

#64

$$f(x) = 6x - 3$$

$$g(x) = \frac{x+3}{6}$$

$$\begin{aligned} \text{a) } (f \circ g)(x) &= f(g(x)) = f\left(\frac{x+3}{6}\right) = 6 \cdot \left(\frac{x+3}{6}\right) - 3 = \\ &= x + 3 - 3 = x \end{aligned}$$

$$(f \circ g)(x) = x$$

$$\text{c) } (f \circ g)(2) = 2$$

$$\text{b) } (g \circ f)(x) = g(f(x)) = g(6x - 3) = \frac{(6x - 3) + 3}{6} = x$$

$$(g \circ f)(x) = x$$

$$\text{d) } (g \circ f)(2) = 2$$

#70

$$f(x) = \frac{x}{x+5}$$

$$g(x) = \frac{6}{x}$$

$$(f \circ g)(x) = f(g(x)) = f\left(\frac{6}{x}\right) = \frac{\frac{6}{x}}{\frac{6}{x} + 5} =$$

$$= \frac{\frac{6}{x}}{\frac{6+5x}{x}} = \frac{6}{x} \cdot \frac{x}{6+5x} = \frac{6}{6+5x}$$

\uparrow $6+5x \neq 0$ i.e. $x \neq -\frac{6}{5}$
 we can cancel x because it is not zero

$$(f \circ g)(x) = \frac{6}{6+5x}$$

domain: $\{x \mid x \neq 0 \text{ and } x \neq -\frac{6}{5}\}$

or $(-\infty, -\frac{6}{5}) \cup (-\frac{6}{5}, 0) \cup (0, \infty)$