

$$\begin{aligned} 80. \quad f(g(x)) &= (4x+1)^2 + 3(4x+1) - 6 \\ &= 16x^2 + 8x + 1 + 12x + 3 - 6 \\ [f \circ g](x) &= \boxed{16x^2 + 20x - 2} \end{aligned}$$

$$\begin{aligned} g(f(x)) &= 4(x^2 + 3x - 6) + 1 \\ &= 4x^2 + 12x - 24 + 1 \\ [g \circ f](x) &= \boxed{4x^2 + 12x - 23} \end{aligned}$$

$$[f \circ g](4) = f(g(4)) = 16(4)^2 + 20(4) - 2 = \boxed{334}$$

$$81. \quad [f \circ g](x) = 6 - \frac{5}{x}$$

$$[g \circ f](x) = \frac{1}{6-5x}$$

$$[f \circ g](4) = 4.75$$

$$82. \quad [f \circ g](x) = \sqrt{x^2 + 4}$$

$$[g \circ f](x) = x + 4$$

$$[f \circ g](x) = \sqrt{20} \text{ or } 2\sqrt{5}$$