

u-Substitution Rule

p. 386 - 392 (5.5)

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$$\int (f(u)) du = F(u) + C, \text{ if } u = g(x) \Rightarrow du = g'(x).$$

1. Let u = inner function
2. Find du , solve for dx
3. Substitute u & du into the integrand
*** You may have to express x in terms of u to have the new integrand all in terms of u & du . ***
4. Integrate
5. Substitute the function back for u .

Evaluate:

**1. If $\frac{dy}{dx} = \cos(2x)$, then $y = \underline{\hspace{2cm}}$.

2. $\int \left[\left(9(x^2 + 3x + 5) \right)^8 (2x + 3) \right] dx$

3. $\int (\sin^2 3x \cos 3x) dx$

Class Notes

$$1. \int (x^2 \sqrt[5]{x^3 - 2}) dx$$

$$2. \int \frac{-5x}{(1 - 2x^2)^2} dx$$

$$3. \int 5\csc^2(3t) dt$$

$$4. \int \left(\sqrt{\frac{x}{9} - 1} \right) dx$$

$$5. \int \frac{1}{\cos^2 6x} dx$$