

Objective: Use pattern recognition to evaluate an indefinite integral.

Find the indefinite integral of $\int (5x^2 + 1)^2 (10x) dx$ by trying to identify the pattern

$$\int f(g(x))g'(x) dx .$$

ANSWER:

Let $u = g(x) = 5x^2 + 1$ and $du = g'(x) = 10x dx$.

$$\int (5x^2 + 1)^2 (10x) dx = \int u du$$

$$= \frac{u^2}{2} + C$$

$$= \frac{(5x^2 + 1)^2}{2} + C$$