1. Show that \( f : \mathbb{R} \to \mathbb{R} \) defined by \( f(x) := e^{5x-1} \) is invertible. Find \( f^{-1}(x) \).

2. What is the domain of definition of the function \( g \), defined by \( g(x) = \tan(x^2) \). Compute \( g'(x) \).

3. If \( a < b \) prove that \( \frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2} \).

   Show that \( \frac{\pi}{4} + \frac{3}{25} < \tan^{-1} \frac{4}{3} < \frac{\pi}{4} + \frac{1}{6} \).

4. Let \( h : \mathbb{R} \to \mathbb{R} \) be defined by \( h(x) := x + 2x^2 \sin(1/x) \) for \( x \neq 0 \), and \( h(0) := 0 \). Show that \( h'(0) = 1 \), but in every neighborhood of 0 the derivative \( h'(x) \) takes on both positive and negative values. Thus \( h \) is not monotonic in any neighborhood of 0.