Quiz 4   **Your name:**

Your TA's name:

1. Find the derivatives of the given functions

(a) [10 points] $f(x) = 2^{\sin 3x}$

(b) [10 points] $f(t) = e^{\sec^{-1} t}$

2. [10 points] A certain radioactive isotope has a half-life of 5 years. How many years will it take for 100 grams to decay to 25 grams?

3. [10 points] Use a linear approximation (or differentials) to estimate the number $\sqrt{99.8}$.

Bonus problem for the first midterm [10 points]

Use the Intermediate Value Theorem to show that there is a root of the equation $\sin x - 1 = -2x$ in the interval $\left(0, \dfrac{\pi}{2}\right)$. Provide all the necessary steps and details.