Example: Given the two functions whose rules are:

\[ f(x) = \frac{-2x+1}{x-3} \]
\[ g(x) = \frac{-x+2}{3x-1} \]

Compute the rule for the composite \( f \circ g(x) \)

Solution: To compute \( f \circ g(x) \), evaluate \( f\left(\frac{-2x+1}{x-3}\right) \) for \( g(x) \).

Replace \( x \) in \( f(x) \) by \( g(x) \)

\[ f\left(\frac{-2x+1}{x-3}\right) = \frac{-2\left(\frac{-x+2}{3x-1}\right)+3x-1}{3x-1} \]

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

\[ = \frac{2x-4+3x-1}{3x-1} \]

\[ = \frac{5x-5}{3x-1} \]

\[ = \frac{x-1}{3x-1} \]

Answer: \( f \circ g(x) = \frac{x-1}{3x-1} \)

Exercise: For each pair of functions, compute the required composite.

1. \( f(x) = \frac{-3x+2}{x-4} \)
   \( g(x) = \frac{2x+1}{3x+2} \)
   \( f \circ g(x) = \)
   \( \frac{-5x}{-7x-2} \)

2. \( f(x) = -3x+1 \)
   \( g(x) = \frac{-x+4}{2x-3} \)
   \( f \circ g(x) = \)
   \( \frac{5x-15}{2x-3} \)

3. \( f(x) = \frac{4x-3}{x-2} \)
   \( g(x) = \frac{3x-1}{x} \)
   \( f \circ g(x) = \)
   \( \frac{11x-7}{4x-3} \)

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