$$f(x) = x + \frac{1}{x}, \quad D = \{x \mid x \neq 0\}; \quad g(x) = \frac{x+17}{x+2}, \quad D = \{x \mid x \neq -2\}$$

(a) $(f \circ g)(x) = f(g(x)) = f\left(\frac{x+17}{x+2}\right) = \frac{x+17}{x+2} + \frac{1}{\frac{x+17}{x+2}} = \frac{x+17}{x+2} + \frac{x+2}{x+17}$

Since $g(x)$ is not defined for $x = -2$ and $f(g(x))$ is not defined for $x = -17$ and $x = -2$, the domain of $(f \circ g)(x)$ is $D = \{x \mid x \neq -17, -2\}$.

(b) $(g \circ f)(x) = g(f(x)) = g\left(x + \frac{1}{x}\right) = \frac{\left(x + \frac{1}{x}\right) + 17}{\left(x + \frac{1}{x}\right) + 2} = \frac{x^2 + 17x + 1}{x^2 + 2x + 1}$

Since $f(x)$ is not defined for $x = 0$ and $g(f(x))$ is not defined for $x = -1$, the domain of $(g \circ f)(x)$ is $D = \{x \mid x \neq -1, 0\}$.

(c) $(f \circ f)(x) = f(f(x)) = f\left(x + \frac{1}{x}\right) = \left(x + \frac{1}{x}\right) + \frac{1}{x + \frac{1}{x}} = x + \frac{1}{x} + \frac{x}{x^2 + 1}, \quad D = \{x \mid x \neq 0\}$

(d) $(g \circ g)(x) = g(g(x)) = g\left(\frac{x+17}{x+2}\right) = \frac{\frac{x+17}{x+2} + 17}{\frac{x+17}{x+2} + 2} = \frac{6x + 17}{x + 7}$

Since $g(x)$ is not defined for $x = -2$ and $g(g(x))$ is not defined for $x = -7$, the domain of $(g \circ g)(x)$ is $D = \{x \mid x \neq -2, -7\}$.