

(23) Let $f(x) = \cos^{-1}(x)$ for $-1 \leq x \leq 1$ (the principal branch $0 \leq f \leq \pi$). Find the polynomial of degree two,

$$P(x) = a_0 + a_1x + a_2x^2$$

which minimizes $\int_{-1}^1 \frac{[f(x) - P(x)]^2}{\sqrt{1-x^2}} dx$