1} + \frac{x+3}{1-x^2}$$

Đáp án lời giải

$$\begin{aligned} \text{a)} \quad & \frac{x+1}{x-3} - \frac{1-x}{x+3} - \frac{2x(1-x)}{9-x^2} = \frac{x+1}{x-3} + \frac{-(1-x)}{x+3} + \frac{2x(1-x)}{-(9-x^2)} \\ &= \frac{x+1}{x-3} + \frac{x-1}{x+3} + \frac{2x(1-x)}{x^2-9} = \frac{x+1}{x-3} + \frac{x-1}{x+3} + \frac{2x-2x^2}{(x-3)(x+3)} \\ &= \frac{(x+1)(x+3) + (x-1)(x-3) + 2x-2x^2}{(x-3)(x+3)} \\ &= \frac{x^2+4x+3+x^2-4x+3+2x-2x^2}{(x-3)(x+3)} \\ &= \frac{2x+6}{(x-3)(x+3)} = \frac{2(x+3)}{(x-3)(x+3)} = \frac{2}{x-3} \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & \frac{3x+1}{(x-1)^2} - \frac{1}{x+1} + \frac{x+3}{1-x^2} = \frac{3x+1}{(x-1)^2} + \frac{-1}{x+1} + \frac{-(x+3)}{-(1-x^2)} \\ &= \frac{3x+1}{(x-1)^2} + \frac{-1}{x+1} + \frac{-(x+3)}{(x-1)(x+1)} \\ &= \frac{(3x+1)(x+1) - (x-1)^2 - (x+3)(x-1)}{(x-1)^2(x+1)} \\ &= \frac{3x^2+4x+1 - (x^2-2x+1) - (x^2+2x-3)}{(x-1)^2(x+1)} \\ &= \frac{3x^2+4x+1-x^2+2x-1-x^2-2x+3}{(x-1)^2(x+1)} \\ &= \frac{x^2+4x+3}{(x-1)^2(x+1)} = \frac{x^2+x+3x+3}{(x-1)^2(x+1)} \\ &= \frac{x(x+1)+3(x+1)}{(x-1)^2(x+1)} = \frac{(x+1)(x+3)}{(x-1)^2(x+1)} = \frac{x+3}{(x-1)^2} \end{aligned}$$