

## 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  $u$ .

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Evaluate:

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

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

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

Class Notes

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

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

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

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

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