

5.3 1)

$$\begin{aligned}\lim_{x \rightarrow 2} [f(x) + 2g(x)] &= \lim_{x \rightarrow 2} f(x) + \lim_{x \rightarrow 2} [2g(x)] = \\ &= \lim_{x \rightarrow 2} f(x) + 2 \lim_{x \rightarrow 2} g(x) = \lim_{x \rightarrow 2} f(x) + 2 \lim_{x \rightarrow 2} g(x) = 3 + 2 \cdot (-1) = \boxed{1}\end{aligned}$$

5.3 2)

$$\lim_{x \rightarrow 2} \frac{5f(x)}{g(x) + 2} = \frac{\lim_{x \rightarrow 2} [5f(x)]}{\lim_{x \rightarrow 2} [g(x) + 2]} = \frac{5 \lim_{x \rightarrow 2} f(x)}{\lim_{x \rightarrow 2} g(x) + \lim_{x \rightarrow 2} 2} = \frac{5 \cdot 3}{-1 + 2} = \boxed{15}$$

5.3 3)

$$\begin{aligned}\lim_{x \rightarrow 2} [f(x)g(x) - x + 1] &= \lim_{x \rightarrow 2} [f(x)g(x)] - \lim_{x \rightarrow 2} x + \lim_{x \rightarrow 2} 1 = \\ &= \lim_{x \rightarrow 2} f(x) \cdot \lim_{x \rightarrow 2} g(x) - \lim_{x \rightarrow 2} x + 1 = 3(-1) - 2 + 1 = \boxed{-4}\end{aligned}$$

5.3 4)

$$\begin{aligned}\lim_{x \rightarrow 2} \sqrt{f^2(x) + 3g(x) - x} &= \sqrt{\lim_{x \rightarrow 2} f^2(x) + \lim_{x \rightarrow 2} [3g(x)] - \lim_{x \rightarrow 2} x} = \\ &= \sqrt{\left[\lim_{x \rightarrow 2} f(x) \right]^2 + 3 \lim_{x \rightarrow 2} g(x) - \lim_{x \rightarrow 2} x} = \sqrt{3^2 + 3(-1) - 2} = \boxed{2}\end{aligned}$$