

3. For any $\varepsilon > 0$, there exists δ_1 and δ_2 and δ_3 such that

$$\begin{cases} 0 < |x - c| < \delta_1 \Rightarrow -\varepsilon/12 < f(x) - L < \varepsilon/12 \\ 0 < |x - c| < \delta_2 \Rightarrow -\varepsilon/12 < g(x) - M < \varepsilon/12 \\ 0 < |x - c| < \delta_3 \Rightarrow -\varepsilon/12 < h(x) - N < \varepsilon/12 \end{cases}$$

for take $\delta = \min(\delta_1, \delta_2, \delta_3) = 10$ $0 < |x - c| < \delta$

$$\begin{cases} 0 < |x - c| < \delta \\ \Rightarrow -3\varepsilon/12 < 3f(x) - 3L < 3\varepsilon/12 \\ \Rightarrow -4\varepsilon/12 < 4g(x) - 4M < 4\varepsilon/12 \\ \Rightarrow -5\varepsilon/12 < 5h(x) - 5N < 5\varepsilon/12 \end{cases} \text{相加}$$

$$\Rightarrow -\varepsilon < 3f(x) + 4g(x) - 5h(x) - 3L - 4M + 5N < \varepsilon$$

$$\Rightarrow |3f(x) + 4g(x) - 5h(x) - (3L + 4M - 5N)| < \varepsilon$$