1 6.5: Substitution

Recall: Chain Rule for Derivatives: \( \frac{d}{dx}(f(g(x))) = \)

Therefore,

Problem: Recognizing when you have an integral of this form and what \( f \) and \( g \) are.

Solution: Substitute for \( g(x) \), your “inner function”

Examples:

\[ \int_0^2 \frac{dx}{(3x + 2)^2} \]

\[ \int \frac{e^x}{e^{2x} + 1} dx \]
\[ \int_0^{\pi/4} \cos^3(2y) \sin(2y) \, dy \]

\[ \int x^3 \sqrt{x^2 + 1} \, dx \]