每題 20 分，共 100 分

1. Let $f(x) = \int_{x^2}^{7x} \sqrt{t^4 + 5}\, dt$. Compute $f'(3)$.

2. Suppose that $f'(x) = 0$ for all $x \in [a, b]$.

   Prove that $f(x)$ is a constant function on $[a, b]$.

3. Let $h(x) = |x + 2|$. Evaluate $\int_{-2}^{5} h(x)\, dx$.

4. Let $f(x) = \begin{cases} x^2 \sin \frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$. Prove that f is differentiable at 0.

5. Find the maximum and minimum values of $g(x) = \frac{x}{1+x^2}$ on $[-2, 5]$.