

Presentation Problem Pg. 23 # 26

Evaluate the difference quotient for the given function.  
Simplify your answer.

$$f(x) = \frac{x+3}{x+1}, \quad \frac{f(x) - f(1)}{x-1}$$
$$= \frac{\frac{x+3}{x+1} - 2}{x-1}$$

$$= \frac{(x+3) \cdot \frac{1}{x+1} - 2 \cdot \frac{1}{x+1}}{x-1}$$

$$= \frac{x+3}{(x+1)(x-1)} - \frac{2}{x-1} \cdot \frac{(x+1)}{(x+1)}$$

$$= \frac{(x+3) - 2(x+1)}{(x+1)(x-1)}$$

$$= \frac{x+3 - 2x-2}{(x+1)(x-1)}$$

$$= \frac{-x+1}{(x+1)(x-1)}$$

$$= \frac{(-1)(x-1)}{(x+1)(x-1)}$$

$$= \frac{-1}{x+1} \quad \text{if } x \neq 1$$

Done by Reed Kluft