

(1) [5 points] Let $H(x) = \sec^4(\sqrt{x})$. Find functions f , g and h such that $H = f \circ g \circ h$.

$$h(x) = \sqrt{x}$$

$$g(x) = \sec(x)$$

$$f(x) = x^4$$

(2) [5 points] Determine the limit $\lim_{x \rightarrow 5} \frac{x^2 - 3x - 10}{x - 5}$.

$$\lim_{x \rightarrow 5} \frac{x^2 - 3x - 10}{x - 5} \sim \frac{0}{0}$$

$$= \lim_{x \rightarrow 5} \frac{\cancel{(x-5)}(x+2)}{\cancel{(x-5)}}$$

$$= 7$$

(3) [5 points] Determine the limit $\lim_{x \rightarrow 3} \frac{\sqrt{x+13} - 4}{x-3}$.

$$\lim_{x \rightarrow 3} \frac{\sqrt{x+13} - 4}{x-3} \sim \frac{0}{0}$$

$$= \lim_{x \rightarrow 3} \frac{\sqrt{x+13} - 4}{x-3} \cdot \frac{\sqrt{x+13} + 4}{\sqrt{x+13} + 4}$$

$$= \lim_{x \rightarrow 3} \frac{x+13 - 16}{(x-3)(\sqrt{x+13} + 4)}$$

$$= \lim_{x \rightarrow 3} \frac{\cancel{x-3}}{\cancel{x-3}(\sqrt{x+13} + 4)}$$

$$= \frac{1}{8}$$