

January 31

Without talking...
write down your prediction for the
super bowl?
(score, best commercial, etc.)



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Students will verbally explain how to
find the integral by substitution
(using the words:
inside, outside, product, differential...)



$$\int \frac{\ln(2x)}{x} dx$$

$$u = \ln(2x)$$

$$du = \frac{1}{2x} (2) dx$$

$$du = \frac{1}{x} dx$$

$$x du = dx$$

$$\int \frac{u}{x} (x du)$$

$$\int u du$$

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

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

$$\int \sec x dx$$

$$u = \sec x$$

$$du = \sec x \tan x dx$$

$$\frac{du}{\sec x \tan x} = dx$$

$$\int u \left(\frac{du}{\sec x \tan x} \right) \quad \int \sec x \left(\frac{du}{\sec x \tan x} \right) = \int \frac{du}{\tan x}$$

$$\int \sec x dx = \int \frac{\sec x}{1} \left(\frac{\sec x + \tan x}{\sec x + \tan x} \right) dx$$

$$\int \frac{\sec^2 x + \sec x \tan x}{\sec x + \tan x} dx$$

$$u = \sec x + \tan x$$

$$du = (\sec x \tan x + \sec^2 x) dx$$

$$\frac{du}{\sec x \tan x + \sec^2 x} = dx$$

$$\int \frac{\sec^2 x + \sec x \tan x}{u} \cdot \frac{du}{\sec x \tan x + \sec^2 x}$$

$$\int \frac{1}{u} \cdot du = \ln|u| + C$$

$$= \ln|\sec x + \tan x| + C$$

$$\int \csc x dx = -\ln|\cot x + \csc x| + C$$

How to
choose
"u"?

- the function whose derivative is the other function
- the most "inside" function
- the denominator
- $\ln()$ function
- exponent of a constant base