



SECTION 5.5 CONTINUED

U-Substitution with definite integrals

$$\int x(x^2 + 1)^3 dx$$

Indefinite integral
Solution is a family of
antiderivatives

$$\int_0^2 x(x^2 + 1)^3 dx$$

Definite integral
Solution is a number

Both can be solved using u-substitution



FIRST WAY...

$$\int_0^2 x(x^2 + 1)^3 dx$$



$$\int_0^2 x(x^2 + 1)^3 dx$$

$$u = x^2 + 1$$

$$\frac{1}{2} \int_{u(0)}^{u(2)} u^3 du$$

We could have left the integral in terms of u , but we would need to change the limits of integration.



ANOTHER EXAMPLE

$$\int_1^2 \frac{dx}{(3 - 5x)^2}$$



EVEN AND ODD FUNCTIONS

- Let f be continuous on the closed interval $[-a, a]$
- If f is an even function, then

$$\int_{-a}^a f(x)dx = 2\int_0^a f(x)dx$$

- If f is an odd function then

$$\int_{-a}^a f(x)dx = 0$$



EXAMPLES

$$\int_{-2}^2 (x^6 + 1) dx$$

$$\int_{-2}^2 \frac{\tan x}{1 + x^2 + x^4} dx$$

