Problem 1 (5 points)

Express the following limit as a definite integral.

\[ \lim_{n \to \infty} \frac{2}{n} \sum_{i=1}^{n} \frac{2}{1 + \left( \frac{i}{n} \right)^2} \]  

(B level)

Problem 2 (5 points)

Find the derivative of \( g(x) = \int_{1-2x}^{1+2x} \sin(t) \, dt \).

(C level)

Problem 3 (5 points)

Use substitution to evaluate the indefinite integral.

(a) \( \int \frac{u}{\sqrt{1 - u^2}} \, du \)  

(B level)

(b) \( \int \frac{\cos(x)}{\sin^2(x)} \, dx \)  

(A level)

The quiz lasts 30 minutes.