Question 1. (10 pts) Evaluate the definite integral
\[ \int_{0}^{\frac{\pi}{2}} \sin^3(x)(\cos(x) - \cos^3(x))dx. \]

Question 2. (6 points) If \( \tan(u) = x + 1 \) what is \( \cos(u) \)?
Question 3. (10 points) What is
\[ \int \sqrt{x} \ln(x) \, dx \]?

Question 4. (10 points)

What is
\[ \int \frac{x^4}{x^3 + 1} \, dx \]?