

Problems - 2.2-2.4 Extras

(1) Verify the limit

$$\lim_{x \rightarrow 0^+} \sqrt{x} = 0$$

(2) Verify the limit

$$\lim_{x \rightarrow 4} \frac{x}{x-4} = \infty$$

(3) Prove the following, or find a counterexample: Suppose f and g are defined for $x > 0$ and $\lim_{x \rightarrow 0^+} f(x) = 0$. Then

$$\lim_{x \rightarrow 0^+} f(x)g(x) = 0$$

(4) Prove the following, or find a counterexample: Suppose f and g are defined for all real numbers, $\lim_{x \rightarrow +\infty} f(x) = L > 0$ and $\lim_{x \rightarrow +\infty} g(x) = +\infty$. Then

$$\lim_{x \rightarrow +\infty} f(x)g(x) = +\infty$$