1. Find the derivative of the function. Find the domains of the function and its derivative.

\[ f(x) = \ln \cos^{-1} e^{2x} \]

2. Find the limit.

\[ \lim_{x \to \infty} \tan^{-1} \left( \frac{5 + x^2}{2\pi + x^3} \right) \]

3. Simplify the expression, and include the domain in your final answer.

\[ \tan \sin^{-1} x \]