

1.11

$$\begin{aligned} 1) \quad (g \circ f)(x) &= g(f(x)) = g(x^2) = 2x^2 + 1 \\ (f \circ g)(x) &= f(g(x)) = f(2x + 1) = (2x + 1)^2 = 4x^2 + 4x + 1 \end{aligned}$$

$$\begin{aligned} 2) \quad (g \circ f)(x) &= g(f(x)) = g(x^2 + 1) = \frac{1}{x^2 + 1} \\ (f \circ g)(x) &= f(g(x)) = f\left(\frac{1}{x}\right) = \left(\frac{1}{x}\right)^2 + 1 = \frac{1}{x^2} + 1 = \frac{x^2 + 1}{x^2} \end{aligned}$$

$$\begin{aligned} 3) \quad (g \circ f)(x) &= g(f(x)) = g(\sqrt{x}) = 2\sqrt{x} - 6 \\ (f \circ g)(x) &= f(g(x)) = f(2x - 6) = \sqrt{2x - 6} \end{aligned}$$

4) Comme l'illustrent les trois premières questions, la composition des fonctions n'est pas commutative : $g \circ f \neq f \circ g$.